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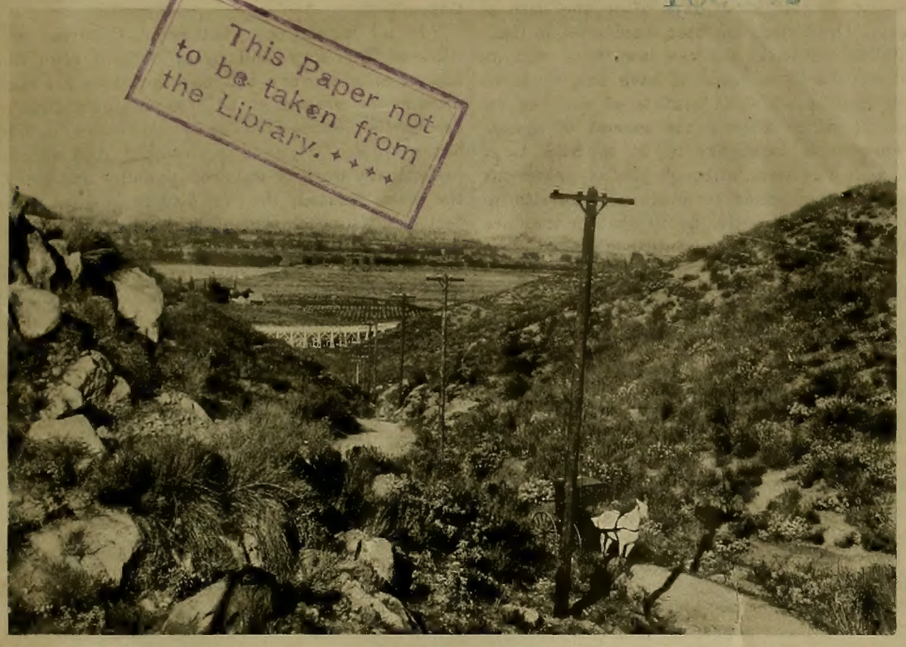

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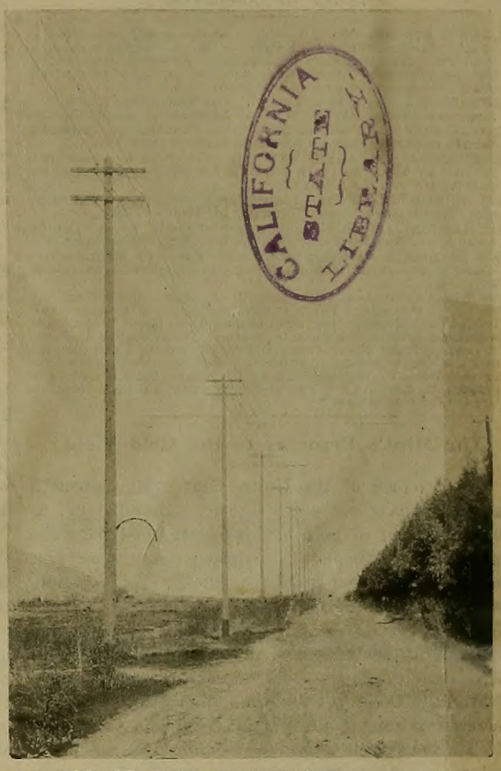

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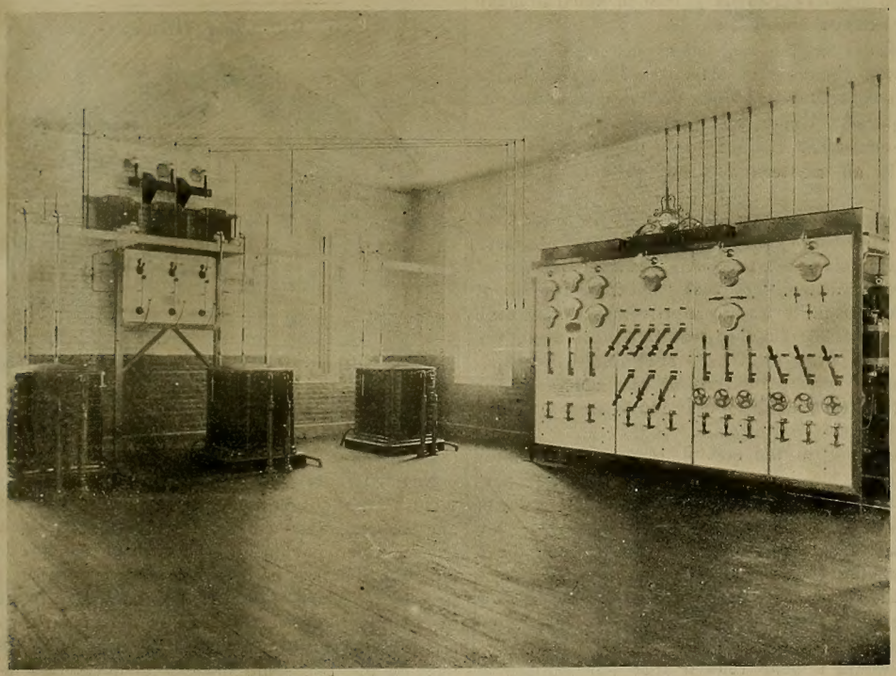
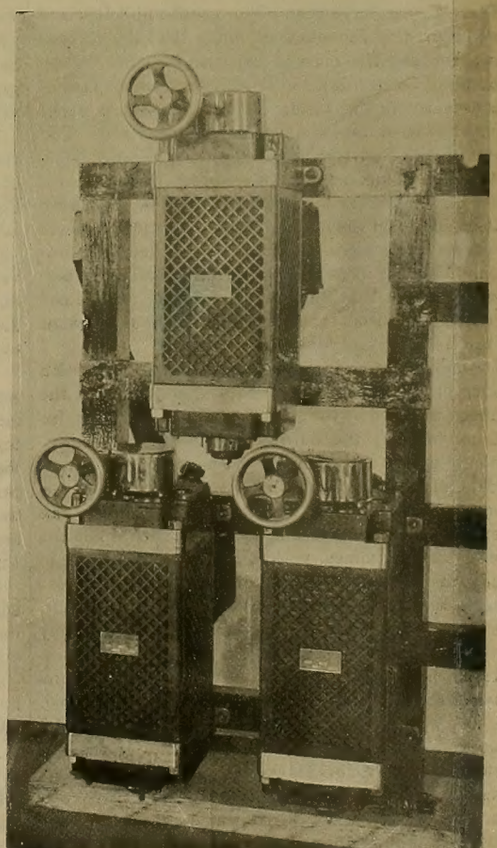


THE SUBSTATION SHOWING LIGHTNING ARRESTERS, HIGH POTENTIAL SWITCHBOARD, TRANSFORMERS AND THE DISTRIBUTING SWITCHBOARD. (See page 8.)



POTENTIAL REGULATORS IN SUBSTATION. (See page 8.)

African Gold Yield.

The output of gold from the mines of the Rand, in spite of the obstacles complained of, caused by the Boer Government, is increasing faster and has been since the beginning of the year than ever before. The returns for May show a yield of 248,305 ounces. In January the returns were 209,832, February 211,000, March 232,067 and April 235,699 ounces. The total for the first five months of 1897 was therefore 1,136,902 ounces, against 860,863 for the corresponding period of 1896. At this rate of increase the yield for the present year would reach 2,800,000 ounces, or $56,000,000. That this increase of yield has come about in spite of the desertion of Africa as a field for investment by the London investor and in the face of local troubles in the Rand says much.

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San Francisco, July 3, 1897.

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The Mint's Error as to the Gold Yield.

The Director of the United States Mint about a month ago gave out some figures, semi-officially, as to the product of gold in this country in 1896. The figures for California were without doubt incorrect, and will be changed when the official report is published; but in the meantime a great deal of harm is being done to California. The returns of the United States Mint for California, as sent in by the statistician to Washington, show a yield of gold for 1896 of $17,181,562.70; yet the semi-official announcement referred to gave the output of California in gold as $15,235,800, which is about one hundred thousand dollars less than the amount returned by the same authority for 1895.

These figures have been given great publicity, and it will remain in the minds of many that the figures last given are the correct returns for the bullion product of California; and it will show on the face of it a decrease in the yield. In this respect a great injury has been done that cannot be repaired. The worst of it is that these figures when given out, being in the way of fresh news, have been given a much wider circulation by the press than will be any later statements from the mint, or any corrections made by others. Newspapers published in other gold producing districts have been vigorously calling attention to the fact that the California gold yield is not increasing and that this State will soon lose prestige as the Golden State.

It would seem to those who are at all familiar with mining in California hardly necessary to say that the figures published by the mint director were wrong, for it is patent that the output of gold was increasing, not only by the reopening of old mines or new mines in old districts, but that there was a large increase from new districts, and in no part of the State has there been any considerable falling off or important closing down of mines, with the single exception of Calaveras county, where a fire closed the largest mine in the State for several months. As a result, the output of Calaveras county was considerably lower for 1896 than for 1895.

In Kern county a large increase was expected and returns show it to have amounted to about $350,000. So, too, with the opening up of mines in San Diego county; a large increase was expected. In the old districts of Nevada, Tuolumne, Mariposa, Trinity, Amador, Siskiyou and El Dorado counties there was increased activity, and there was a greater number of stamps falling and a larger output of ore, and it was expected that the returns would show a large increase in the bullion yield. It is from these counties that the increase comes.

Year by year the means of obtaining accurate information from the mines are increasing. If the Director of the United States Mint cannot take for his authority his own statistician and the State Mining Bureau, where could he get data that would be at all reliable from any other source? No authorities except the United States Mint and the State Mining Bureau gather these statistics. If these are not correct, or approximately so, there certainly are no other sources worth consideration.

Will the Assessment Clause Hold?

Considerable opposition is manifested toward that clause in the new law of California as to mining locations which requires that $50 worth of work must be done within sixty days after the date of discovery. Opposition has been manifested in Utah to a similar clause in the new law there, and an attempt will shortly be made to have this declared to be in conflict with the statute of the Federal Government, which refers to the amount of assessment work it is necessary to do to hold title. Strange as it may seem, although similar provisions have been incorporated in State and Territorial laws for years, the question as to whether they are in conflict with the Federal statute does not seem ever to have been brought up in a court for determination, except in the Supreme Court of this State in 1882, and then in reference to the older Federal statutes.

This was the case of the Original Company vs. the Winthrop Mining Company (60 Cal., p. 631). The local rules of the district required that work should be done every sixty days on the claim, while the old law of Congress required that $10 worth of work should be done each year for each 100 feet along the vein.

The attorneys for the appellant stated that "the Court below held that there is no conflict between these acts of Congress and the local rules and regulations then in force in the district where the mine is located. But these provisions plainly appear to us irreconcilable. That the acts of Congress are the paramount law is too plain for argument. Under the acts of Congress above cited appellants had until the first day of January, 1875, in which to make the first annual expenditure."

Attorneys for the respondent held that "under the acts of Congress of May 10, 1872, a compliance with the local laws and rules of the mining district are required. Under this provision the local law cannot contradict, but may add to the act of Congress in all matters not inconsistent with the act."

The Court in its opinion says: "We think that the Court erred in charging the jury that a locator of a mining claim must not only observe the law of Congress which requires that 'ten dollars worth of labor shall be performed or improvements made each year for each one hundred feet in length along the vein until a patent shall have been issued therefor,' but also the local regulations of the miners of the district, which require 'that work shall be done every sixty days on the claim.'

"According to the law of Congress, a locator would forfeit his claim if he did not each year perform work or make improvements of the value of ten dollars for each hundred feet of the vein. By the local regulations, he would forfeit it if he did not perform some work on it every sixty days. It seems to us that there is a clear conflict between the law and the regulations. And if there is, it is conceded that the law must prevail."

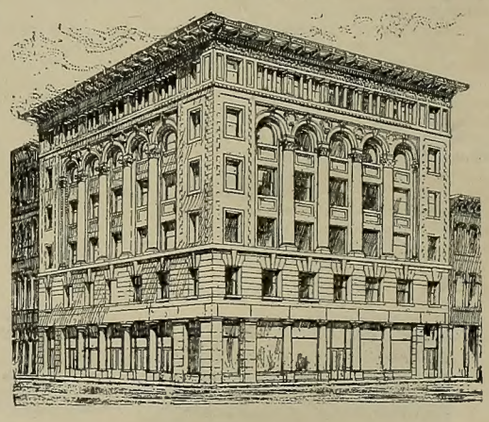
So it would appear that if this question should come before the Supreme Court of California again, unless it reversed this former ruling, the clause requiring fifty dollars worth of work to be done in sixty days after discovery would be declared to conflict with the Federal Statutes, and, as they are paramount, would have to give way.

However, the question will have to be finally decided, to affect the different States and Territories interested, by the Federal Courts. The United States Supreme Court has only inferentially recognized the right of local districts or State legislatures to make provisions for work on locations in addition to that required by the act of Congress. In the case of Erhardt vs. Boaro (113 U. S. Reports, p. 527) it would appear from the decision that the Supreme Court was inclined to admit the right of States or districts to require extra work.

Justice Field, who rendered the decision, says: "The statute of Colorado requires that the discoverer, before a certificate of location is filed for record, shall, in addition to posting the notice at the point of discovery, sink a shaft upon the lode to the depth of at least ten feet from the lowest part. Before this work could be done by the plaintiff the ground claimed was taken possession of by the defendants, the stake at the point of discovery, upon which the notice was posted, was removed, and Carroll was thereby and by threats of violence prevented from re-entering upon the premises and completing the work required to perfect the location. * * * *

"In all legislation, whether of Congress or of State or Territory, and by all mining regulations and rules, discovery and appropriation are recognized as the sources of title to mining claims, *and development, by working, as the condition of continued ownership, until a patent is obtained.* And whenever preliminary work is required to define and describe the claim located, the first discoverer must be protected in the possession of the claim until sufficient excavations and development can be made, so as to disclose whether a vein or deposit of such richness exists as to justify work to extract the metal." * * * "And the laws of the United States do not prescribe any time in which the excavations necessary to enable the locator to prepare and record a certificate shall be made. That is left to the legislature, which, as we have stated, prescribes sixty days for the excavations upon the vein from the date of discovery, and thirty days after for the preparation of the certificate and filing it for record. In the judgment of the Legislature of that State this was reasonable time." * * * "A mere posting of a notice on a ridge of rocks cropping out of the earth, or on other ground, that the poster has located thereon a mining claim, without any discovery or knowledge on his part of the existence of metal therein, or in its immediate vicinity, would be justly treated as a mere speculative proceeding, and would not in itself initiate any right."

Our New Office.



Nearly twenty years ago the MINING AND SCIENTIFIC PRESS outgrew its rooms, corner California and Sansome, and with its allied interests took the entire upper part of the block bounded by Front and Market streets. It has now outgrown the building it so long occupied, and this issue appears from our new offices, 330 Market street. We have leased for a term of years what we consider the best part of the handsome modern building just completed at the intersection of Battery, Bush and Market streets, No. 330 Market, an illustration of which appears above. The building is up-to-date in every particular, was built by the Clark estate, under the supervision of Mr. Edw. Swain, who was the architect, and that part of it occupied by the MINING AND SCIENTIFIC PRESS was built specially for the use of this paper. It is intended that, as in the past, this office shall be headquarters for mining information, and mining men resident or visiting the city are invited at any time to make use of its facilities.

Concentrates.

A LEDGE of onyx was discovered last week near Vollmer, Idaho.

THE plan to build a smelter at Vancouver, B. C., has fallen through.

THE gold yield of Victoria, Australia, during May amounted to 66,604 ounces.

THE Le Roi mine at Rossland, B. C., has increased its shipments to 180 tons a day.

THE Banner Mining Co. in the Florence district, Idaho, are to erect a 10-stamp mill.

PLATINUM to the value of about $17,000 was produced in New South Wales during 1896.

THERE are about 100 men in the revived Meadow Lake district in Nevada Co., Cal.

SPOKANE people have bonded the Queen Esther mine at Cheney, Wash., for $25,000.

LANE CITY is a new mining town established at the Chainman mines, near Ely, Nevada.

MINING PROPERTIES all over the coast are being opened up, in most cases, by their owners.

THE Anaconda Copper Mining Company of Montana turns out about 5000 tons of ore daily.

EASTERN people have begun negotiations for copper property on Michal creek in Washington.

A COPPER strike has been made in the Amazon district near Basin, Montana, in the Scioto mine.

A RECENT cleanup at the Cariboo hydraulic mine, in British Columbia, yielded gold valued at $71,414.

THE monthly payroll of the Mountain Copper Company at Keswick, Shasta county, Cal., is about $40,000.

THE Comet, a prospect at Gold Creek, Nevada, has been bonded by T. A. Bennett and others for $22,000.

E. C. MITCHELL is about to erect a 10-stamp mill at the South Fork mine, at Graniteville, Nevada Co., Cal.

THE steamship City of Topeka is down from Alaska with $70,000 in bullion from the Alaska-Treadwell Mining Co.

THE Minnehaha mine, in the Randsburg, Cal., district, has been bonded by J. W. Rogers and F. N. Hubbell for $15,000.

THERE was exported from New York, in the week ending April 8, to Europe 1,840,000 ounces of silver valued at $1,140,800.

THE tailings at the old mill at the Chainman mine, in White Pine district, Nevada, are to be worked by the cyanide process.

FOUR PUMPS have been manufactured and will be set up immediately at Leadville to drain the down-town mining district.

THE Boston & Montana Consolidated Copper and Silver Mining Company's mines in Montana produce about 1200 tons a day.

IT is reported that placers have been found two miles north of Randsburg, Cal., which are as rich as those at Goler.

THE Montana Smelting and Refining Company is going ahead with the erection of its plant at Twin Bridges, Montana.

IT is estimated that there have been 15,000 mining locations recorded in Josephine county, Oregon, since the first one was made in 1863.

NEGOTIATIONS are on foot in London to transfer the Golden Cache free milling gold mines in the Lillooet district, B. C., for $3,000,000.

THE statement of the Parrott Company at Butte, Montana, shows net profits for the year 1896 of $412,377.66 from their copper properties.

HYDRAULIC WORK has begun at Gold Creek, Nev., under the direction of C. H. Cook. The Empire mine there has been bonded for $25,000.

A NEW discovery of coal deposits, said to be of good quality and extensive, has been made in the western part of Box Elder county, Utah.

THE Exchange group of mines on Springer creek in the Slocan district, B. C., has been bonded by Sir Chas Tupper of Ottawa for $42,000.

THE mill at the Fortuna mine in Arizona, with twenty stamps weighing 1350 pounds each, crushes eighty tons daily, or four tons per stamp.

THE Anglo-Mexican reports that the output for the month of May amounts to: Bullion, $81,700; concentrates, $1300; 1780 tons, 29 days' run.

ACCORDING to the Spokane *Spokesman-Review*, the owners of Reco mine of the Slocan, B C., have sixteen cars of ore in transit which will average $3500 a car.

F. AUG. HEINZE's application to the Canadian Government for a subsidy of $8000 a mile on a railroad from the Columbia river to Pendleton will stand over for a year.

THE mineral export of Tasmania for May was valued at £73,171, and dividends were declared amounting to £13,485, and a total for the first five months of 1897 of £55,946.

FOR the convenience of our readers, the index to the contents of the six months' issue of this paper, from January to June, 1897, inclusive, appears on pages 10 and 11 of this issue.

LARGE powers have been granted to the Yukon Chartered Company of England to explore in what is known as the Cassiar concession, and the advance party has started for the fields.

IN the hanging wall of the Daisy mine at Mercur, Utah, there is about 18 inches of a fine quality of fireclay, some of which is being used in the assay offices to manufacture crucibles.

THE Grand Central of Mexico reports for May: Thirty stamps ran 28 days, crushing 4500 tons; bullion shipped, £7000; concentrates estimated to be £3800; expenses, £6000; profit, £4800.

UP to May 22 the dividends declared by South African mines this year amounted to £358,939 on a total capital of £1,379,594, or over 26 per cent. However, this came from only thirteen mines.

THE Little Sunflower reservoir at Gold Creek, Nevada, contains about 300 million gallons of water and hydraulicking has been commenced. When filled the reservoir will hold 820 million gallons.

IN the Senate last Tuesday by a vote of thirty to twenty-three the committee tariff rates of 1⅛ cents per pound on lead in ore was agreed to. The duty on pig lead is increased from 2 to 2¼ cents per pound.

THE exports of ore from the Kootenays for the week ending June 19 was 1,145 tons; the total so far for 1897 is 26,986 tons. The value of the output of ore and bullion and matte up to that date is given at $3,339,723.

DURING the last two years nearly 100 new papers have been started up, and in some cases old papers have been revived. Of the latter, the most notable is the resuscitation of the *Times-Review* at Tuscarora, Nev.

THE gold output of the Indian mines for May was 32,099 ounces, an increase of 674 ounces as compared with the preceding month, and an increase of 5259 ounces as compared with the corresponding month of 1896.

A NEW strike has been made in the Stonewall mine near Julian, San Diego county, opened and worked by the late Governor Waterman. The mine has been idle for a number of years since the ore bodies pinched out.

LAST week's ore shipments from Rossland, B. C., were: Le Roi, 900 tons; War Eagle, 250; Iron Mask, 80; Columbia and Kootenay, 200; Josie, 95; Cliff, 40. Total, 1455 tons. The I. X. L. milled in the O. K. mill 105 tons.

THE oil producers at Los Angeles have been holding oil up to $1 a barrel, but now the increased production, it is claimed, will increase the reserves largely or force down the price. The local demand takes 2000 barrels daily.

THE Mount Lyell mine of Tasmania reports for the last half year having worked 34,089 tons of ore and produced 1283 tons of copper matte valued at £84,853. When the additional works are completed, it is expected to treat 500 tons daily.

AN effort is to be made in London to raise funds to build a railroad between Bute inlet, near the north coast of British Columbia, to the village of Quesnelle, Cariboo, a distance of 230 miles. It would be of value to a rich gravel mining country.

THE cost of shipping nine tons of mining material from San Francisco to the Rand, South Africa, lately was about $1000, the Cape charges being eight times as great and the Netherlands railroad, twenty-seven times as great as the American per mile.

THE export of gold from British Guiana from January 1 to May 24, this year, has amounted to $736,522, as against $665,806 for the corresponding period of 1896. The weekly yield, however, would indicate an output for the year much larger than last.

IN Meadow Lake district, Nevada county, Cal., nearly all the mines are bonded to the syndicate which is building the road for transporting the rebellious ores. Although nearly all the known ledges have been taken up many prospectors are going in.

THE Alaska-Mexican reports for May as follows: Period since last return, 31 days; bullion shipment, $33,380; ore milled, 14,369 tons; sulphurets treated, 289 tons; of bullion there came from sulphurets $9593; working expenses for period, $17,901.

THE Salt Lake *Tribune* is unearthing and exposing a number of mining swindles being perpetrated in the East with worthless Utah mines. The old game of giving names similar to well known mines, or locating their wildcats near big properties is the most common in use.

THE Superior Court of Butte Co., Cal., has refused to grant Goodall, Perkins and others an injunction restraining the Golden Feather Co. from making use of the dams and flumes for turning the waters of the Feather river at Morris ravine. The case will now go on to trial.

THE De Lamar of Idaho reports for May: Crushed during the month, 4660 tons; bullion produced in the mill, $44,680; estimated value of ore shipped to smelters, $400; miscellaneous revenue, $155; total produce, $45,235; total expenses, $34,430; profit for the month, $10,805.

NEGOTIATIONS are pending for the transfer to the Scottish Colonial Gold Fields, Limited, of Edinburgh of the properties of the Adams Mining Co., the Cumberland Mining Co., the Slocan Mill Co., the Slocan Tramway Co. and the Idaho mines in British Columbia for about $400,000.

THE Arizona Legislature at its last session passed a bill exempting from taxation for five years new railroads. As one result it is proposed to build a road from Kingman or Hancock into the White Hills in Mohave county. This would enable a number of low-grade gold mines to be worked.

IN the Gregory-Bobtail mine in Gilpin county, Col., a strike of rich ore has been made by the Gold Coin Company, which holds it under a bond and lease. This mine was discovered in 1859 and has been worked ever since and has produced several millions, although of late but little has been taken out.

THE output of copper in the United States for the first five months of 1897 has amounted to about 90,000 tons and is an increase of a little more than 3000 tons over that of the corresponding period of 1896. European demand has taken more than usual and the home consumption has remained about stationary.

THE Bon Accord Placer Mining Company, operating near Bannack, Montana, have proved the feasibility of working gravel with a dredger last season, and now are about to erect a dredge having the capacity to handle 5000 to 6000 cubic yards of gravel every twenty-four hours, to work on Grasshopper creek.

A MORTGAGE for $250,000 bonds has been executed by the Arizona Onyx Company of New Jersey to the Continental Trust Company of New York, covering the Big Bug onyx mines in Maricopa county, Arizona, recently purchased by the mortgagors for $50,000. This step is to secure a large working capital.

THE Alaska-Treadwell reports for June 23,596 tons ore worked, averaging $2.84 per ton. There were also 372 tons sulphurets treated, of the value of $21,166. The total bullion product for the month was $67,043. The expenses were $28,981. In May the ore averaged $2 per ton, and the total bullion product was about $41,000.

AT Brown's valley, Yuba county, Cal., 2000 inches of water taken from the Yuba river by the irrigation district authorities have been leased for fifty years by the Dannebroge Mining Company, and they are now putting in an electric light and power plant to supply their 20-stamp mill and mine and other properties in the neighborhood.

THE Montana (Drum Lummon) of Montana manager reports that the 50-stamp mill, which resumed operations on May 1, crushed during that month 3500 tons of ore, which contained gold 1720 ounces, and silver 12,730 ounces, valued at $40,800. Working expenses on revenue account, $26,800; outlay on developments, $5400; sundry, $300; total, $32,500; estimated net result, $8300.

IN the *Pall Mall Gazette* of London lately it was stated that "a syndicate of British investors will within a few weeks purchase half a dozen gold mines in Cripple Creek, Col., and two lines of railroad connecting the mines with the nearest trunk roads, thus giving it control of the shipping facilities to the East. The railroads are the Colorado Midland and the Midland Terminal."

TWO MEN charged with kidnaping Captain William Meikle, superintendent of the Niagara mine in Sierra county, Cal., last December, because he was employing Chinese, were last week found guilty of false imprisonment and one sentenced to one year and the other to six months imprisonment in the county jail. Another defendant, who has been confined in jail for six months, was acquitted.

THE Geldenhuis Estate, on the Rand, South Africa, which made a profit for the year ending March 31 of £70,123, reports that the 120-stamp mill crushed 189,598 tons of ore. The cost per ton for the year, including development work and all expenses, was $4.29, against $4.40 for the previous year. The cost of cyaniding 127,000 tons was 70.2 cents per ton, against 83 cents per ton for the previous year.

LATELY a shipment of ten tons of ore was made from the San Juan country in Colorado valued at 40 cents per pound, or about $800 a ton. In referring to this the Cripple Creek *Mail* says that shipments of more than ten tons of even more valuable ore have been made from the Doctor, Elkton, Smuggler, Victor, Portland, Independence, Pike's Peak, Garfield-Grouse, Moose and Eclipse mines of Cripple Creek.

GOLD mines in Servia were largely worked in Roman times and in the middle ages, but during the long Turkish oppression mining operations ceased. The richest source of gold known to the Romans was on the river Timok. Only alluvial deposits were then worked, but traces of systematic mining are visible, dating from the sixteen years of Austrian occupation in the last century. They are now being reopened.

THE Lillooet, Fraser River and Cariboo Company reports for the Lanark mine in British Columbia for May: Concentrator has been running continuously for twenty-five days, 3122 tons treated; have shipped 430 tons of concentrates. Six days' delay caused by a breakage to the pumps and landslide. Estimated profit $35 per ton (say, total net profits for month of May, $15,050. Estimated profit for the month of June, $20,000, can be increased to $30,000 subsequently.

FIFTY producing mines in April made up the total output of the Rand, South Africa. These crushed with a total of 3412 stamps working on an average nearly twenty-eight days. Of these the 907 stamps at thirteen properties in the Association of Mines crushed on an average 4.73 tons per stamp per day. The thirty-seven mills in the Chamber of Mines with 2505 stamps crushed an average of 4.45 tons per stamp per day. The twenty stamps in the Langlaate estate will made an average of 6.41 tons per stamp per day.

DEEDS have been filed transferring some thirty claims owned in San Diego county, Cal., by the Golden Cross Mining and Milling Company, to a syndicate of Salt Lake and California capitalists, for a consideration named of $1,000,000. For some time, under the management of the receiver, W. W. Stewart, these mines have been paying a profit of some $30,000 a month. There are 150 stamps on the property, and it is stated by the management that a large cyanide plant will probably be erected soon to work the tailings.

OF the loss of copper by drainage from the Bingham, Utah, copper mine, the *Bulletin* of that place says: "One of the copper springs runs a little over one miner's inch of water, or about 100 pounds, per minute, carrying one-fourth of 1 per cent copper, and each minute four ounces of copper runs to waste from this one spring alone. In all probability the stream was running at the dawn of the Christian era—say, 1900 years ago—and by computation we find that during this period 268,831,000 pounds of the red metal have gone to waste—enough to make a belt for the world 8 inches broad by one-sixteenth thick, and have over 4,000,000 pounds left for buckles and bangles."

AN Englishman writing from London to a correspondent says: "If any one had during the first days of the depression in Africans and Australians come over with good California properties, he could easily have placed them on a reasonable basis. But now I have changed my opinion as to where the property should be located, and have seriously changed my estimate of the California mine owners' aptitude for business. Thirsting for capital, they no sooner see it approach than they drive it away by asking several times more than they had intended. Get an option on a well-opened mine in Kootenay, with good reports, and you have something you can sell our friends. British capital is very much inclined to follow the British flag, and always will."

HENNEN JENNINGS in his evidence before the mines commission in South Africa compared the cost of working the El Callao mine in Venezuela with those of Africa. At first it was worked by utterly inexperienced people, but later in its history there were thirty-one companies running 758 stamps. Now the lode is practically worked out, only ten stamps running on the fields. The gross yield from the mine has amounted to £5,457,432, while the dividends have only amounted to £1,940,478, in spite of the great richness of the ore. This paucity of return must be attributed to the high costs, which during the first thirteen years were 149s 2d per ton, and have averaged 58s 8d during the period of the lode—the lowest level being reached in 1891, when the figure was 39s 9d.

THE Comstock Tunnel Company (Sutro tunnel) has failed to take action on the proposition submitted to it by the directors of the American Flat Development Company, and the claim owners all along the line of the proposed tunnel extension, from the Alta to the Rock Island, have generally declined to accept the terms proposed by the Development Company. On this subject the *Enterprise* says: "Notwithstanding all this, the proposition has by no means been abandoned, and the directors of the company are as enthusiastic of success as ever. They say the mines of the American Flat will be drained in the course of a few years. The plan of the tunnel extension from the Alta to Rock Island has not been abandoned, but other plans are now under consideration, one of which is a tunnel from the river at Dayton through Silver City into the American Flat country, and still another is to run a tunnel from the Dayton mine at Silver City to the Rock Island shaft."

Assaying of Gold and Silver.

By JACOB B. ECKFELDT, Assayer of the United States Mint at Philadelphia, Pa.

Assay of Gold.—Gold received at the mint for refining or coinage, either in the manufactured or native condition, is of every variety of fineness, the alloy in a majority of cases being silver, with a smaller proportion of base metal.

In some cases of low-grade gold the alloy is largely composed of copper. The object of the assay is to ascertain these different proportions, both in order to base the calculations for value and for subsequent minting operations. For this purpose a small sample is cut from each bar after melting. The fineness of this sample must, if the melting has been properly conducted, be the fineness of the gross amount.

The fineness of gold being expressed in thousandths (pure gold being 1000), it has been found expedient in assaying to employ the French system of weights, using the demigramme as a unit of 1000 parts with the decimal divisions to the ten-thousandth of that weight.

The demigramme is rather less than 8 grains. From the sample, after it has been laminated for convenience in chipping, there is accurately weighed 1 demigramme on the assay balance.

This assay balance is so constructed as to be of the utmost precision and delicacy, and so fine is the adjustment that it is sensitive to the fiftieth of a milligramme.

To the gold, after being accurately weighed, there is added sufficient fine silver to make about twice (according to one system) or thrice (according to another method, now less used) the estimated amount of silver which may be contained in the alloy, extreme care being necessary that the amount of silver added varies as little as possible from this proportion, as in any marked divergence the result would be liable to inaccuracy. Practice enables an expert to judge of the fineness of gold within a few thousandths, thus securing the proper basis for the addition of silver. It is needless to say that the added silver is accurately weighed.

If the gold for assay is of low fineness, or contains a large amount of base metal, where it is impossible to estimate the quality, it is customary to make a preliminary or approximate assay as a basis or guide for a subsequent rigid assay.

The gold and silver, each having been weighed, are inclosed in a piece of lead foil about ten times the weight of the assay. A very little copper is added, merely to assist the cupellation. These are now ready for what may be termed the first part of the operation, that of removing the copper and other base metal. This is effected by the cupelling process.

The cupel is a small, shallow cup made from the ash of bones or the pith of animal horns. It possesses the quality of absorbing the oxides of the metals, but not the metals themselves.

The bone or pith is first well burned in open air and thoroughly ground, after which it is moistened with water and pressed in a mold to the desired shape.

The assay furnace is oval in cross section, about 1 foot in height, made of fire brick. Extending across the furnace about the center is what is known as the "bridge" (that is also made of fire brick), and is designed to support the muffle. The muffle is the oven for the reception of the cupels. It is flat-bottomed, with an arched top, its length nearly corresponding to the depth of the furnace. The modern furnace is arranged for burning gas; the flame completely surrounding the muffle subjects it to a high heat, easily controlled and regulated.

The front of the furnace has an arched opening corresponding to the muffle; through this opening the cupels are introduced by a long pair of spring tongs. When in operation the muffle is nearly closed by a door, allowing, however, the entrance of a regulated current of air, which, passing over the assay, oxidizes the lead and base metals, their oxides being absorbed by the cupel.

At the back of the muffle is a slit or opening, which allows the exit of the unabsorbed fumes formed by the oxides of the metals, which are not absorbed by the cupel.

The furnace having been properly heated, the cupels are placed therein and brought to a uniform temperature of which the assayer must judge from experience. Each leaden bullet with its contents is then placed in its cupel, and the furnace closed. The lead in which the gold and silver has been inclosed is rapidly changed to a fluid vitreous oxide, which, exerting an oxidizing effect upon the base metals in the gold, causes their absorption into the pores of the cupel.

The lead likewise helps to form a more uniform alloy of the gold and silver.

The precious metal is allowed to remain in the cupel until all agitation ceases; it then presents a bright surface, which indicates that the base metals have been oxidized and absorbed.

The cupel is now allowed to cool gradually, and the button of pure gold and silver detached. The next step in the operation is the extraction of the silver, which is effected by digesting the rolled-out button in nitric acid.

The object of the addition of fine silver previous to the cupellation is to make an alloy, in which the particles of gold will be so far separated from each other that they may not protect any part of the silver from free action of the acid. A total extraction of the silver, both that which has been added and that which was originally in the alloy, is thus insured, within the limit hereafter described.

The button is hammered, annealed, and rolled to a thin strip, to furnish a larger surface for the action of the acid. This strip is loosely coiled into a small roll, technically termed a cornet.

The cornet is now ready for the process of separating the silver. If three parts of silver have been added in making up the assay, the action of the acid has to be conducted more slowly (to lessen the danger of breaking the cornet) than when but two parts of silver have been used; consequently, a weaker acid is employed.

The cornet is introduced into a small vessel or flask, containing 1¼ fluid ounces of nitric acid at 22° of Baume's hydrometer; heat is then applied, either by a sand bath or gas jet, and the acid boiled for ten minutes.

The resulting solution, which contains nitrate of silver, is poured off, and three-fourths of an ounce of stronger acid, at 32° Baume, is substituted. This is boiled for ten minutes, after which the operation is again repeated with acid at 32°.

When the boiling or digestion is completed, it is presumed that the whole of the silver has been removed. The acid is accordingly poured off, and the cornet well washed with pure water. It is then deposited in a small clay crucible, which is placed in the muffle, that the gold may be dried and annealed.

The cornet (which is now fine gold) is brought to the assay balance and its weight ascertained in thousandths of a demigramme. The number of thousandths which it weighs expresses the fineness of the original sample in thousandths.

If but two parts of silver have been used in preparing the assay, the cornet is introduced into the flask containing 1 ounce of nitric acid at 32° Baume's hydrometer. This acid is boiled for ten minutes, when it is poured off and replaced by another equal charge of acid of the same strength, in which the gold is again boiled the same length of time. After the second boiling has been completed, the cornet is washed, dried, annealed, and weighed, as in the preceding case.

By subjecting another demigramme of the alloy to the cupellation process, without adding any silver, the base metal alone is removed. The loss gives the proportion of base metal, and, the fineness in gold being known, the amount of silver is ascertained by difference. It must equal 1000, less the sum of gold and base metal.

It is customary with every assay or set of assays to make one or more of pure gold, as a test assay or proof of the work, to detect any possible inaccuracy from overheating, too prolonged boiling, and particularly to afford the necessary correction for "surcharge," which will be explained at the close.

With every set of assays for the determination of base metal there is also a proof assay made. For this purpose gold of a standard fineness is used when the assays are of native gold, or in other cases when the proportion of alloy is not very large. A special proof, however, is made for every such assay. The proof, by calculation from the approximate assay, is so composed that when melted it will make an alloy similar to the sample for assay. Its exact proportion of base metal being thus known, any deviation from this proportion shown by cupellation becomes apparent. By this deviation the necessary correction is made upon the result of the regular assay. In an assay of gold containing platinum, as in dentist plate, the amount of silver in the alloy cannot be accurately determined by the cupellation process, for the reason that the platinum, being a nonoxidizable metal, it is not absorbed by the cupel, but is returned in the button as precious metal.

(*To be Continued.*)

Lead Poisoning.

Dr. Wegener of Clausthal has published in the German Quarterly Review of Public Health an important memoir on lead poisoning. Lead miners are in no way liable to lead poisoning. The danger only occurs when the ores are smelted. It then results entirely from the formation of lead dust and of volatile lead fumes. In order to obviate the danger it is, therefore, necessary to prevent lead fumes from being formed, or to conduct them away as rapidly as possible. It is satisfactory to note that much has been done of late years to improve the sanitary condition of lead works, the result being that there has been a notable decrease in lead poisoning. This is well shown by the following statistics collected at the Tarnowitz Lead Works:

		All illnesses.		*Lead poisoning.*	
Year.	*Workmen.*	*No.*	*Per 100 men.*	*No.*	*Per 100 men.*
1888	614	386	62.9	252	41.0
1889	616	249	40 4	122	19.8
1890	622	226	36.3	104	16.7
1891	636	152	23.9	48	7.5
1892	579	131	22.6	36	6.2

The Waterloo Mining Case.

Written for the MINING AND SCIENTIFIC PRESS.

The Calico Mines of San Bernardino county, Cal., after various vicissitudes, passed mainly into the hands of two separate ownerships—on the one side by T. S. Doe of San Francisco, and on the other the Waterloo Mining Co. of Milwaukee.

When the claims of these separate ownership adjoined arose a number of conflicting interests, which resulted in long and expensive litigation. The most important of these suits, so far as the miner is concerned, was the conflict between the Silver King mine, owned by the Waterloo Co., and the Oriental No. 2, owned by Mr. Doe. This suit had its inception in a contract between the prior owners of the Oriental No. 2 ground and the prior owners of the Silver King mine, by which the Silver King owners were given the right of way to run a tunnel through the Oriental ground to reach their own mine, on certain conditions. At this time the miners of the district considered the ore deposits as merely superficial, and gave but little thought to any extra lateral rights which they might have. In the subsequent developments, however, of the Silver King mine the ore was followed to considerable depth and beyond the side line and into the Oriental No. 2 ground. After about $300,000 or $400,000 had been extracted from the Oriental No. 2 ground, Mr. Doe brought suit in the Superior Court of San Bernardino county for the value of the ore extracted from that ground. This brought up the question of the extra lateral right of the Silver King mine. The Silver King owners came into court with elaborate plans and models to try to prove that they had on the Silver King ground a lode on similar lines as was contended in the celebrated Eureka case. That this lode had a well-defined hanging and footwall, and that the ore which they had extracted was within these boundaries, and had been followed down continuously from their croppings, the counsel for Mr. Doe denied their right to justify. They contended that whether they had a vein or lode, or not, they had no right to trespass upon the ground of another because the end lines of their claim were not parallel. At this time the Silver King was not patented and their title rested upon their original location, which had widely divergent end lines. The Court took the view of counsel for Mr. Doe, and the jury were instructed to award the extent of damages.

An appeal was taken from this decision to the Supreme Court of the State, where the ruling of the lower court was reversed and the case sent back for re-trial on its merits.

Pending this decision the Silver King owners, about 1000 feet westerly from the original points of contention, again trespassed upon and extracted ore from the claims owned by Mr. Doe, who stopped them by a temporary injunction issued by the U. S. Circuit Court of Southern California. The testimony in this case was taken before an examiner of the court, which permitted all the testimony bearing on the merits of the case to be heard. Practically the same points were involved as in the original suit, with the exception that in the meantime the Silver King owners had obtained a United States patent, or Land Office receipt for patent, showing parallel end lines for the greater portion of their original location.

The experts for the Silver King owners, following the lines of the Eureka case, contended that the ore deposits of the Silver King were within a lode having well-defined hanging and footwall boundaries; that the whole mass of rock between these boundaries should be regarded as a lode within which ore might be anywhere found.

The experts for Mr. Doe proved that the ore was found only along the planes of three distinct and independent fissures, constituting three independent veins. The apex of one of these veins, and that from which the ore in dispute had been extracted, was within the surface boundaries of the Oriental No. 2 ground.

The main points therefore which were brought before the Court for decision were:

First—To what extent the non-parallelism of the end lines of the original location would affect the extra lateral rights; and

Second—Whether the ore deposits constituted an indivisible unity, or were several independent and distinct units.

As to the non-parallelism of the end lines, the Court finds that a patent having been issued showing parallel end lines, the presumption is that the Land Office was right in issuing it, as no attack is made on the patent.

It is believed that this ruling opens or leaves open a very wide field of uncertainty as to subsequent and adjoining locators to a faulty location, and that a more radical decision would in the end be of far greater justice to the miner. Space, however, does not permit of a discussion of this subject at this time.

After a careful consideration and thorough knowledge of the facts, it is not seen how the decision could be otherwise as to the constitution of the ore deposit. The question was stubbornly fought by able experts on both sides.

West Australian Gold Mining.

The principal features of the gold fields of Western Australia may be briefly summarized as follows:

1. Vast Extent.—The area of the proclaimed gold fields is over 300,000 square miles, and there are still unexplored enormous tracts into which prospectors have not yet penetrated. The total area of the colony is close on 1,000,000 square miles, and it may be assumed that throughout its whole extent it contains auriferous deposits of more or less value.

2. Barren Nature of the Country.—The greater part of the gold fields consist of a desert, fresh water on the surface being almost unknown, and where water is found it is of a densely saline character. All water for drinking purposes requires to be condensed, and it has only been found possible to penetrate into the country by the establishment of condensers at various points. The exploration and prospecting of the country has, to a great extent, been conducted by the use of camels. Experience has shown, however, that there is a considerable rainfall which can be conserved, also that there are subterranean watercourses and reservoirs throughout the fields.

3. Rapidity of Development.—It seems almost incredible that, in the short space of about three years, 300,000 square miles of gold fields have been opened up, many important towns built in the desert, hundreds of miles of railways built, and numerous stamp batteries erected, some of them in the most distant parts of the interior. It has not been unusual to pay from £60 to £75 per ton for the transport of machinery and stores from the railway terminus to the mines. Labor charges have also been excessive, and this has rendered mining operations most costly. In spite of these difficulties, the returns of the West Australian Chamber of Mines for the month of April last show that 14,452 tons of ore were crushed, yielding 31,957 ounces of gold, equal to an average of nearly 2¼ ounces per ton. Undoubtedly this result bears eloquent testimony to the enterprise and activity of those who have had charge of the development of the mines.

4. Character of the Gold Deposits.—The reefs are of two distinct kinds—(1) quartz veins and (2) composite veins, known in Western Australia as "lode formations." The quartz veins have similar characteristics to those of other countries, but are of exceptional richness, and certainly exceed all previous experience. The gold generally occurs, as elsewhere, in chutes, which vary very much in length and thickness, and the value of any mine working on these veins depends entirely upon the length and thickness of the payable chute. A remarkable feature of these gold fields has been the extraordinarily rich patches of almost solid gold that have been found in detached masses in mines like the Londonderry, Bayley's Reward and others; but a still more remarkable feature is the high average value of many of the reefs over long distances and for great widths. This high average value is not confined to any particular center, but is found throughout the gold fields.

The composite veins of Western Australia appear to be as peculiar to that colony as the gold-bearing conglomerate beds of Johannesburg are to the Transvaal. They chiefly occur in the diorite or diabase, but are not unknown in the granite. No scientific study has been made of these formations up to the present, and they have hardly been explored below the zone of decomposed diorite in which they consist of a light-brown rock of a clayey and talcose character, intersected in all directions by veins of quartz of varying thickness. So far as is known, the more numerous the quartz veins the richer the formation in gold. The transition between these formations and the country rock on each side is often not well defined. Information is wanting as to the behavior of these formations below the decomposed zone. So far as is known at present, they become hard like the enclosing diorite, and contain iron sulphides and tellurium ores, and are equally as rich in gold as in the decomposed zone. Sufficient time has not yet elapsed for the mining companies to sink their shafts into the undecomposed rock, and results will be watched with much interest. These "lode formations" are of great size, are persistent over large areas and their gold contents are, as a rule, very regular, varying in different formations from half an ounce up to many ounces per ton. Extraordinary results have already been obtained from these formations, not from a few tons of ore, but from large quantities and continuous crushings. For instance:

	Tons crushed.	*Gold recovered.*	*Yield per ton. Ozs.*	*dwts*
Great Boulder Proprietary Co.....	21,020	82 612	3	18.60
Lake View Consols.....	11,037	31,173	2	16.11
Hannan's Brownhill Gold M. Co..	2,048	18,424	6	5.00

These results, it must be remembered, have been obtained in the face of the great difficulties already pointed out, with inefficient and inadequate machinery, and by the use of the extremely dense salt water which is alone available. In many cases from one ounce to two ounces of gold is left in the tailings—equal to two or three times the amount contained in the original ore of some of the richest mines of other countries. There seems little doubt that, when sufficient time has been given to allow of the industry being organized, and machinery placed on these formations, a production of gold will take place which will eclipse that from any other part of the world.

5. Machinery and Methods of Ore Treatment.—The specially difficult conditions under which West Australian mining presented itself at the beginning has resulted in a diversity of practice among engineers with regard to machinery and ore treatment, and great attention has been given to dry treatment. The author's opinion is that, so far as the treatment of the ore from quartz veins is concerned, wet crushing and plate amalgamation is the most economical, where sufficient water can be obtained for the process; but for the "lode formation," in which the gold occurs in an extremely finely divided condition, and which also contain a quantity of clayey and talcose material (forming slime), dry crushing is preferable. He suggests that the ore should, as it comes from the mine, be dried, and in some cases partially calcined in revolving dryers. It should then be crushed dry, and the pulp divided into two products by air winnowing, viz.: (1) A product easily percolable. (2) A very fine product or slime. These are then treated by cyanide or bromo-cyanide solution, extracting all the fine gold, and the tailings dealt with by some form of amalgamation. It will be seen that this is a complete reversal of the ordinary method of treatment, and from the author's experience will give better results.

6. Occurrence of Tellurides.—A considerable amount of interest has been aroused by the fact that ores of tellurium have been found in the "lode formations," and as these ores generally occur in formations rich in gold, it has been rather hastily concluded that their value is mainly dependent on the presence of telluride of gold, whereas there is no doubt that many of the "lode formations" in which no tellurium has been detected are as rich, if not richer, than those containing that metal. A considerable amount of the gold occurring with some of the tellurium ores is in a free state, and, as tellurium itself is unattacked by cyanide of potassium, there would seem to be little difficulty in extracting the gold by that means. It is possible that in some cases gold may occur in the form of a telluride of gold, and, if so, it would have to be kept apart for treatment of smelters.—C. E. Moreing's paper read before the London Institute of Civil Engineers.

Destiny of Mining Investment.

The recent past experience of the mining industry has introduced into financial and other circles a subject of discussion of great interest to mining investors and speculators—indeed, to all who are connected with this great industry either closely or remotely. It is whether mining investment will gradually decline until it reaches, in a few years, the vanishing point, or whether, on the other hand, it will more and more attract the capitalist class, to the detriment of other phases of industry. Now, this is seemingly a difficult question to answer, but it would not be audacious to predict, with some feelings of assurance, the future course of public investment. The probabilities are highly promising that the mining industry will increase in favor as the years roll on, as new gold fields are opened up, and as scientific methods are modified and improved upon. But we must always expect to see ebbs and flows. The stream of investment will never flow uninterruptedly and in increasing volume.

But, in forecasting the future, a most important and vital circumstance must be taken into full consideration. The many evils from which the industry suffered in the past have been greatly diminished, and will become fewer as the years advance. Consequently dangers will be lessened, and investment will not be so risky an enterprise as of old. It is safe to say, therefore, if the public will fully grasp this fact, that, far from allowing their favors to be diverted elsewhere, their affection for the industry will become stronger, and thus mining, instead of declining, will become more and more the favorite medium of investment. Science is advancing. That is the great hopeful, assuring fact. Where in the past profitable working was impossible, with improved machinery and more economical methods of treatment mining can now be carried on with success. Then new gold fields are coming forward destined to surpass in richness and reliability anything that has yet been heard of. The failures and disasters which accompanied the introduction of some of the great gold fields in the past are not likely to be repeated in the careers of these newcomers, for not only are the indications of permanence most convincing, but the facilities for economical working are exceptional, whilst profits will be earned from the treatment of tailings which in old times were discarded as valueless. This is another powerful reason against the decline of mining investment, and one which should foreshadow greater activity than has ever yet been displayed. The great evil, of course, is gigantic, and the less remediable of all. It is the unscrupulous company promoter, whose insidious tactics it is almost impossible successfully to combat. Enormous capitalization is insignificant in comparison with his success in foisting worthless properties upon the unwary investor. Though he is believed by many to be less successful than of old, owing to the exercise of greater caution and judgment on the part of the public, this is very doubtful. —London Mining Journal.

Side Lines Adjoining Agricultural Patents.

A correspondent asks what action has been taken regarding the Sawyer decision which forbids the following of veins or lodes past side lines of a mining claim into land under an agricultural patent of date prior to the location of the mine. Unless legislation is had in the matter there is no likelihood of any change. In the case of Amador Medeau Gold Mining Company vs. South Spring Hill Gold Mining Company et al., as reported in Vol. 36, Federal Reporter, page 668, Judge Sawyer stated in his decision, "The only question is whether, under the Revised Statutes, a party discovering and acquiring title by patent from the United States to a mineral gold-bearing vein or lode having its apex within the land purchased, is entitled to follow the vein or lode down on its dip, across the boundaries of his own land into the agricultural lands of an adjoining proprietor who has the older title? In my judgment he clearly has not. The equitable title to the agricultural lands, held by plaintiff, fully rested on the entry and payment by Hammack on June 15, 1874. After that the United States merely held the dry legal title in trust for the purchaser without any pecuniary or beneficial interest in it. From the moment of the entry, payment, and issue of the certificate of purchase, these lands cease to be public, and become private property. Milling Company vs. Spargo and Same vs. Fick, 8 Savoy, 647, 16 Fed. Rep., 348, and cases cited. Also, Wirth vs. Branson, 98 U. S., 118; Deffeback vs. Hawke, 115 U. S., 405, 6 Sup. Ct. Rep., 95. By the entry and payment by Hammack, there being no known mine on the land, the entire interest to the center of the earth rested in him, and there was nothing left in the United States for a subsequent grant to other parties to operate upon. The only exceptions in the patent relate to easements and other prior rights already vested in other parties, before the date of the entry, as was held in case of Milling Co. vs. Spargo, cited. No other exceptions are authorized by the statute to be inserted, and exceptions not so authorized, if inserted, would be void. Cowell vs. Lammers, 10 Savoy, 254, 21 Feb. Rep., 200; Deffeback vs. Hawke, 115 U. S., 402, 406, 6 Sup. Ct. Rep., 95. Section 2322, Rev. St., relied on by defendant, does not authorize any such exception, and it only applies, at most, to public lands, and to rights acquired by such lands before other parties acquire interests therein. It certainly does not apply to agricultural lands disposed of years—perhaps half a century—before by the Government and before any easement, or other right, has become vested in other parties. The United States can undoubtedly grant easements, and other limited rights, in any portion of the public lands, and subsequent purchasers must take them burdened with such easements or other rights, but when it has once disposed of its entire estate in the lands to one party, it can, afterward, no more burden it with other rights than any other proprietor of lands. *Mining Debris case,* 9 Savoy, 493, 18 Fed. Rep., 753. The defendant acquired no rights in the premises in question under the section cited, or any other statute of the United States, brought to the notice of the court, as against the prior grant plaintiff holds. The result is that there must be a judgment for plaintiff, and it is so ordered."

German Deep Mining.

The Journal of the Society of German Engineers contains a memoir on mining in the Upper Harz, by Mr. von Groddeck. The veins, which have been worked since the earliest times, yield argentiferous galena, zinc-blende, and copper pyrites. Ample water power for working the mines is available, for art has come to the aid of Nature by hydraulic undertakings of great magnitude. Conduits, aggregating 75 miles in length, convey the water into 70 reservoirs with a capacity of 13,000,000 cubic yards. Secondary conduits of 50 miles in length convey the water to motors aggregating 3500-horse power, the supply being sufficient to last for fourteen weeks of uninterrupted want of rain. The water is economized in such a way that it is led from the higher motors to lower ones, and finally to others deep down in the shafts. The various mechanical appliances used in the mines are passed in review by the author, special reference being made to the man engines and the hydraulic engines. The new Kaiser Wilhelm shaft has been sunk vertically to a depth of 2840 feet. It has an internal diameter of 16 feet, and is the first and so far the only winding shaft in the Harz, with a circular section and with iron tubbing. The sinking was begun in 1880 and finished in 1892, the cost being £90,000. The remarkable feature of the shaft is the absence of machinery from the surface, all the motors being hydraulic engines placed at a depth of 1180 feet in the shaft at the level of the great Ernst-August adit. The water required is brought down in pipes from the surface and escapes through the adit.

Mining Summary.

CALIFORNIA.

Amador.

Republican: At the Kennedy rock from this mine at the 2150 level averages $15 per ton. The new hoist for the north shaft will have greater power than any ever used at the Kennedy mine. The company has lately bought thirty acres east of its location on which a perpendicular shaft will be sunk to a depth of 2500 feet. Sixty additional stamps will then be put in.

The Anita mine has reached a depth of 500 feet, and last week a very heavy flow of water interfered with work. The pay chute is 114 feet in length.

At the Zeila the retimbering of the shaft has caused several months' delay, but the work is now nearing completion. A station has been cut at the 1180 level which is to be opened up. The mine will probably be in full operation some time in July.

Ore from the Argonaut mine amounting to 500 tons was handled at the Zeila mill recently and yielded an average of $11 per ton free gold.

D. Dutmann has purchased the Muldoon mine and will begin operations within a short time. At present work preparatory to the location of the shaft and hoisting works is going forward.

On the South Eureka, at a depth of 1200 feet, good rock has been taken out. A second shaft is now being sunk 900 feet south from the present workings. A drift 485 feet north and 380 feet south was made in this mine before encountering any pay chute.

In the Union Consolidated a station at the 500-foot level was cut some time ago and the ledge encountered 22 feet from the shaft. The improvement of the rock is apparent, and no doubt the 30-stamp mill will be kept going in the near future.

Ledger: At Volcano in the Marklee mine, which has remained idle for many years, recently G. P. Rixford of San Francisco acquired some of the interests of Marshall and Hall and he now proposes to reopen the property.

The Iron Mass has the new hoist in operation and has taken out the water. The management of the Iron Mass is in charge of A. B. McLaughlin and he proposes to sink to a new level and take out and crush ore.

At the Monte Cristo recent developments in the ore body show improvement in the amount of gold carried.

Record: At the Potazuba mine the shaft is down 360 feet and sinking is progressing at the rate of 2 feet per day. It is the intention to run drifts north and south at a depth of 500 feet; and if the lode is found to be as good as that encountered on the 100 and 200 foot levels a mill will be erected.

At the American mine sinking is progressing, and in the bottom of the shaft a 10-foot vein of ore is exposed. The mill has been started up again. Sixteen men are on the payroll at present.

Liens and attachments aggregating $10,000 have been filed against the Bay State mine at Plymouth.

The Baliol mill is running steadily on the adjacent property.

The Argonaut 40-stamp mill will be completed in about three months.

Butte.

The manager of the Consolidated Gold Mines of California reports to London as follows: 800-foot level—South drift has been extended a further distance of 21 feet; 1000-foot level—Twenty-five feet north have been crosscut from the east crosscut to make preparations for sinking proposed winze on the quartzite; 300-foot level—The bulkhead from the east crosscut has been removed to the west side, and we have commenced to clean out the 760 feet of tunnel between the shaft and Amosky vein. Clark and Coffee—In this mine we have commenced to raise on the vein, which looks very promising, and for the week just ended thirty-eight tons of ore from the raise have been removed to ore bin ready for milling. The 10-stamp mill is now running full time, and next month will work a fortnight on Clark and Coffee and a fortnight on Banner ore.

Calaveras.

Prospect: One of the properties owned by the Murray Creek Mining Company, has been bonded to J. B. Rodgers, and work will commence on the mine next week and the mill will soon be started up. Two tunnels have been run, one crosscutting the ledge at a depth of 125 feet and the other at a depth of 200 feet.

Chronicle: At the Paragon mine work is progressing well in three tunnels. Tunnel No. 1 is now in 127 feet and has cut the Paragon ledge. It is full 7 feet wide, lies in smooth slate walls, well defined, the quartz prospects well in free gold and also carries a large percentage of sulphurets. At tunnel No. 2, on the Tip Top ground before reaching the Bullion lode a well defined 4-foot vein was encountered, with yet no foot wall reached. Four feet of quartz shows that it will mill well in free gold. Tunnel No. 3 is being driven on a small vein in the Tip Top ground, which vein averages 12 inches wide and is high grade. They have constructed a 5-stamp mill with timbers and shafting for ten stamps.

The Malones mine at Robinson's Ferry on the Calaveras side of the river closed down last week, an order to that effect having been received from the directorate in San Francisco. About twenty men were thrown out of employment A deposit of rich telluride ore was found in this mine about a year ago.

At the Quartz Glen mine near Rich Gulch the working tunnel has been driven in over 1000 feet on a fissure vein, with granite walls, the ledge averaging 6 feet and carrying a large percentage of good sulphurets. The mill has five concentrators. A. U. Marsh is superintendent and twenty-five men are employed.

Col. W. T. Robinson has bonded the Wesson quartz mine. Active work is now being prosecuted on the lead. A 10-stamp mill will be put upon the property.

At the South Paloma (extension of the Gwin) a 35 H. P. hoist has been put in to sink to 1000 feet out and drift the ore body. The shaft is now down 675 feet. The large hanging wall vein has pitched towards the foot wall and the two are expected to contact at 700 feet.

El Dorado.

Nugget: At the Pine Hill mine fourteen men are employed. They are down 340 feet, and have about 1100 feet in drifts and prospects.

At the Griffith Consolidated they are down 270 feet. They are sinking for the 300-foot level. At that time they will commence drifting.

The Atlantic mine, near town, has been bonded, and the present controllers are repairing the old shaft with the intention of sinking deeper.

Kern.

Randsburg *Miner*: In the Val Verde No. 2 last week a new 3 foot vein was uncovered. Since then the vein has been perceptibly widening and the ore has increased in richness.

On the Alameda ore is being sacked for shipment. Ore in the various workings continues to grow better as depth is gained.

Kinyon & Sons have just received $3,346.40 from the mint, the result of a cleanup on forty tons of ore recently milled at Garlock.

W. B. McConnell, F. A. Pratt, H. F. Parker, J. A. Haralson and H. C. Flanagan have just taken a bond on a group of four claims near the Petaluma in the sum of $22,500, and will in a few days put men to work developing the property. The claims are the Skookum, Yorkshire Lass, Spokane and Superior.

Nevada.

(Special Correspondence.) — California is recognized the world over as a great gold-producing country. To-day, with the fabulous amount of gold taken from her hills and valleys, the State is still in the infancy of systematic mining, and none the less so in the production of precious metals.

Nevada ranks at present as the banner county of the State in the mining field, and yet it is safe to say that she is only in her babyhood. Present development and present indications point to the assurance that in the territory of this section awaiting the prospector's pick and the capitalist's aid to labor, prudent investment cannot make any error of judgment by coming into this county.

Whilst much is said of the "Great Mother Lode" in the lower tier of mining counties, the question is rightfully asked, "What about the Great Father Lode running through Nevada county?" In reply to this, one need but refer to the Nevada City and Grass Valley folio of the United States geological survey for authority as to the rich and extensive formations permeating the county. Aside from this, the properties at present in active operation are a most convincing argument of the productiveness and stability of the county.

The question of deep mining, as is well known, is no longer an experiment in this section. It is none the less true that properties which were abandoned at water level, or such as failed some years ago for want of high explosives, are again receiving attention, and some of them are already proving themselves a veritable storehouse of wealth. Some of these shall receive special notice later on in verification of the statement made in the preceding sentence.

New developments are gradually coming to light, and these, too, will be referred to specifically, to show the true state of facts in the advancement of mining in this county.

With its past history, its present record, and its new discoveries of paying ore bodies, Nevada county is certain to attract the attention of capital seeking opportunities for careful and safe investments. Like in many other localities, much of future success must depend in a measure on assistance from outside the county, though perhaps few localities show such a precedent for investment of home capital as do Nevada City and Grass Valley. The field of operations is widening and is consequently not confined to one or two particular districts.

It is probably well to state for the information of many Eastern readers of the MINING AND SCIENTIFIC PRESS that Grass Valley and Nevada City are both on the railway, and but a short distance of connection at Colfax with the overland trains from the East.

In addition to the mining resources and railway facilities, the other important factors of wool and water abound in plenty and convenience. Electric power is no less a representative feature in active operation. With the above facts, though briefly outlined, a fair knowledge and a safe estimate can be gained of the present important position, and the promising future, of Nevada county in the mining world. J. F. L.

Nevada City, June 28, '97.

Transcript: Letson Balliet is looking after the affairs of the Des Moines company that is working a mining claim on Alder creek west of Truckee. A double compartment shaft is being sunk on the ledge and is down about 40 feet. Preparations are under way for erecting a hoisting and pumping plant, to be run by water power.

A. L. Bigbie, who will direct mining operations for the Electric Power Company in the Yuba river channel during the summer, has left for the scene of his work. He will make Purdon's crossing his base of operations. The water of the Yuba will be turned into the Power Company's flume and the gravel in the river bed will be prospected to see if it will be profitable to work the long stretch of channel that can be drained. Within a few weeks forty to fifty men will be at work under Mr. Bigbie.

Placer.

Sentinel: The Jubilee quartz mine near Auburn is being developed. The ledge is from 2 to 2½ feet in width and shows free gold in many places. It is owned by Paul, Kirby, Morgan & Bourne.

Herald: At the Gold Blossom mine a hoist is being erected to be operated by steam and the drills run by compressed air. The machinery that is being put in is sufficient to enable them to sink to the depth 1500 feet. It is the first mine in this vicinity that has done away with the bucket and adopted the cage as a means of hoisting.

Plumas.

Independent: At the Plumas Imperial mine, owned by C. D. Hazard, piping has been brought to a close for the present season, and the work of cleaning bedrock, bedrock cuts and gold flumes is being vigorously prosecuted.

National Bulletin: At Taylorville men are being put to work on the Lucky S. mine. This property was purchased by Mrs. Weggener last year, but little work has been done since.

The mill at the Robinson mine was started about a week ago and the yield of gold thus far has been much better than was expected. New hoisting works will be erected and power drills put into the mine. About thirty men are now in the employ of the company.

San Diego.

Union: The placer claim of 120 acres twenty-five miles beyond Foster station, on the Cuyamaca railroad, owned by Pierce, Benton, Morse, Burk and Schafer, all of San Diego, has been sold to Colorado mining men, who will develop the property. The price paid was $30,000. It is expected that work will begin in about a month.

Shasta.

Free Press: A ledge of gold quartz ore has been struck in the Salee & McDonnell mine, at Bully Hill. They began work over a year ago upon a long tunnel with which they expected to cross cut a ledge of free gold ore. They ran through several small veins and finally, after running 1000 feet, tapped the ledge at a depth of 500 feet.

Chapman & Voluntine, owners of a hydraulic mine on Clear creek, have closed down after a very successful season's run.

Fitzhugh, McCutchen and Henshaw agree to deliver to the Mountain Copper Company each week for six months, from June 3d, thirty-five tons of quartz ore from the Evening Star mine, in Old Diggings mining district.

The National Consolidated Mining Company, at Old Diggings, has twenty-eight men in the mine, and the mill is crushing quartz with good results.

Searchlight: At the Niagara little is being done pending the reorganization of the company, which will be effected by July 1st.

D. B. Hunt, representing Senator Jones & Company of Nevada, is placing two large 2-stamp batteries on the Milkmaid mine at French Gulch, which, owing to their large possible discharge, are regarded as equal to an ordinary 10-stamp mill. Twenty men are at work, and more men will be employed July 1st. About 600 tons of ore are on the dump from development work.

Hall & Carpenter, who have opened up a property at Hall City, are now crushing ore from their mines.

The Gladstone, owned by the Euclid Mining Company of Ohio, superintended by F. E. Brighton, is reported to have made a new rich strike. Upon being exposed the vein proved to be 5 feet in width.

The Portuguese Flat property near Delta has been purchased by W. R. Conant, who is now sole owner of the whole property, comprising nineteen claims. It is a combined quartz and gravel proposition, and, so far as has been worked, has given good returns. Mr. Conant proposes to begin a thorough development.

At Harrison gulch Capt. Roberts is putting in his new process, and is resuming work. Twenty-five men are in the mine and seven are at the mill. Only five stamps of the mill are running, owing to insufficient capacity to treat the product of the complete mill. The settling tanks, barrel amalgamators, etc., of the new process are now in use, but the cyanide tank is not yet completed.

Sierra.

(Special Correspondence). — Development work in and about Forest is showing considerable activity. The Bald Mountain Consolidated Company is at work at the edge of the village. Their tunnel is 2700 feet long, tapping the channel at 2400 feet. They are crossing the channel, and at 400 feet have not yet reached the west rim. There are eight men employed in the development work. An 8 ton locomotive is on the ground and will soon be put in use for hauling the cars. There is a water right and tailing claim attached to the grounds, which comprise 800 acres. F. W. Page is manager, and J. O. Jones is the superintendent.

The Kate Hardy on Oregon creek, a quartz property, has two tunnels 60 and 300 feet. The ledge will average 4 feet of pay ore. The formation is slate hanging and porphyry footwall. The property is idle at present for want of means to prosecute the work. Hooper & Dudley of Forest are the owners.

Benson & Meehan, nine miles east on American Hill, have tapped an ancient channel by an 800-foot tunnel. Gold is found in soft bedrock in coarse pieces. They have 200 acres of ground.

The Dreadnaught quartz mine, three miles from town, has two tunnels on the ledge, which averages 16 inches, running from 3 inches to 4 feet, the ore averaging $5 per ton. The formation is serpentine and slate. The lower tunnel is 600 feet long and has 200-foot backs. The property is idle for want of capital. E. L. Craft is the present owner.

The Bald Mountain Extension (gravel) is running a tunnel for the channel, which at present is 845 feet long. The gravel yields a good "prospect." This is the old Bald Mountain lead which paid handsome dividends for thirteen years. The company (incorporated) expects to reach the channel within a short distance.

Forest, Cal., June 26, '97.

Enterprise: The hydraulic mines at Craycroft have closed down for the season. The clean-up for the year exceeds expectation.

Siskiyou.

News: The McKinley mine, near Oro Fino and owned by Raymond, Tuttle & Coburn, is being developed by tunneling and a large body of ore has been opened up.

A rich chimney of ore has been struck in the old Steele ledge of Quartz valley, now the property of Morrison & Coburn. This mine is showing up well under late developments, aside from the recent important find.

There is some talk of fitting up the old Steamboat mine near Fort Jones for operations.

Considerable prospecting has recently been done near Honolulu with good success. Several promising claims have been located.

A new 10-foot vein of porphyry is being developed by Freshour & Jackson. The dyke is located on the summit of the mountain between Lumgray and Empire creeks, at an elevation of about 1000 feet above the Klamath. It is supposed to be an extension of the 50-foot dyke on Empire owned by Mr. Freshour, which will mill about $3 50 in gold. There are thousands of tons of ore in sight in the upper dyke, which has a tunnel in 80 feet.

Journal: At the Commodore mine on Barkhouse creek some good work is being accomplished. This mine is at the head of Barkhouse creek. The double arrastra reduces five tons of ore every twenty-four hours.

Bailey & Carrick of the Katie May mine on Greenhorn have not been taking out any ore from their mine lately, but are soon to run a tunnel.

The Scheld brothers are taking out some good ore at their mine on Long gulch, near Yreka, which they crush in an arrastra at the mine.

Reporter: At Sawyer's Bar a number of prospectors are at work in the different gulches in this vicinity.

One by one the hydraulic mines are closing down on account of the scarcity of water. All the miners seem to be satisfied with the season's run, although it was exceptionally short.

Mauche and partners are digging a ditch on their claim that will give them about 4000 more inches of water.

The Jumbo mine will open shortly.

Trinity.

Searchlight: Chambers & Harrison at Hall City have a lease and bond on the Green property, comprising the Yellow Stone, White Rock, Sabbath and Quartzite claims. About fifty tons of ore are on the dump. They also have a bond from Hall & Landis on the Isabel and Evaleen claims, and are now putting in a 5-stamp mill, which will be running next month.

Journal: On East Fork the Thanksgiving mine is being operated with good results.

At the North Star mine ten stamps are kept dropping on good ore. Mr. Mayberry, the superintendent, has recently fitted up the mine well and has it on a paying basis.

Reed, Given, Simpson and Zuella have recently discovered a 3-foot body of ore.

At the Lone Jack mine under the superintendency of Grant Day, the mill is kept running steadily on good ore.

At the Independence mine, owned by Hippler, Carr and Brown, work is steadily progressing toward the main chute of ore.

Tuolumne.

Democratic Banner: The Green mine, between Confidence and Sugar Pine, is being pumped out preparatory to development.

Superintendent Richard Chute, at the Rappahannock, is drifting on the fissure vein from the 600-foot level.

At the Arbona a tunnel 190 feet has been driven and drifting is being done north and south. The vein is from 4 to 12 feet and carries free gold and sulphurets. There is upon the dump 500 tons of ore ready for the mill, which will be in operation by the 15th of July.

At the Marietta, under the superintendency of W. G. Long, the shaft is down 400 feet. At the 150-foot level drifting is being done that will tap the Gagnere. The vein is from 4 to 8 feet wide. Mr. Long commenced operations on the Patterson, below Tuttletown, this week.

N. J. Coleman has a shaft 145 feet in the Anchor and will sink it 300 feet, at which point he expects to cut into the vein.

G. Ogden, at the Providence, has a 6-foot ledge in the bottom of the winze, which gives a good mill test both in free gold and sulphurets. Mining expert Newhouse, of San Francisco, has examined it for San Francisco parties.

Union Democrat: At the Rawhide the main shaft is nearing the 1200-foot mark, and a new station and level will be run when that depth is attained. Work still continues on the north drift of the 800, while the big body of ore in the slopes between the 1000 and 800 levels is fine as ever. The vein holds a regular width of about 35 feet.

At the Lady Washington the mill is about completed, and will soon be crushing ore from the mine.

At the Providence preparations are being made for putting in a hoisting plant. Work on an upraise from bottom of shaft is being

prosecuted. When this is completed sinking will be continued for 300 feet.

At the Grizzly a hoist is in course of construction, while sinking on the vein still goes on. A large flume is being built to convey water from the river to the property.

Eight men are drifting and cross-cutting on the Consuella.

Mother Lode: At the Golden Rule a cross-cut is being run for the east vein on the 300 level.

At the Trio the new three compartment shaft is down 45 feet. Two ten-hour shifts with four men each are employed in sinking. A rich body of ore has been found in the west cross-cut on the 200 level in No. 1 shaft.

Yuba.

Nevada *Transcript*. At Smartsville the Allender Yuba River Mining Company is beginning preparations for mining the river bed with renewed energy. It is expected that everything will be in running order by the middle of next month.

Interest in the quartz mines is still in the ascendant. Considerable work has and is now being done on what is known as the Nugget Ledge, on Sand Hill.

NEVADA.

Silver State: J. A. Blossom has shipped from Winnemucca fifteen tons of high-grade ore from his Kennedy mine to a smelter in Utah.

Tuscarora *Times-Review*: The ledge in the Dexter was encountered in the new shaft, as was predicted by Supt. J. F. Parsons. At present they have not reached the footwall, and its full extent is yet a matter of conjecture. It is the intention of the company to carry the shaft on down. Both the foot and hanging walls run high in gold and are milling ore.

Sluicing has begun on the placers of the White Rock Mining Co.

Mason and Fleishman have made a new strike on their copper property on Lone mountain.

Pioche *Record*: The De Lamar Company increased its working force. More men are employed than at any time in the past. The work of reopening the caved ground of last month is being pushed. Prospecting work has been resumed. The mills at the De Lamar Works are operated principally at night. It is comparatively easy to crush the 300 tons of ore needed per day in this time.

On the Oro mine, adjoining the Magnolia, the owners report at the bottom of the shaft 4 feet of ore that assays well in silver, besides a good showing in gold.

The work at the Magnolia has opened up what appears to be a new ore body. It lies to the south of the old chute, though close against it and very near the middle of the claim. An extensive broken up country, largely porphyry, is found, from which some fairly good ore is mined. The main tunnel has been pushed ahead and another ore chute encountered to the north.

White Pine *News*: At Cherry creek, in the Grey Eagle shaft, men are to prepare for sinking, and at the Star shaft sinking is being pushed as rapidly as possible.

The North Mountain Co. at Egan canyon are putting their machinery in position, and very shortly the mill will be running.

A new strike was made in the Ontario mine, Robinson district, last week. The ledge is about 3 feet wide and the ore goes about 55 per cent lead and carries a good percentage of gold and silver. This is one of the oldest locations in the camp, having been worked for lead and silver many years ago. At that time, however, the value of the gold found in the ore was comparatively small, and formed no part of its shipping value.

Yerrington *Rustler*: Fish brothers are drifting on the Argona. Forty-two men are now on the payroll of the Boston Nevada Company. The shaft at the Pratt mine is down 90 feet and four men are taking out good ore from a 2½-foot ledge. The owners of the Irma Faye mine are now down 45 feet and the ore is getting richer. A 20-inch vein of excellent quality is reported from the Lottie. The shaft has been sunk 34 feet and the ledge is strong. Four men are at work on the Strosnider mine, sinking and stoping in good ore. As soon as the 125-foot level is reached crosscutting will commence. The Pioneer mill at Pine Grove, which has laid idle for many years, started ten stamps on low-grade ore last week in order to test the machinery.

ARIZONA.

Journal-Miner: R. M. Dougherty has sold his Charleston mining claim in the Bradshaw mountains to the Gladiator Mining Company. The claim is an extension of the Crowned King and shows up well in ore.

The price at which the Standard group of claims on the Santa Maria were sold was $75,000, instead of $50,000, as previously reported.

Another body of free milling gold ore has been encountered in the Little Jessie mine at a depth of 190 feet.

The Crown Point group of gold claims, situated near Walnut Grove, under Superintendent Brodie, is showing up finely. As depth is reached, the lead not only is widening, but the grade of ore encountered is richer and gives indication of permanency.

Mojave *Miner*: In sinking the main shaft of the Eureka mine at Cerbat a 5-foot body of six-ounce gold ore has been encountered. The shaft on the Eureka has been sunk between the ore chutes, and the opening of the new ore body was a surprise to the owners.

At Painted Canyon a trial run has been made with the Smith stamp mill. The teams hauling from the mine are unable to supply the mill with sufficient ore, but more will be put on this week.

Kay & Vandercook have gone to El Dorado canyon to again start up work on the mines at Kay camp.

Many prospectors are going into the country south of Kingman in search of gold. There are many small ledges showing on the surface within four miles of town.

At the Connor mine J. Barry is making extensive improvements at his mill, and will soon be able to increase the output.

W. Burkhart is taking rich ore from a lease on the Retort mine, Mineral Park.

I. C. Conkey has put men to work on the Lady Bug mine, at Mineral Park.

OREGON.

Baker City *Retrocl. Democrat*: In the Cliff mine, north of the Flagstaff, a recent discovery made by the Bradbury Bros., the ledge in the drift from the bottom of an 80-foot shaft shows a width of 5 feet.

Montana people have made an examination of the Balsley-Elkhorn mine, with a view to a purchase of the property. The mine and mill are running with satisfactory results.

The placer mining season will soon close, on account of a scarcity of water. The season has not been as long as was anticipated. The output of gold thus far has been large, and the final clean-ups will swell the total.

P. Berthon, manager of the Flick Bar Mining Company, operating near the mouth of Powder river, has built a ditch eight miles in length and a reservoir this spring, and the claims are now in operation.

Monitor-Miner: The Brass Nail, a placer mine in the Jump-off-Joe district, owned by J. W. Robinson, has been developed for three years. Owing to scarcity of water it can only be worked from three to six months in the year, but up to date it has produced about $6000.

The Oregon Bonanza Company is operating night and day at the Anderson mill on Eclipse ore. This ledge shows two feet of solid quartz, all high grade.

BRITISH COLUMBIA.

(Special Correspondence.) — The mining world is distressingly flat just now and the cause of the depression cannot be accurately stated. A combination of unforeseen circumstances is responsible, but none of the mining men appear to be able to give an intelligent reason, but all are confident that the depression is only temporary. Rossland papers say that owing to British Columbia mines Canada is about to experience a period of prosperity. No doubt in time Canada will be greatly benefited by development of British Columbia mines, but for want of capital the mines are being developed very slowly.

There are many good prospects along the seaboard being taken up largely by Americans The numerous islands in the Gulf of Georgia are alive with prospectors and claims are being staked every day. Many of them are being purchased by Americans, but after the report of the sale nothing more is heard of them. The time will come when there will be a great deal of business done in the way of shipping ore and legitimately developing the mines in British Columbia territory, but perhaps owing to the unsettled state of the English money market and the fact that Americans are turning their attention entirely to the Kootenays, the seaboard propositions, though the most rosy reports of their merit are being given, seem to be between the prospecting and developing stage. There are, however, three or four free milling propositions which will be crushing in sixty days, the Golden Cache in Lillooet and the Tinhorn in Okanogan district being the principal ones. If these mines make a good showing they will do much to restore waning confidence.

The Providence mine in Harrison Lake district is now shipping in small quantities to the smelter, as is the Athabasca of Nelson district. The latter is a free milling proposition. GOODMAN.

UTAH.

The Chicago Pumice Company is making arrangements to develop extensive pumice stone beds in Miller county, Utah, where the company owns 120 acres of land said to possess an abundance of the product. James Quigley is president of the company.

Tintic *Miner*: Shipments from the district for the week are as follows: From the Bullion-Beck, 20 carloads ore; Centennial-Eureka, 3 carloads; Gemini, 10; Uncle Sam, 6; Ajax, 5; Carisa, 1; Sioux mill, 1; Swansea, 3; South Swansea, 6; North Star, 5; Governor, 1.

From the Gemini five carloads were sent out Monday and five Wednesday. For a time at least the shipments will probably amount to five carloads every other day.

At the Beck the force has been slightly increased during the past week, and the ore being sent out is reported to be some of the highest grade ever found in that great mine.

MONTANA.

Basin *Progress*: J. Berkin of Boulder has leased and bonded the Legal Tender group on Cataract creek for three years at $12,000 A shaft is down 50 feet on the lead, and Mr. Berkin will continue this down to the 100-foot level, at which point they will drift on the lead.

The Boulder mill has been started up. This mill and mine have been leased for three years to O'Neill and Largent by the Boulder Gold and Silver Mining Company. At present five stamps will run. Soon a set of jigs will be put in and two vanners added.

COLORADO.

(Special Correspondence.)—The new chlorination works, of fifty tons daily capacity, has been treating telluride and sulphide ores for the past fortnight, and two gold bricks have been produced that were valued at about $6,000. The management of the Delano Mining and Milling Company has built this chlorination mill at a cost of about $50,000, for the purpose of treating the enormous quantities of low grade mineral produced in Boulder county, yet is exceedingly doubtful if the object be attained. The price for treating ore has been fixed at $10 per ton, which is $3 above the charges at the smelter for raw ores, and $6 higher for treating concentrates. It is stated that the actual cost of treating ore by chlorination will not exceed $3 per ton, which would give a net profit of $7 per ton or $350 per day.

Arthur G. Gorham, president and manager of the Marshall coal mines, returned from New York City last week, where he has been in consultation with the directors of the company. Extensive arrangements were consummated for opening the recently discovered Gorham coal vein, which is 10½ feet thick, of elegant coal for domestic purposes. Superb machinery has been ordered for the mine, which is situated one-half mile southeast of Marshall camp, and near the Gulf railroad track. While the new slope is being made to the coal, and machinery erected, the several mines owned by this company will be run to their fullest capacity in order to supply the demand for this particular coal. Marshall is the oldest coal camp in Boulder county, and will, during the winter, be an exceedingly lively town. Other mining matters, involving an outlay of $250,000, were discussed by President Gorham before the board of directors, and within the next sixty days a company will be organized for the purpose of consummating the scheme.

The new Inter-Mountain Railway has received wonderful impetus during the past three weeks, by visits to this city of important railroad men from the East. J. T. Blair, of Greenville, Pennsylvania, has made a careful examination of the surveyed route from Boulder City to the mining camp of Ward, with a view of the success of such an enterprise. The road will be a 30-inch gauge; will be thoroughly equipped with the most modern and powerful locomotives for the mountain work. The object is to haul ore, passengers and freight at much reduced rates.

The company also proposes to build in the near future a mill—chlorination, cyanide or some cheap process for treating low grade ore. The capacity will be from 300 to 500 tons daily, and the supply of mineralized matter will be purchased at the mines of the numerous camps.

The Kilton Company treats about eight tons of mineral daily by chlorination, while there are other chemical processes in operation in Boulder City treating the tellurides more or less successfully.

The bromine process has proven a failure so far as treating the tellurides of Boulder county mines. Over $125,000 have been spent in the Keystone-Mountain Lion mines, and building the large mill, which the owners said would save 95 per cent of the precious metal contained in the ore, at a cost of not over $2 per ton. The ore carried no gold and silver, or the process failed to save these metals.

The miners and merchants have put a lien on the property and the court has appointed a receiver. WM. M. RULE.

Boulder, Colo., June 23, '97.

Republican: Assayer W. J. Plunkett of the United States branch mint gives the following statement of the gold bullion received at the mint for the fiscal year ending June 30:

	1896.	*1897.*
First quarter	$1,186,161.12	$1,224,091.54
Second quarter	1,108,415.68	1,117,709.02
Third quarter	834,007.86	1,556,294 59
Fourth quarter	1,069,436 76	3,045,819.06
Totals	$4,198,021.42	$6,944,904.19
		Gain in 1897.
First quarter		$ 38,330.42
Second quarter		9,383 34
Third quarter		722,286.71
Fourth quarter		1,976,382.30
Total		$2,746,882.77

If the figures given by the director of the mint and by the Wells-Fargo Express Company, both of which give Colorado approximately $15,000,000, are accepted, there is good reason to anticipate a production in this State during 1897 of not less than $25,000,000. For the last two quarters of the fiscal year ending June 30, 1896, and the first two quarters of the present fiscal year the receipts of the local mint were $4,246,235.18, a little less than one-third the total production of 1896, according to the authorities named. Assuming that the last half of the present year will be equal to the half just closed, Colorado will have in mint receipts for 1897 over $9,000,000, and with all due allowance for unforeseen accidents, if the ratio between mint receipts and total production in 1896 holds good during 1897, the estimate of $25,000,000 is within the bounds of reason. It is well known to all mining men that the output for this year will be a very heavy increase over that of last, and estimates made so far based upon what is known of the present production of leading mines and districts range from $20,000,000 to $25,000,000, with the probabilities strongly in favor of the latter figure.

At Cripple Creek Manager Weston of the Good Will tunnel is devoting all his energy to the development of the veins cut in running the tunnel. It is likely that in a few days the treasury, which now only contains $10,000, will have its fund largely increased, when another contract will be let to drive the tunnel ahead.

Manager McDonald of the Strong mine reports that he is now shipping a little over 2000 tons a month of ore that is worth about $50 a ton, average grade. Drifting is under way from the 500-foot level on a large body of ore. A new 100 H. P. boiler is being placed on the property over the main shaft.

The Anchoria-Leland management has resumed the sinking of the main working shaft, which, when work had ceased about the first of the year, had gained a depth of 740 feet.

The Gladden lease on Lindsay ground on Beacon hill has broken into better ore than ever. Every bit of rock hoisted shows sylvanite.

A new plant of machinery has arrived for the Grant & Kline lease on the Cariolanus on Battle mountain. The property is producing regularly.

The people who are working the Elkhorn have started a new shaft, which is now down 75 feet. Within a day or two they expect to put on machinery. The shaft is continued to 200 feet.

On the Hayden gold placer, a few hundred feet east of the Crescent ground, Reed & Hague are saving ore from a 60-foot shaft.

On the Yankee Girl on Womack hill W. B. Webb has taken a bond and lease and started retimbering the old shaft on the property.

The May Queen on the Lawrence townsite, worked under lease by Carhart & Saunders and others, is showing up well. Returns from several small runs from the 5-foot vein opened up at 65 feet have given satisfactory results.

At La Plata A. Lakes, who is making a geological examination of the new district, gives out the following opinion:

"From a general superficial and preliminary survey of the greater portion of the La Plata region, I am of the opinion that the geological conditions are decidedly favorable to the formation of veins and ore bodies. The grounds for this assertion are, firstly, the numerous eruptions of diorite, a variety of igneous rock which, the world over, is notorious for its gold-bearing tendencies.

"Secondly, the peculiar mode of eruptions of enormous intrusive masses and sheets of this lava, in that mode of eruption known to geologists as laccolitic, has also its favorable points by fissuring the country in an unusually plentiful way by traversing it with eruptive dikes and intrusive sheets, and by powerful metamorphic action on the surrounding strata. All these phenomena are recognized by the students of ore deposits as amongst the most favorable conditions for their formation.

"There is evidence, through these agencies, of the production of an unusual number of veins within a comparatively small area, a few of which have already been discovered and partially developed, but we prophesy that many more will be found by future prospecting. It will be premature to predicate the character of all these veins, but in those so far developed there are certain characteristic family features.

"The veins as a rule are comparatively narrow from wall to wall—that is, the gangue matter—and in this gangue matter the pay streaks are still smaller, but in proportion to their smallness they are generally exceedingly rich, and it may be a surprise to many who have supposed that tellurium ores were confined to Boulder and Cripple Creek to learn that the La Plata area is, so far as we have observed, an essentially telluride camp."

At Yankee, for some time past the Gold Coin Company and an Eastern syndicate have been negotiating for the purchase of the Alice. The Eastern syndicate now have a bond and lease on the entire property for two years, the bond being $250,000—$50,000 being paid down, $100,000 to be paid at the end of the first year, and the balance to be paid at the end of the second year. The big 200-ton concentrator belonging to the property is to be thoroughly repaired and probably enlarged. The property is to be worked by air drills, instead of hand drills, as heretofore. The Alice Company owns 1180 acres of patented ground, consisting largely of placer ground, in which the village of Alice is situated. The Alice mine probably contains one of the largest ore bodies of any mine in the State, as it is known to be 310 feet between walls, everything being low-grade concentrating ore, with streaks of rich smelting ore running through it.

The working force on the Shell Back has been doubled Large shipments of smelting ore are being made to Idaho Springs.

Dr. G. W. Compton intends to start up work on his Kentucky property. A large new shaft is shortly to be erected on the Gilt Edge mine.

Some fine ore is being encountered in the Stormy Petrel mine.

Near Salida, in the Cameron district, three weeks ago, one could count on his fingers the properties that were over 15 feet deep. Now dozens of shafts have been sunk to 50 feet and more, and every day the enthusiasm grows. At the surface the veins are small, but depth increases both bulk and values.

At Idaho Springs a new hoisting plant is to be installed at the Smith & Wiley property and the shaft continued deeper from the lower level, which leaves the shaft at a depth of 400 feet. A nice body of mineral shows in the levels being driven.

The rich gold streak found by Henry Blackwood on the divide between Chicago and Soda creeks is showing even richer than at first reported, and 1 inch of the mineral is alive with free gold. It runs $5 a pound. Of course, the streak is small.

While drifting from the shaft at the fourth level of the Eclipse mine, leasers have struck mineral which has all the indications of coming into an important ore chute.

Ore is coming in at the Champion mine, on Bellview mountain, and from the levels down to the sixth several shipments have gone forward.

The Bellman mine, in Virginia canyon, has started up with work near the surface. The vein is the same as the Crown Point, but water makes in the Bellman shaft so rapidly that sinking was stopped by the former company and the mine has remained idle for some time.

Leasers in the Great Republic have extended the Mattie adit and are now coming into mineral which is thought to be the big ore chute like that heretofore found on the lode.

The new shaft at the Silver Age mine was sunk to a depth of 200 feet and levels commenced at 100 and 200 feet. Both of these have been driven west and are now in good ore.

By working through the Lake tunnel, the Windsor Castle people have opened into a big body of lead ore and are getting out some good shipments.

Electrical Progress.

The Riverside Transmission Plant.

Written for the MINING AND SCIENTIFIC PRESS by W. A. LAYMON.

(See Illustrations, Page 1.)

On December first, '96, there was recently turned over to the city of Riverside, Cal., from the California Electrical Works of San Francisco, an electric transmission and general distributing system for power and lighting. The transmission of electric energy twenty-two miles appropriated the energy of mountain streams and placed within the reach of Riverside residents electric power and light at favorable rates.

The Redlands Company, by contract, delivers to the city of Riverside at the switchboard of the generating station a three-phase alternating electric current of 2500 volts pressure. This current passes through step-up transformers which change the pressure to 11,000 volts, at which the energy is transmitted 22.4 miles over the open country to a sub-station in the City of Riverside. There it is in turn again transformed by step-down transformers to a pressure of 2200 volts. From the step-down transformers it passes to a distributing switchboard, and from the latter continues out over the general city distributing circuits—four in number—of which two are for street arc lighting and two are for incandescent lighting and motor work. On these street circuits reducing transformers are again used, changing the pressure to 30 volts for the street and commercial arc lights and to 100 volts for the incandescent lights and motors. From first to last the three-phase system of distribution has been followed.

The generating dynamos, which at present are two in number, are of 250 kilowatts each, and are of the General Electric 3-phase, 6000-alternation type. As before stated, these dynamos deliver current to the switchboard at 2500 pressure. Since the two machines are not always required there are independent sets of bus-bars, and it is from either of these or both, as the case may be, that the energy for Riverside is taken.

The Riverside equipment accordingly begins with a marble panel on which are mounted three double-throw, single-pole, quick-break switches of the California Electrical Works' design and manufacture, by means of which current is thrown on a special set of three bus-bars feeding the step-up transformers. From these bus-bars the current passes through a panel of specially designed single-pole fuse blocks to the three 100-kilowatt step-up transformers. These blocks are so made that the portion containing the fuse is separable and perfectly insulated, so that were it desirable to do so the fuse could at any time be quickly removed from circuit and as easily reinserted. Furthermore, the blowing of any fuse is devoid of the burning of contacts, and the block is accordingly good for unlimited service.

Coming now to the step-up transformers, there is found probably the most decided innovation of the entire equipment there, three in number, and of a capacity of 100 kilowatts each, built by the Electric Manufacturing Company of St. Louis, under stringent requirements for efficiency. They are a radical departure from conventional practice, each being a series combination of two 1250 to 5500-volt units, encased in cast-iron, oil-filled, water-jacketed boxes. They were designed to afford not only a higher degree of insulation safely, but a more economic use of materials and a higher operating efficiency at all loads than is possible with an air-ventilated transformer. The insulating oil is of the highest quality, as shown by proof tests, to be had in the market and is sent out under guarantee. The iron cases are built up in sections, each lateral member of which is so cased as to give successive small channels confining the water to constant flow up and down as if there were a continuous coil of pipe all around the transformer. The sections are cross connected in such a manner that, all in all, there is not possible any communication of the water and the oil. The water flow is from a gravity head of about 15 feet, and can be regulated at the will of the operator by means of globe valves in the outlet pipe of each transformer. The design is such that no cooling device whatever is required up to one-half or three-fourths load, and not until the apparatus begins to approach the full load does the temperature of the apparatus rise much above that of the atmosphere. Operating under one-third load without cooling device, the maximum temperature attained in a ten-hour run was but 100° Fahrenheit.

Passing from the step-up transformers, the 11,000-volt current goes out through three single-pole quick and long-break switches to the transmission line. These switches are also of special design, manufactured by the California Electrical Works, and are so arranged that the blowing of a protecting fuse automatically opens them. Immediately beyond the switches are the lightning arresters, of the Wurtz pattern.

In the transmission three No. 4 bare copper conductors carry the current. These conductors are mounted on porcelain insulators, these insulators in turn being carried on the iron pins. On the entire transmission line 3300 of these insulators have been used.

The substation is a single-story brick building 36 by 30 feet. The transmission line enters the east side, passing directly to the high-tension switchboard which has single-pole, quick-break switches exactly duplicating those on the high-tension side of the step-up transformers. From this high-voltage marble switchboard, which is about 3 by 4 feet, the 10,000-volt lines pass to three bus-bars to which the step-down transformers are connected.

The step-down transformers are practically identical with the step-up transformers in general mechanical features, being oil-filled and water-jacketed. Their only difference is in the transformation ratio, and the capacity here being but 85 kilowatt units instead of 100 kilowatts as there, and having a reduction ratio of 5.

The step-down transformer secondaries lead direct to the distributing switchboard of the general wiring system of the city.

The marble switchboard, 7 by 12 feet, is designed and made by the California Electrical Works.

The step-down transformer secondaries, on reaching the board, are grouped in three-phase interlinking on the rear projecting studs of fuse blocks at the bottom of the main feeder panel. The current passes upward through these special fuse blocks to quick-break, single-pole switches, thence to the Whitney ammeters above and then down to three main bus-bars extending all the way across the board. Above the ammeters on the panel are three Whitney indicating volt-meters, reading through special resistance boxes direct on the full voltage on each phase of the main feeder circuits. The adjoining panel on the right is for the two three-wire arc lighting circuits. These circuits are fed from an auxiliary set of three bus-bars connected with the main bus-bars through a set of three fuse blocks and three single-pole switches. Between the auxiliary bus-bars and the outgoing branches of the circuits are interposed single switches by means of which the arc load is divided up so that a small portion may be thrown on at one time. On this panel, occupying a position above all the switches, is a single voltmeter so arranged that it can be thrown on any two of the auxiliary bus-bars.

The third panel is for a three-wire incandescent current feeding the western business portion of the city. Here, again, the current for each leg passes from the main bus-bar through special fuse block to a single-pole switch above. Beyond the switch it passes through special pressure regulating transformers to the outgoing line. On this panel there is also a single Whitney voltmeter and a single Whitney ammeter. The former is so arranged, through small throw over switches, that it can be quickly connected to either of the three phases of the outgoing circuit. The latter is so arranged that it may be plugged by means of special flexible leads in parallel with either of the three single-pole switches below, and when so connected the simple opening of the switch in which it throws the current through the instrument. By this process a single ammeter is made to do the indicating, both on this panel and the next, in all branches of the two circuits.

The fourth panel is identical with the third, with the exception that where the ammeter is located on the third there is here placed the ground detector switch. This panel feeds the residence incandescent district, and on this, also, the outgoing line pressure is regulated by means of three Wagner regulating transformers.

The six regulating transformers are designed to control the pressure of the circuits in which they are placed for a variation of 10 per cent above or below the nominal feeder pressure.

For street lighting there are used eighty 2000-candle power helios arc lamps, especially built for this frequency. These lamps are fed from an equal number of 2000 to 30-volt oil-filled transformers.

The incandescent service follows the conventional practice. Where requirements and conditions accommodate themselves, large transformers feed secondary bus-lines, from which grouped customers are supplied.

The system in its entirety has now been in operation a sufficient length of time to demonstrate its success.

The California Electric Works of San Francisco have been represented in the field by A. J. Myers.

The installation as originally contracted for was to have cost $40,978. Additional work will, however, bring this up to about $50,000.

Drilling by Electricity.

The Bryam Oil Company of Indianapolis has completed the first oil well ever drilled by electricity. It is located on a 400-acre lease about four miles west of Indianapolis, within sight of the village of Dundee. After practical tests for a year and a half the company pronounces its power a success. One disadvantage was developed in drilling, and this fault is that the electricity does not raise the tools or the bailer out of the well fast enough. But, altogether, it is said to offer many advantages over steam power. It requires fewer men to operate the wells on the lease, there are no delays from lack of fuel, and, during the cold of last winter, when other oil properties showed a decreased production, that of the Bryam Company was at a higher point than during the summer and fall before.

ACCORDING to the *Journal de Medicine de Bordeaux*, a man placed under arrest for illegal practice of medicine, claiming to be a graduate of an American college, presented a diploma which excited the suspicion of the magistrate. Calling in the services of an expert, the document was submitted to the action of a Crookes tube, and the result showed distinctly the outlines, in the substance of the paper, of a name which had been erased from the surface to make room for that of the man who was convicted upon this evidence.

IN the proceedings of the Chemical Society of London Heycock and Neville describe the study of the sodium-gold alloys with the X rays. Sodium is much more transparent to the rays than gold, and X-ray photographs of thin sections of the alloy show its crystalline structure very clearly. The authors point out that other alloys may be similarly studied, and are at present engaged on those of aluminum. It is possible that by this method our knowledge of alloys may be materially extended.

Scientific Progress.

Liquefying Fluorine Gas.

At a sitting of the Academy of Sciences at Paris lately, M. Moissan communicated the results of his experiments with Prof. Dewar in the liquefaction of fluorine gas. This gas, as is well known, has hitherto resisted all efforts to reduce it to a liquid state. M. Moissan announced in his address that it had now been liquefied by him and Prof. Dewar at about 185° centigrade, below zero. The experiments resulting in liquefaction were conducted in apparatus invented by Prof. Dewar. When a current of fluorine gas is passed into an apparatus maintained in the midst of liquid oxygen in tranquil ebullition at a temperature of minus 180° centigrade, liquefaction does not occur. But as soon as that temperature is diminishing by exhausting the gas above the liquid oxygen, the liquefaction of the fluorine begins, and a clear yellow and extremely mobile liquid is obtained, which resumes the gaseous state as soon as the temperature rises. This liquid has lost the chemical activity characteristic of fluorine in a state of gas. It no longer attacks glass, silicon, sulphur or phosphorus. Fluorine at a very low temperature, however, still attacks carburetted hydrogen, and its affinity for hydrogen seems still to exist. M. Moissan and Prof. Dewar are continuing their investigations, and although solid fluorine has not yet been obtained, M. Moissan is sanguine that this result will also be secured.

An Ergometer.

An instrument in use at Columbia University is a dynamometer made to write on a kymograph. The maximum pressure of the thumb and forefinger or the movement of a single finger could thus be registered, and a series of movements showing fatigue could be recorded. The curves give the actual amount of work done, the height of the curves being proportional to the pressure in kilograms. The instrument was compared with Mosso's egrograph, and curves were shown in which the movements made in lifting a weight and in extending a spring were simultaneously recorded. It was evident that the ergograph curves did not give a correct measure of fatigue, and of course gave no record when the weight was not lifted, whereas the ergometer curves measured more nearly the actual course of fatigue. The instrument is being used in the psychological laboratory of Columbia University, to study fatigue and the effects of sensations and emotions on movements.—Science.

Tin in Canned Goods.

In a graduating thesis at Washington and Lee Universty, J. R. K. Cowan takes up the question of the presence of tin in canned goods, and his results confirm those of previous investigators along this line. He finds tin present in every can examined, including tomatoes, peaches, apricots and sweet potatoes, in quantities of from 60 to 150 miligrams per kilo. Granting that this tin is present in a form which can be acted upon in the human system, and considering the large consumption of canned goods, it seems to follow that tin is less toxic than has been supposed and that it cannot be a cumulative poison. The maximum dose of tin is given as half a grain of chloride, but the amount of tin corresponding to this might often be taken into the system during a single meal. Very few cases of supposed tin poisoning from eating canned goods have been reported, and it is probable there is little danger from this source. In no instance did Mr. Cowan detect the presence of lead.—Science.

AT a late meeting of the Royal Society, London, was exhibited by C. T. Heycock and F. H. Neville a curious alloy of silver and zinc, which would have warmed the hearts of the old-time alchemists. This alloy is of the ordi-

nary color of silver, but when warmed up to 300° C. and then suddenly cooled, it becomes the color of copper. On reheating and cooling slowly, it resumes its original color. The same effect is produced by heating in air, in hydrogen or in a vacuum.

Mechanical Progress.

Weighing Sky Scrapers.

It is necessary for an architect to know the weight of a tall building long before it is put up. The character of his foundation depends upon it. Yet the estimation of this weight is so simple a matter that an under clerk or an apprentice in an architect's office often gets the task of calculating it. His grand total may reach, as in the case of the twenty-one story Surety Building in New York, 50,000 tons, or, in the case of some big bridges like the one at Poughkeepsie, 4000 or 5000 tons. How is it done? In the first place, the weight of every piece of material to become part of the structure is furnished by the manufacture.

Whether it be Z-bar girders or white lead, it is all brought into the total. Even such an insignificant thing as a difference in the quality and kind of paint used may make a ton of difference in the general weight of the structure. Every rivet in the building is accounted for; and if the ends are fused or hammered down on the opposite side of a girder instead of being merely bolted on, the fact must be taken into account. If the roof is covered with tin, the solder which holds the plates together is put down as weighing so much per ingot. In laying the tin plates on the roof the edges of each plate are lapped over the adjoining plates to the extent of a quarter of an inch on all sides. This quarter inch of necessary lap adds a large number of pounds to the general weight of the roof. So the process continues through the whole building. The weight of the clapboards, the plaster, the wall paper, the window glass, the gas or electric fixtures, the cornice ornaments and of the thousand and one materials and appurtenances which go to make up a building are considered and accounted for. In the aggregate, these weights, thousands of tons, constitute merely the dead weights of the building. The live weight, such as the weight of the tenants, the furniture and their other belongings, must be added to the total.

An office building with a capacity of 3000 persons would be about 165 tons lighter at night, when it is deserted, than in the daytime, when it is occupied. In office buildings it is customary to estimate about 100 pounds of live weight to the square foot. The buildings themselves press down upon the earth at the various rates of from four to twelve or fourteen tons to the square foot. The tall St. Paul building is estimated at the last named figure. The Surety building, mentioned above, is estimated to exert a pressure of six tons to the square foot.

Use for Scrap Mica.

C. H. Mitchell, before the Ontario (Canada) Mining Institute, said that by taking the scraps or waste pieces of mica and subdividing them as finely as possible, and then quilting them between galvanized wire netting, that we produce a fireproof mat, flexible and clean, and a non-conductor of heat, that makes a very good covering for boilers, steam pipes, etc. It will be noticed that all these flakes are ribbed or corrugated, the object being to increase the number of dead air spaces in the mat, and also to add to its bulk without increasing its weight. The finer we are able to divide these flakes the more effective they become, as each one in itself is an effective non-conductor.

The mats, or quilts, are not only fireproof, but are flexible and elastic, which is a most valuable feature, as they will expand or contract with the iron or steel they cover without cracking or flaking off. The real value, however, in making these mats in sections, is that they can be removed whenever it is desirable to examine the shell of the boiler, and can be replaced easily and quickly without injury.

They are secured to the boiler by means of hooks attached to iron bands, which are passed round the boiler under the mats. Besides this covering for boilers, the waste mica is made into sectional covering for all sizes of steam and hot-water pipes, the only difference being that the mica is stitched between a wire core which fits the pipe, and an outer covering of canvas.

Nail Production in 1896.

The production of iron and steel wire nails in the United States in 1896 amounted to 4,719,860 kegs of 100 pounds each, compared with 5,841,403 kegs in 1895, a decrease of 1,121,543 kegs, or over 19 per cent. In 1894 the production amounted to 5,681,801 kegs and in 1893 to 5,095,945 kegs. The wire nails produced in 1896 were manufactured by seventy-three works, thirty-one more than were in operation in 1895. The production of 1896 represented 210,708 gross tons.

The total production of cut nails in 1896 was 1,615,870 kegs of 100 pounds each, against 2,129,894 kegs in 1895, a decrease of 514,024 kegs, or over 24 per cent. There has been a steady decline in the production of cut nails since 1886, in which year the maximum production of 8,160,973 kegs was reached. In 1896 the production of wire nails exceeded the production of cut nails by over 3,103,000 kegs. The production of cut nails in 1896 represented 72,137 gross tons. Eleven states made cut nails in 1896.

The Largest Swing Bridge.

The Sanitary Trustees of Chicago will build the largest swing bridge in the world across the drainage canal at Thirty-first street and Campbell avenue. Its total length will be 400 feet 5 inches, and its width will be 120 feet. The height of the center columns will be 68 feet; headway under the trusses for trains, 21 feet; headway under the bridge, 18 feet, and depth of water in the channel, 24 feet. The bridge will be of steel, weighing 7,000,000 pounds. It will be capable of supporting a trainload of 8,000,000 pounds. The total cost is estimated at $700,000, including the machinery. Three railways will use the structure, crossing on eight tracks. The turn-table will have a diameter of 80 feet, and the bridge will be swung in one minute, probably by electric power.

It is stated by one of the heads of departments of the London and Northwestern Railway that that company issues yearly fifty tons of railway tickets.

DIVIDEND NOTICE.

The German Savings and Loan SOCIETY,

526 California Street.

For the half year ending June 30, 1897, a dividend has been declared at the rate of four and twenty-hundredths (4.20) per cent per annum on Term Deposits and three and fifty-hundredths (3.50) per cent per annum on Ordinary Deposits, free of taxes, payable on and after THURSDAY, July 1st, 1897. GEO. TOURNY, Secretary.

DIVIDEND NOTICE.

San Francisco Savings Union,

532 California Street, Corner Webb.

For the half year ending with the 30th of June, 1897, a dividend has been declared at the rate per annum of four and two-tenths (4.2) per cent on Term Deposits and three and five-tenths (3.5) per cent on Ordinary Deposits, free of taxes, payable on and after THURSDAY, July 1st, 1897.
LOVELL WHITE, Cashier.

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E. S. TOPPING, TRAIL, B. C.,

Has prospects for sale in Trail Creek and the whole of the Columbia basin. Will buy legitimate stock and mines for investors. Will examine mines. Has lots for sale in Trail and Deer Park.

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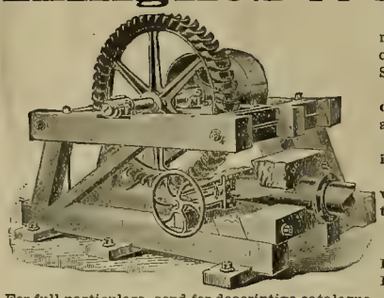

The accompanying cut shows the general arrangement of Knight's Standard Water Wheel, of which there are hundreds in use in different States of the Union.

These Wheels are made from 2 feet to 6 feet in diameter, from 10 to 1000-horse power, and adapted to all heads and purposes.

Wheels inclosed in iron cases, from 6 to 24 inches.

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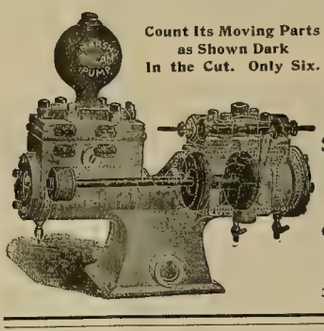

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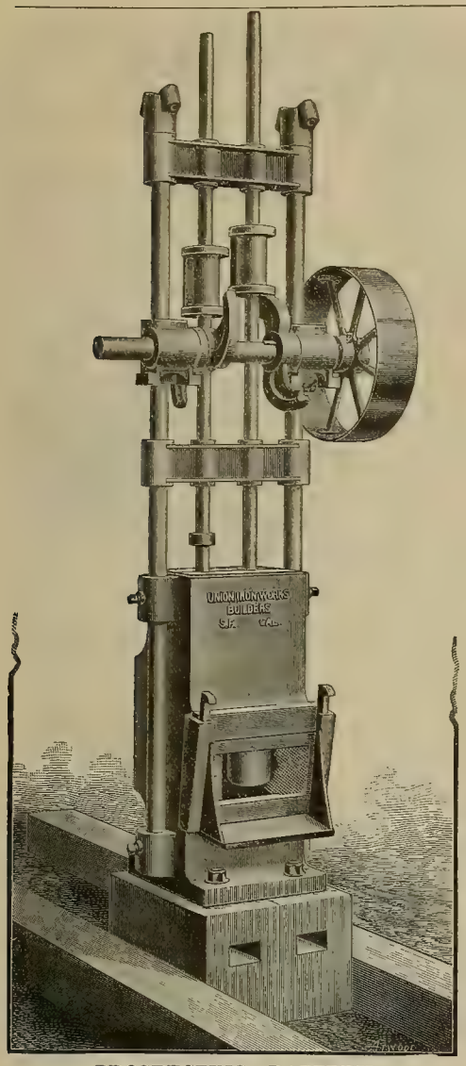

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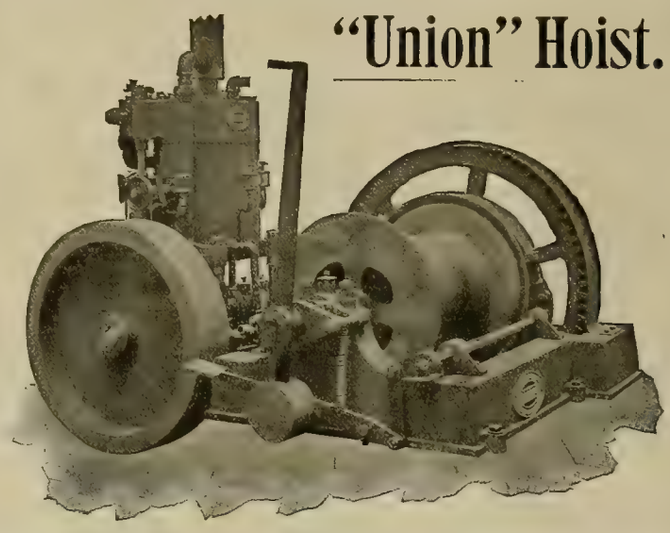

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Coast Industrial Notes.

—Flagstaff, Arizona, will spend $100,000 for water works.

—City expenses will cost San Francisco $5,756,371 this year.

—During June San Jose, Cal., shipped 3,000,000 pounds of cherries.

—The Mexican Sulphur Co. proposes to erect a plant at Ventura, Cal.

—A railroad will be built this summer between Fort Thomas and Globe, Arizona.

—The San Francisco Chamber of Commerce will memorialize Congress in favor of Hawaiian annexation.

—The Garlick Company will supply Keswick, Shasta Co., Cal., with water from Spring creek.

—Over 20,000 visitors are expected on this coast next week, the fare from Chicago —2600 miles—being $25

—The Torrens system of land transfers was adopted at the last session of the California legislature and is now in force.

—The East Riverside, Cal., Company will use an electric pumping plant to supply water for irrigation along its system of ditches.

—A thousand tons of tea of the new crop has been landed in Tacoma, Wash.; 12,000,000 pounds are now on the ocean between Yokohama and that port.

—It is thought that the present extraordinarily low passenger rates between San Francisco and northern ports will be raised during this month.

—The parties holding the concessions for building a railroad from Deming south into old Mexico have surveyors in the field traversing the proposed route.

—At Colton, Cal., the fruit cannery was reopened this week. The cannery employs 400 hands and puts out 35,000 cans of fruit daily. They expect to run five months.

—The Bibb Lumber Co. has a contract with the Chinese Government for 10,000 M. feet railway ties and 7,000 M. feet stringers for building a railroad through Manchuria, China. The lumber is to be delivered at Tien-tsin.

—When the frost came on Florida the orange industry of that State had grown to 5,000,000 boxes, while California then produced but about 1,500,000 boxes. The Los Angeles *Times* says: "It appears now that, barring accidents, southern California can count on harvesting 4,000,000 boxes this year."

—On July 1st the Atlantic & Pacific Railway went out of existence. The line from Mojave, Cal., to Albuquerque, N. M., is now known as the Santa Fe Pacific Railroad. The line from Benson to Guaymas now belongs to the S. P. Co. J. J. Byrne is the general passenger agent of the new Santa Fe Pacific, with headquarters at Los Angeles, Cal.

—The Union Construction Company is organized at Phœnix, Arizona. Capital, $100,000. Incorporators, J. W. Beckley, Rochester; A. Smith, New York; A. A. Daugherty, Los Angeles. The company is supplemental to the Randsburg Railroad Company, formed several months ago for the construction of a railroad from Kramer, on the Atlantic and Pacific, to Randsburg, a distance of twenty-seven miles. The local representative of the corporation states that the new road will be in operation by August 15th.

—The engineers at Newtown shoals, where the Sacramento enters Suisun bay, have sounded to a depth of 18 or 20 feet below low water and encountered only sand. One report is to the effect that hardpan was struck under the sand. This is supposed to be packed or cemented sand. Engineer Price believes that the substance, whatever it may be, should be removed in order to stimulate the current of the river. He holds that dynamite would readily loosen the packed sand and the current would do the rest of the work.

Recent California Mining Incorporations.

Murchie Drift Gravel M. Co., San Francisco; C. L. Benton, C. A. Cole, F. Hiller, J. C. Brown, G. T. Emery; capital stock, $300,000; $1500 subscribed.

Old Virginia M. and M. Co, San Francisco; W. F. Drake, G. Strauss, C. T. Ryland, J. G. Hopper, C. A. Stubbs, H. Harvey, J. E. Gabriel; capital stock, $200,000; subscribed, $700.

Recently Declared Mining Dividends.

Tamarack Copper Co., Michigan, $180,000; payable June 30.

Osceola Copper Mining Co., Michigan, $50,000; payable July 26.

Ontario, Utah, $15,000; payable June 30. Total to date, $13,445,000.

Le Roi, Rossland, B. C., $25,000; payable June 30. Total to date, $425,000.

Recent Publications Received.

"*The Brownstones of Pennsylvania*" is the title of a report on this subject just issued from the Mining School of the Pennsylvania State College. It contains 125 pages of text besides twenty-six page plates of illustrations and two maps. It shows care in preparation and contains valuable information on the subject. The author, Mr. T. C. Hopkins, is an expert on the subject of building stones, having published several monographs on the subject in the Government and different State geological survey reports, and numerous shorter articles in the scientific and trade journals.

Personal.

LOUIS JANIN JR. has returned to Sidney.

C. M. RALKER is in Montana and will come on to Idaho.

UPON John Muir the University of Wisconsin has conferred the degree of LL. D.

J. H. COX has been appointed superintendent of the Trinity Consolidated, Delta, Cal.

JUDGE JOHN CALDERWOOD has been appointed manager by the Boston & Colorado Gold Mining Co.

J. H. COX has been appointed superintendent of the Trinity Consolidated mine at Delta, Trinity Co., Cal.

SIMON & WILLIAM GUGGENHEIM, the smelter owners, went up to British Columbia last week to look at the mines.

ALLEN C. WASHINGTON, president of the Horn Silver Co. of Utah and Anson Phelps Stokes from New York are in eastern Nevada.

EX-GOVERNOR GEORGE BLACK has been appointed one of the commissioners for the classification of Northern Pacific mineral lands in Idaho.

A. T. DUNBAR has associated himself with C. H. Chase in the management of the New York Belting & Packing Co., Ltd., 509 Market St., San Francisco.

PROF. SAMUEL F. EMMONS of the United States Geological Survey will shortly go to the Tintic district, Utah, to take charge of a survey of the mineral belts there.

Commercial Paragraphs.

THE San Francisco branch office and warehouse of Park Brothers & Co., Limited, Pittsburg, Pa., "Black Diamond" Steel Works and Lake Superior Copper Mills, has this week removed to the new building 324 and 326 Howard Street, between Beale and Fremont.

E. A. RIX has sold out his stock in the Rix Compresssed Air Machinery Company, and has opened a new business under the title of the Rix Engineering and Supply Co. at 507 Market street. He has just contracted with the Black Oak mine for a 100 H. P. compressor plant with 14-foot direct connected water wheel, and with the Gwin Mining Co. for the first half of a 500 H. P. plant with duplex 18 x 24's and 16-foot direct connected water wheel attached. This plant will be for pumping from the mine at an elevation of 1200 feet Compound pumps will be employed and a unique method of reheating. In addition to carrying on the compressed air business Mr. Rix has made a connection with one of the large electrical companies and will install electrical plants where they fulfill the requirements better than compressed air. The Cramp-Hoadley Co. have placed their agency also with Mr. Rix, and this places with him the American Wheelock engine, the most economical of steam engines in this market, and also the products of several other manufacturers.

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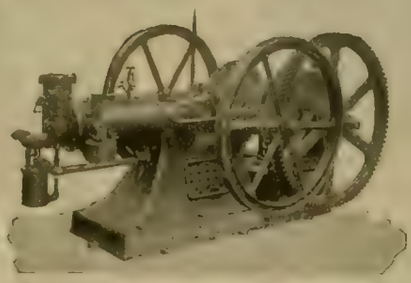

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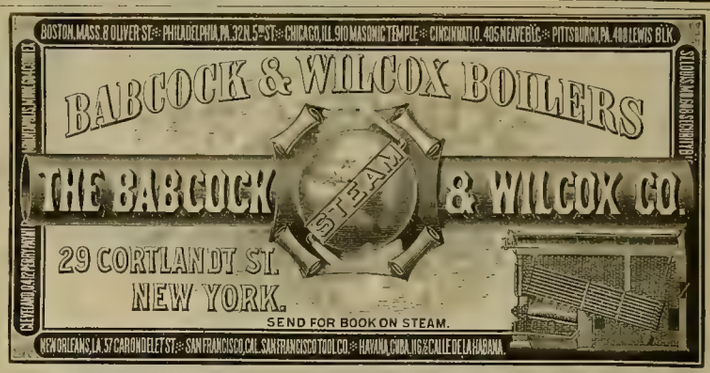
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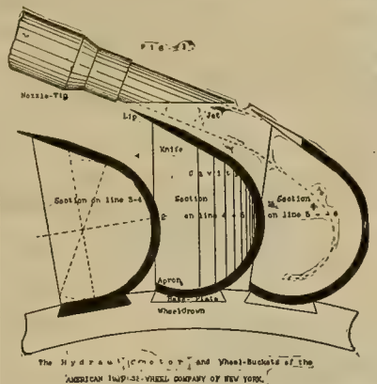

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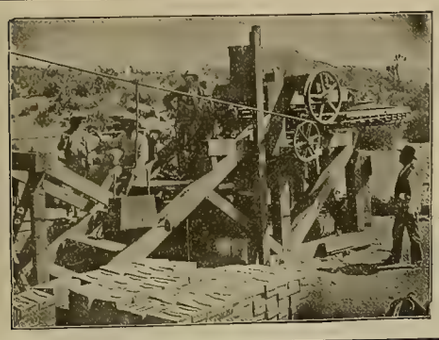

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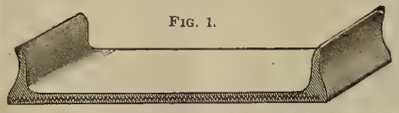

FIG. 1.

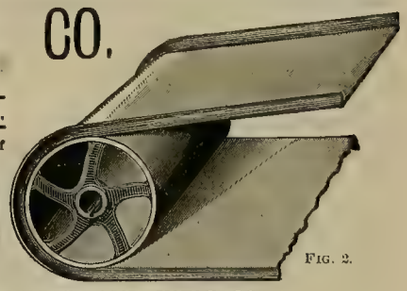

FIG. 2.

We shall be pleased to quote you also on Water, Air Drill, Steam, Suction and Fire HOSE, RUBBER BELTING and RUBBER PACKING. Correspondence Solicited.

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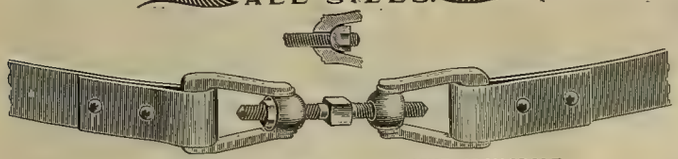
ALL SIZES.



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These couplings are easily applied. They are the best—most powerful. They have a direct pull, working freely with right and left screw on ball and socket joints tangentially to curvature of the tank. The turn-buckle principle of these clamps makes them lasting favorites with all who have once tried them. We use them extensively in our tank-building department.

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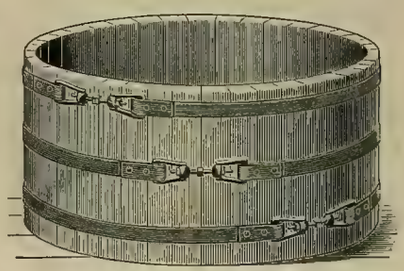

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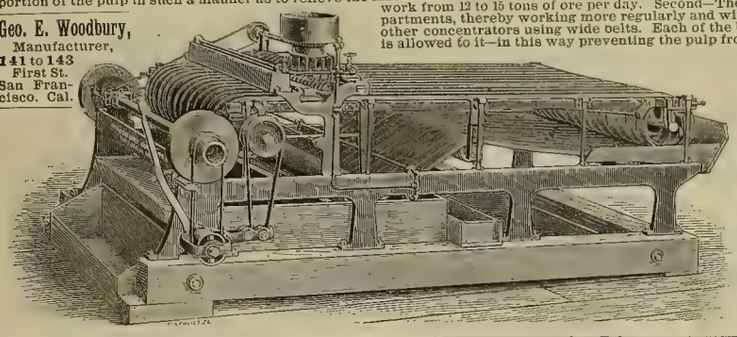
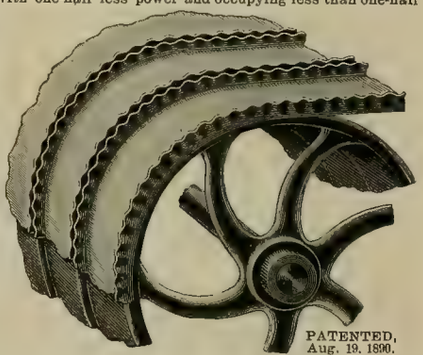
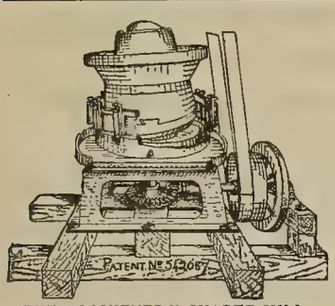




PATENTED, Aug. 19, 1890.

This Concentrator took the 1st prize at the San Francisco Mechanics' Institute in 1890, 1891 and 1892, and at the California State Fair in 1892; it took the 1st, prize at the World's Columbian Exposition 1893, and at the San Francisco Midwinter Fair, 1895.



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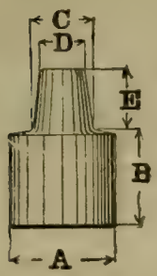

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D=..... "
E=..... "

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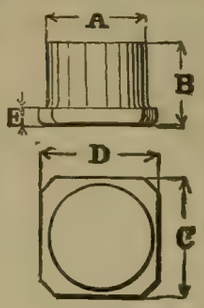

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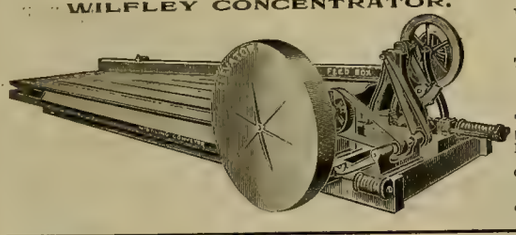

For confirmation of all of the above we refer to Henry Lowe, Puzzle Mine, Breckenridge, Colo.; Mary Murphy Mine, St. Elmo, Colo. W. E. Renshaw, Mayflower Mill, Idaho Springs, Colo.; H. E. Woods, Denver, Colo.

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[SIGNED] S. I. HALLETT.

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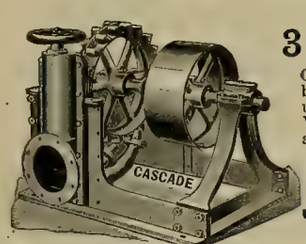

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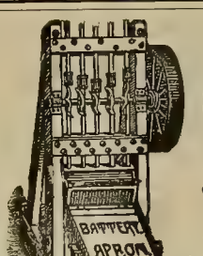

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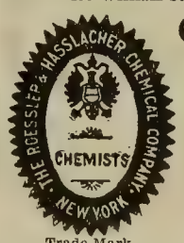

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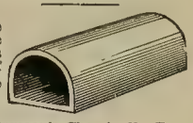

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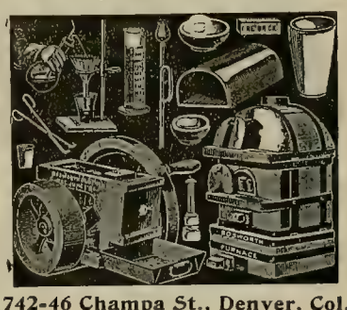

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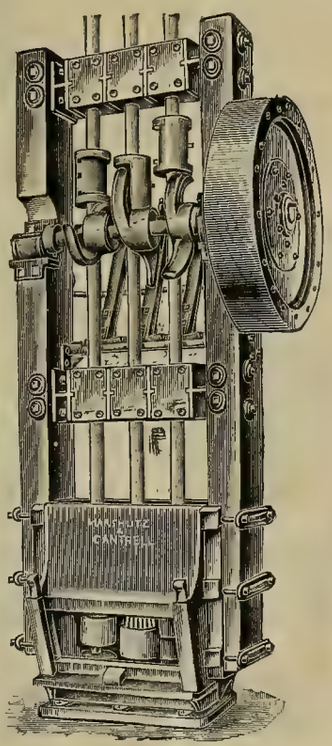

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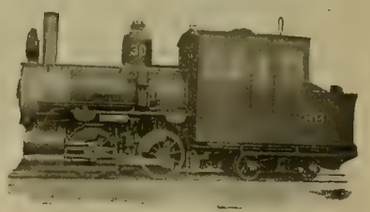

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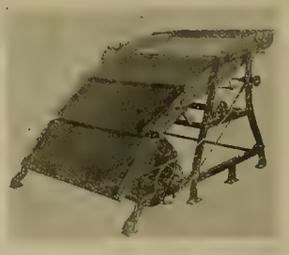

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List of U. S. Patents for Pacific Coast Inventors.

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FOR THE WEEK ENDING JUNE 22, 1897.

585,087.—SAFETY BANK CHECK—A. W. Dowe, S. F.
584,817.—FRUIT DRIER—A. Fleckenstein, Portland, Or.
584,818.—FRUIT DRIER—C. Fleckenstein, Portland, Or.
584,866.—PNEUMATIC OVERSHOE—J. A. Flint, S. F.
585,037.—SAWING MACHINE—H. C. Hutchinson, Woodville, Or.
584,880.—STONE GRAPPLE—W. Knox, Haywards, Cal.
585,045.—ANIMAL TRAP—C. T. Pelton, Perris, Cal.
585,046.—CAMP STOVE—C. S. Penfield, Spokane, Wash.
585,047.—ELECTRIC RAILWAY—C. Peterson, S. F.
584,796.—SPRING BRAKE—P. Selleg, Valley, Wash.
585,055.—WHEEL—J. T. Stockton, Santa Rosa, Cal.
585,056.—POWDER DISTRIBUTER—E. D. Stodder, S. F.
585,009.—PLANT PROTECTOR—S. Taylor, Winters, Cal.
584,790.—WASHBOARD—W. G. Tower, Murrietta, Cal.
585,064.—FIRE LADDER—J. E. & E. Uren, Auburn, Cal.
585,013.—PADLOCK—T. R. Vincent, Salem, Or.
585,142.—BUTTON FASTENER—C. H. Warrington, S. F.
585,168.—MITER BOX—F. A. Zeigler, Los Angeles, Cal.

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Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

VOTING MACHINE.—Christ Christensen, East Oakland, Cal. Assignor to the California Voting Machine Company, of San Francisco, Cal. No. 584,494. Dated June 15, 1897. This invention relates to an apparatus which is designed to mechanically indicate the choice of a voter from a list of candidates, and means of registering the same, and totalizing the entire number of votes cast for each of the candidates. It consists of a casing containing the registering mechanism, mechanism to prevent more than the requisite number of votes being cast for any one office, having exposed for the manipulation of the voter a series of keys and a corresponding list of the names of candidates for each of the offices to be voted for, a means for locking the keys so that but one vote can be cast for any one individual, and means for allowing the requisite number of votes to be cast for offices where more than one is to be voted for. The keys to be operated by the voter are rotatable, and are fixed upon the ends of screw-threaded rods which, when turned, advance the indicators and show the number of votes by the position of the indicators upon the figured index behind. The keys are segmental, having a straight portion upon one side, and there are blocks slideable with relation to these straight edges so as to prevent the keys from being turned when the blocks stand opposite to them. The number of these locking blocks equals the number of candidates less the number to be voted for, and they can be moved so as to allow the voter to turn the key corresponding with the name or names he desires to vote. In conjunction with this mechanism is a returning device by which, after the voter has left the booth, all the parts may be returned to their normal position.

BROOM CORN SIZING MACHINE.—J. M. Gaffney and J. J. Fischer, San Francisco, Cal. No. 584,499. Dated June 15, 1897. This invention relates to a class of machines for sizing or sorting broom corn into lengths. It consists in the novel construction, arrangement and combination of the parts of the machine, so that the broom corn can be accurately sized and sorted. This object is attained by supporting the corn fiber upon a firm bed or table having an inclined side with means for receiving and advancing the broom corn over the bed or table, a series of rotatable devices arranged in pairs parallel with the inclined side of the bed so that they may be set at successively different distances from the path of travel of the broom corn and receive successively different lengths between them and withdraw the lengths. Stationary pins are fixed in the table to check the progress of the corn after it has been engaged by the devices.

CONCENTRATOR BELT ADJUSTMENT.—George Gates, Jackson, Cal. No. 584,502. Dated June 15, 1897. This invention relates to a device for adjusting endless traveling concentrator belts. In the employment of the long endless traveling belts of considerable width, the varying weight of material which may at times be brought upon one side or the other of the belt will stretch it irregularly so that it is apt to run off the drums. This invention is designed to correct this difficulty, and it consists in the employment of a roller or rollers adapted to press upon the lower part of an essentially loose or slack belt, with a means for changing the angle of the roller obliquely to the belt so that it will be caused to travel to one side or the other as may be desired.

CONCENTRATOR BELT.—George Gates, Jackson, Cal. No. 584,501. Dated June 15, 1897. This invention relates to an improved concentrating belt, and consists essentially in the novel construction of the belt and its raised or upturned edges. Belts of this class are made endless, adapted to travel over drums or rollers at the ends and receive the pulp or material to be concentrated so that, in conjunction with water, it flows down the belt while the belt travels upward against the current and passes continually around the rollers at each end, the sulphurets being cast off at the upper end and the lighter material discharged at the lower end. The constant stretching and straightening of these edge ribs in most constructions of such belts causes them to crack and break in time, and my invention is designed to so construct this rib as to allow it to compress when a belt is passing around the rollers without such a stretching as would be apt to tear or break the flanges. The flanges in this construction are made substantially of the same thickness throughout, and are extended upwardly and outwardly from the body of the belt, joining at their upper limits by short inclined walls which form, with the inner and outer walls of the flanges, acute angles in which the apex is approximately vertical in line with the point on the belt where the base of the outer inclined wall meets the horizontal bottom line of the belt.

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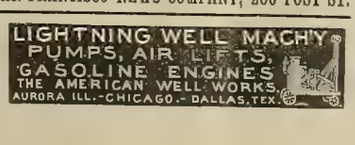

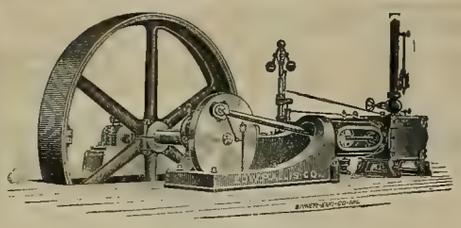

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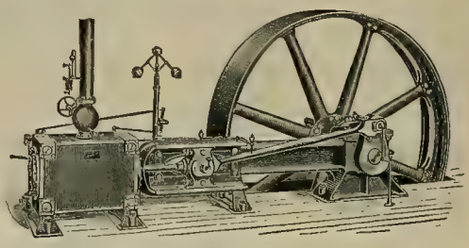

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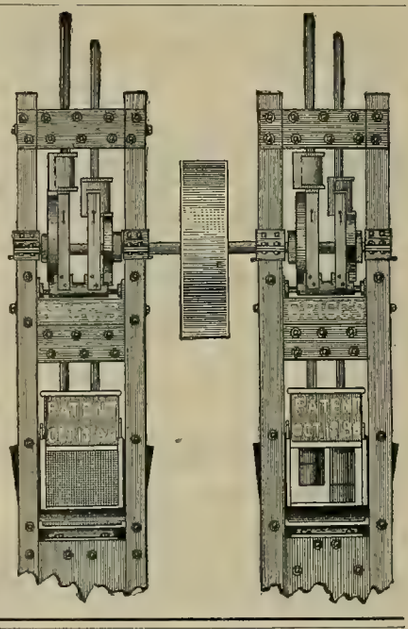

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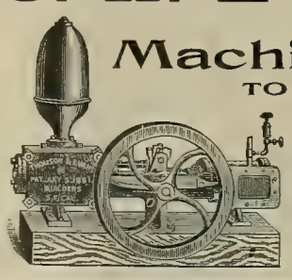

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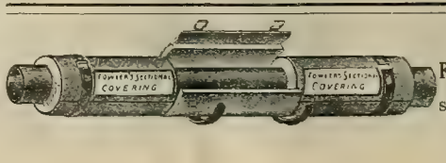

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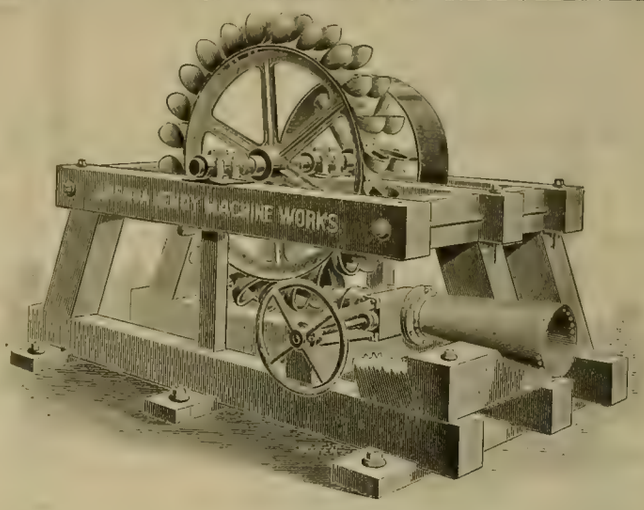

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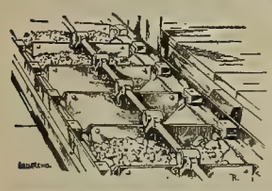

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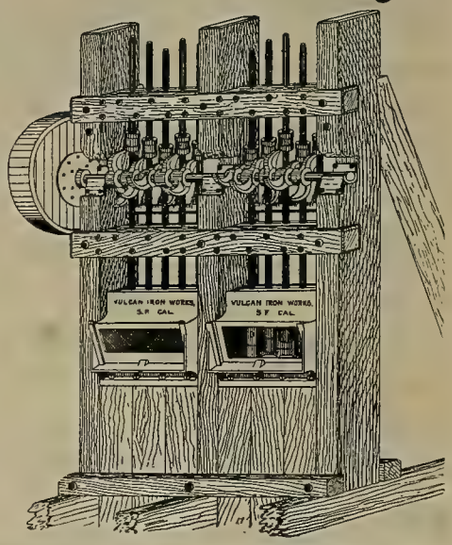

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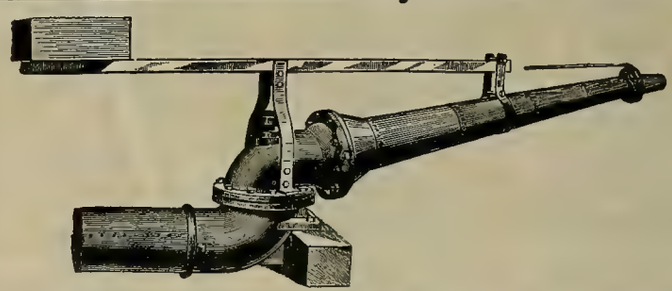

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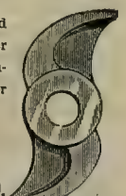

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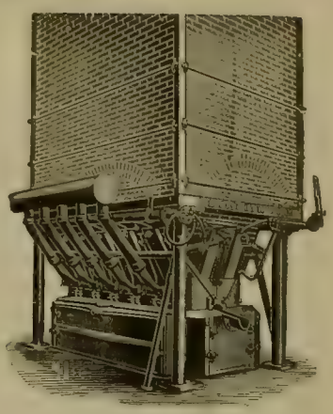

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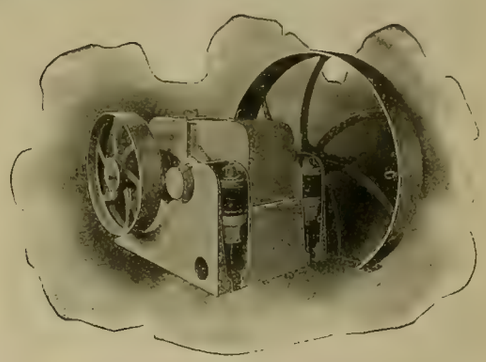

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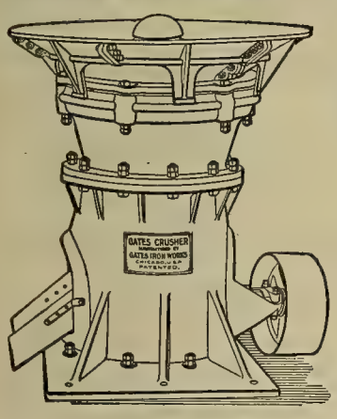

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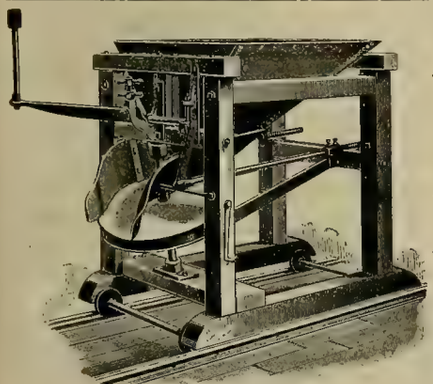

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Hendrie & Bolthoff M'f'g Co., DENVER, COLORADO.

Market Reports.

The Markets.

SAN FRANCISCO, July 1, 1897.

Business in every branch of trade is steadily enlarging, but the margin of profit has been cut so as to be completely wiped out in some lines. This is expected to change for the better as buying increases. The belief prevails that there will be a large influx of merchants and miners within the next ten days, which will help to improve trade. With manufacturers there is nothing new to report. The larger institutions report large contracts in hand. The Union Iron Works are turning out some heavy machinery for the Anaconda mine. These works have added over $360,000 worth of the latest improved labor-saving machinery, selling that grown obsolete. This enables the best of work at low figures, so as to compete successfully with the largest works at the East or in Europe. They have in hand contracts calling for over $6,000,000. From the general tenor of information it seems quite reasonable to assert that in structural machinery and other iron work there is more doing than at the corresponding time for several years past.

The local money market is steadily working to more ease, although two or more of the banks still prefer hoarding to letting out funds. Outside capitalists are coming in more freely and taking the better loans. They believe that lower rates of interest will have to rule. Collections are reported easy for the season of the year. There is more money going out for crop moving purposes, but this soon goes into circulation and finds its way back to the general reservoirs. There is very little speculation at present, but this is expected to change before long. Remitting money to the East is still quite free, which keeps New York bills strong. New York advices continue to note an active market, with a free call for funds. There is considerable speculation in railroad and industrial securities. Advices are also to the effect that business is steadily reviving, but it will take time to recover from the late depression. European advices continue to note more doing in American securities, but the volume is not yet sufficient to overcome the heavy importation of goods by the United States, and the difference will have to be met later on by exporting gold.

New York Silver Prices.

NEW YORK, July 1.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	27 9-16	60⅛
Saturday	27 9-16	60⅛
Monday	27¾	60⅜
Tuesday	27⅝	60⅛
Wednesday	27 9-16	60⅛
Thursday	27 9-16	60¼

	Copper.	Lead.	Iron.	Tin.
Fri.	11 00 @11 25	3 35	10 00@12 25	13 97½
Sat.	11 00 @11 25	3 35	10 00@12 00	14 00
Mon.	11 00 @11 25	3 40	10 00@12 00	14 00
Tue.	11 00 @11 25	3 45	10 00@12 00	14 10
Wed.	11 00 @11 25	3 55	10 00@12 00	14 10
Thur.	11 00 @11 25	3 55	10 00@12 00	14 10

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	17½c Prem
New York Telegraphic Transfer	20c Prem
London Bankers' 60 days	$4.87
London Merchants	$4.85
London Sight Bankers	$4.88
Refined Silver, per oz., 1000 fine	60⅝
Mexican Dollars	49@49¼

SILVER.—The market advanced slightly, but did not retain the firmness over one day. Our Eastern and European advices are to the effect that there is an entire absence of any move that looks like speculation. The steadiness of the market in the absence of a free movement shows that holders on this side are not pressing for a market, but sell as required. It is the impression that China will take increased quantities soon, as the new season tea and rice crops is on now. The steamer for Hongkong hence June 26th took out in silver bullion 71,600 ounces for China and 63,000 ounces for Bombay.

MEXICAN DOLLARS.—The market shows a slight improvement in the call. The last steamer for China took 157,580 dollars.

QUICKSILVER.—The market is slightly lower. The demand is reported fully up to if not ahead of that ruling at this time in 1896. Our market is quoted at $40 for domestic consumption.

COPPER.—The market shows more strength at the East and abroad, but with us there is very little change to note. There have been few imports of ingots the past week which indicates an increasing consumption. The East reports a firm market with the American demand improving. England continues to advise of free consumption in all European countries. The demand is for legitimate wants.

The local market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@17
Bolt	¾ and 5-16, 20c; ⅜ and larger, 17

TIN.—In our market there is nothing new to report. At the East and abroad the markets have gained strength closing strong at an advance. Although we do not quote higher yet in our market prices will be advanced when the cheaper lots are out of the way.

We quote as follows in a jobbing way:

Pig, per lb	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

LEAD.—The market is strong at higher figures. The consumption is free. The East reports steadily advancing markets, closing strong. The consumption at the East, it is said, shows quite a decided increase over that at the corresponding time last year.

Our market is quoted in jobbing lots as follows:

Pig	4 10	@	4 35
Bar	—	@	4 60
Sheet	5 75	@	6 25
Pipe	5 00	@	5 50

SHOT.—In sympathy with lead, the market is expected to sell higher.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 35
Drop, B and larger sizes, " "	1 60
Buck, Balls and Chilled, do, " "	1 60

POWDER.—There is nothing new to report. The demand continues strong.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9c to 11c, according to strength and quantity.

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4½

IRON.—Our market is practically unchanged. At the East the market is slightly lower notwithstanding a heavy movement.

AMERICAN.

	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

COAL.—The bark Theobald from Cook's Inlet, Alaska, to North Pacific Mining & Transportation Co., brought in the past week 1000 tons of coal, which is of superior quality and is equal in every respect to the best mined on the coast. So say experts. The prospects of a 62½-cent duty on coal will make its influence felt later on, or so soon as supplies on hand at time duty goes into effect are exhausted.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$8 00@— —
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 50@ 6 00
Coos Bay	—@ 4 75
Cannel	8 00@— —
Egg, hard	12 00@13 00
Wallsend	6 50@— —

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	—
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	9 50	@	— —
" spot, in bulk	10 00	@	— —
" in sacks	11 00	@	12 00
Cumberland	— —	@	— —

ANTIMONY.—The market is steady.

Our market is quoted at 7¼@8¼c in a jobbing way. New York mail advices quote 7½c for Cookson's, 6⅞@7⅛c for Hallett's and 6⅞@7c for Japanese.

NAILS.—The market is strong and active.

Wire, carloads, basis per keg	—
" jobbing, " "	$2 35
Cut, carloads, " "	—
" jobbing, " "	2 25

PLATINUM.—Very little doing.

Our market is quoted in a jobbing way at $10 to $15 per ounce.

ZINC.—The market is firm at quotations.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 50 cents per pound for ingots.

Chemicals.

The general feeling both here and at the East is to more ease. While quotations remain unchanged, yet it is stated that concessions are obtainable on about every line. This is particularly the case at New York when the heavy imports with liberal consignments on its way begin to tell against sellers.

SPELTER.—The market is quiet

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is steady.

Our market is quoted in a jobbing way at $1.50 a pound.

PHOSPHORUS.—The market is steady.

We quote in a jobbing way at 70 to 75 cents per pound.

BONEASH.—There is a free outward movement.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3¼c; No. 2, 2½c.

SODA ASH, 58% (LeBlanc process).—The market is steady at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is quiet at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—There is a fair demand at 2½c a pound from stores.

NITRATE OF SODA.—Market is quiet.

Our market is quoted from store at 4c for 95%.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

SULPHURIC ACID.—The demand is fair.

We quote in a jobbing way at 1½c per lb for 66%.

NITRIC ACID.—Our market is reported steady from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is quiet.

We quote in a jobbing way at 4½c per pound.

Mining Share Market.

SAN FRANCISCO, July 1, 1897.

The market has been fairly active the past week at advancing prices under the lead of Sierra Nevada in the north end and Yellow Jacket in the south end. The belief prevails that the market is in control of one or two brokers, one of whom controls two or more mines and has sufficient money backing to send prices to fair figures if desired. About every year this person, it is said, takes hold of the market when such persons as John W. Mackay, D. O. Mills and Col. Hayward are not in the market. It is also stated that under his manipulation the leader has, at times, been advanced several dollars a share. Knowing this the better informed are slow to short at the commencement of his manipulation, but wait until there are signs of outsiders buying after the leader has made quite a nice little advance, for then it takes more money to handle it and therefore it is a safer proposition for selling short. The upmove in Yellow Jacket and Sierra Nevada is due to the shares having been well concentrated and the work in each mine could be magnified into importance so as to excite the cupidity of outsiders into buying at a good profit to the manipulator. In Sierra Nevada they struck a body of low-grade ore said to be entirely new which has been known to miners for years past, that admits of enlarging on so as to get in buyers who are always afraid of being left on a deal. In Yellow Jacket quiet rumors have been put for some time of an improvement in the mine and that a deal in the shares could be looked for. This is the old story brought to life about every two or three years, but which has proved a success to unload shares at good prices. For years no one on the outside has got any returns from Yellow Jacket and it looks as if it will be some time to come before they get returns in the shape of dividends. The adjournment of the exchanges from this afternoon to July 6 is a longer vacation than usual and helps to make small shorts on the market fill.

Official and semi-official news from the Comstock mines is practically unchanged since our last week's review. There are four centers of attraction, as follows: Sierra Nevada, Yellow Jacket and the work in both Alpha and Con. Imperial or Challenge. The Chollar work on the Brunswick lode has seemingly lost its attraction, as has the work in Con. Virginia on the Comstock lode; but now it is Sierra Nevada and Yellow Jacket. What will come next is as yet an open question. In Utah they are still running the north drift from the main west tunnel. In Sierra Nevada the work is confined largely to the 900-foot level, although work is continued on the Layton Tunnel level. On the first-named level they struck a body of low-grade quartz, and expect to run two more crossdrifts for it after the north lateral drift has been run still farther. It is this "expectation," combined with share manipulation, that has given life to the shares down here. In Union they are still working on the 900-foot level, with no change reported. Mexican shareholders are to be congratulated, for the management has struck something beside assessments, even if it is 75 cents to $1 a ton rock. The work in this mine is on the 5000-foot level, in a southwesterly direction. Work in Ophir is continued on the Central tunnel and 1000-foot levels. In the former $1 ore has been struck. In Con. Virginia they are still exploiting the 1000-foot, 1550-foot and 1650 foot levels. Last week they did not extract any ore. They ran into old timbers in one direction and into about everything except pay ore in other directions. From 385 tons of ore worked at the mill there was a bullion return of $36,000. What the net coin return was we are not advised at this writing There is no change in the joint work of Best & Belcher and Gould & Curry. In Savage they continue to make slow progress in striking ore. The Hale & Norcross litigation makes it hard to get mine news, even if there is any to report. The Grayson-Hayward combination, in control at Virginia City, and the Fox combination, down here, places outside shareholders between the devil and the deep sea. No work in Chollar. In Potosi they are still raising from the 100-foot level. Nothing new has come to hand from Bullion. In Alpha the poor grade ore, ranging from $8 to $18 per ton, which we stated would be struck, has been reported. The high-grade ore, still farther west, will not, so it is said, be found yet awhile. When this is uncovered, then the mine, under proper management, could be made to pay handsome dividends; but it looks as if this time is still in the dim future. The joint work of Con. Imperial, Challenge and Confidence to the west is being pushed slowly ahead in favorable formations. The work in Confidence, Crown Point, Belcher, Seg. Belcher and Overman is in the same directions reported last week, with practically nothing new reported in official letters.

From the Brunswick lode our advices state that the joint work of Best & Belcher, Gould & Curry and Con. Virginia is confined to sinking incline shaft No. 2 and exploiting the 300-foot level. The shaft is down nearly 900 feet. In Occidental they continue to exploit the 550-foot and 650-foot levels. On the latter they ran into low-grade ore. Chollar shaft No. 1 is down over 960 feet. They continue to exploit the 300-foot, 400-foot and 500-foot levels. They extracted and raised nearly 200 tons of ore last week. The assays are not so high. They sent to the Carson mint $10,557 in bullion, of which $4935 was in gold. They are still pushing the south drift on the 600-foot level. They ought to start one or two crossdrifts before this month passes.

The following illustrates the changes of the week:

MINES.	June 24.	July 1.
Alpha	.....	$ 12
Alta Consolidated	.....	.....
Andes	.....	.....
Belcher	.....	22
Best & Belcher	.....	45
Bodie	.....	.....
Bullion	.....	10
Challenge	.....	45
Chollar	$ 75	1 10
Confidence	.....	.....
Consolidated California and Virginia	1 40	1 45
Consolidated New York	.....	.....
Crown Point	.....	21
Exchequer	.....	03
Gould & Curry	31	35
Hale & Norcross	.....	.....
Justice	.....	.....
Mexican	26	36
Ophir	63	76
Overman	.....	11
Potosi	36	41
Savage	22	26
Sierra Nevada	53	92
Union	.....	42
Utah	.....	.....
Yellow Jacket	32	51

Under date of June 25th F. H. Pettingell writes from Colorado Springs, Col., on mining stocks: "It is tiresome to read daily announcements of strikes and shipments that never occur. We have in mind one company which makes a practice of announcing a shipment before it is made, making mention of it in the newspaper when it occurs, and calling attention to it when the returns are received. This too frequently has the effect of giving this company credit for three shipments when but one is made, to say nothing of the notoriety it receives from the assays, depth acquired, new drifts started, machinery pur-

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Deling't and Sale.	Secretary.
Alta S M Co, Nev	56	5c	May 21	June 25..July 16	J E Jacobus, 309 Montgomery
Brunswick Con G M Co, Cal	12	3c	June 22	July 22..Aug 14	J Stadtfeld, 309 Montgomery
Bullion Con G M Co, Cal	11	22c	June 22	Aug 2..Aug 23	C A Grow, Mills Bldg
Challenge Con M Co, Nev	23	10c	May 13	June 16..July 8	C L McCoy, Mills Bldg
Chollar M Co, Nevada	43	15c	May 10	June 15..July 8	C E Elliott, 309 Montgomery
Gold Hill M Co, Cal	12	25c	June 16	July 26..Aug 12	C A Grow, Mills Building
Jamison M Co, Cal	9	5c	Nov 27	June 23..Aug 18	Sam W Cheyney, 120 Sutter
Nth G & C G & S M Co, Nev	18	10c	June 26	July 28..Aug 14	E W Sichel, 337 Pine
Osceola Con M Co, Cal	6	1c	June 30	Aug 2..Aug 21	Holland Smith, 307 Montgomery
Pine Hill G & S M Co, Cal	10	5c	May 10	July 1..July 22	Chas A Hare, 1003 Railroad Ave
Rock Island G & S M Co, Nev	14	2c	May 20	June 25..July 6	W W Guptill, 309 Montgomery
Rose Creek M Co, Cal	1	15c	June 28	July 28..Aug 30	J M Wilmans, Crocker Bldg
Thorpe M Co, Cal	7	2½c	June 9	July 17..Aug 9	A F Frey, Phelan Building

WILL NEGOTIATE with owners or their duly authorized agents only.

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THE DEMAND FOR STUMP PULLERS.

Another order for a California Stump Puller has just been received from Honolulu. This makes the second within a year from Hawaii. Three more to Mexico, one to Central America and one to Siberia, indicates the growing favor in which these machines are held.

Send to A. BARNES, Gen'l M'g'r, 82-84 Zoe St., S. F., Cal.

A CONTROLLING INTEREST IN 480 ACRES of channel gravel property, requiring from $2000 to $3000 to put in readiness for production. For further information, address L, care of Mining and Scientific Press.

chased occasionally, etc. The stock in question is no doubt at present selling beneath its intrinsic value, and we attribute this directly to the blatant disposition of its 'press agent,' and at present should a rich strike be encountered and given wide circulation, it is possible no consideration would be given to it unless it was to excite ridicule. We do not claim that these newspaper miners are intentionally dishonest, but they are carried away by their optimistic opinions, which they give vent to on every occasion, particularly in the presence of a representative of the press; but whatever their intentions, they do injury to their own properties and are a detriment to the entire mining business. We are forced to admit we are not at all hopeful as regards outside properties, that is, companies that represent only undeveloped territory on the outskirts of the mineral belt. Investors are not at all attracted toward them, and those who are identified with those companies are not protecting their stocks, and we feel that the future in these presents a gloomy aspect. The investor or speculator to-day desires mining propositions, and not land speculation. But to our local stock market: Anyone endowed with ordinary intelligence cannot overlook the many attractive purchases too evident for one to quickly decide which is possessed of the most merit. There are several dividend payers that pay very handsomely on the quotation, but regardless of this there is no great outside buying interest, and the few local speculators who purchase to-day and sell to-morrow buy only for a slight profit. They will invest just as quickly at a higher quotation or sell as promptly at a lower one as they do at present. Another unfortunate weakness which is very apparent is that in case a stock declines, no matter for what cause or under what circumstances, the unthinking ones, either through indolence or from questionable intent, advise their purchase. This many times emanates from those who are carried away by absurd enthusiasm, principally supported by the glamour of local confidence, partially based on the utterance of some effervescent promoter of the stock. Miners and mine-owners and those connected with mining are ever too susceptible to encouragement, ever sanguine, always elated and generally without good and sufficient cause, but it is farthest from our intent to discourage investors—we merely want to assist in correcting, or fostering a careful buying interest that will display good sound judgment and not be guided by something that cannot be substantiated by facts. The production of Cripple Creek must sooner or later dictate higher prices. It may not come at once, but the present re-adjustment that is now taking place in all legitimate stocks foreshadows an advance and defeats the possibilities of any great decline."

San Francisco Stock Board Sales.

SAN FRANCISCO, July 1, 1897.

9:30 A. M. SESSION.

400	Alpha	$	12	100	Mexican	36
400	Belcher		22	400	Occidental	16
100	Best & Belcher		45	200	Ophir	76
200	Bullion		10	100	Overman	11
300	Challenge		15	300	Savage	26
250	Chollar		79	200	Scorpion	05
50	Con Cal & Va	1	45	300	S B & M	06
100	Crown Point		21	1200	Sierra Nevada	92
300	Exchequer		03	400	Union	42
100	Gould & Curry		35	1700	Yellow Jacket	51

SECOND SESSION—2:30 P. M.

300	Alpha	$	10	100	Ophir	73
100	Best & Belcher		43	200	Potosi	41
300	Chollar		79	400	Savage	26
50	Confidence	1	10	700	Sierra Nevada	91
100	Gould & Curry		35			

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Silver Ores.
A Standard Work.
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By C. H. AARON.

This work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist nor the pratical miner can mistake his meaning.

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Table of Contents—Preface: Introduction: Implements; Assay Balance; Materials; The Assay Office: Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of cupellation; Weighing of Beads; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests of Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

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Assessment Notices.

THORPE MINING COMPANY. Location of principal place of business, San Francisco, California. location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 9th day of June, 1897, an assessment (No. 5) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of July, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY the 9th day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

ROSE CREEK MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Star, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of June, 1897, an assessment (No. 1) of 1c cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 63, Crocker building, junction Post Montgomery and Market streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 28th day of July, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 30th day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. M. WILMANS, Secretary.

Office—Room 63, Crocker building, San Francisco, California.

OSCEOLA CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Amador County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 30th day of June, 1897, an assessment (No. 6) of 1 cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 307 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 2nd day of August, 1897, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on SATURDAY, the 21st day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

HOLLAND SMITH, Secretary.

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In the Superior Court of the City and County of San Francisco, State of California, Department No 8. John V. Kimball, plaintiff, vs. Mabel L. Kimball, defendant. Action brought in the Superior Court, City and County of San Francisco, State of California, and the complaint filed in said City and County of San Francisco, in the office of the clerk of said Superior Court. The people of the State of California send greeting to Mabel L. Kimball, defendant. You are hereby required to appear in an action brought against you by the above-named plaintiff in the Superior Court, City and County of San Francisco, State of California, and to answer the complaint filed therein within ten days (exclusive of the day of service) after the service on you of this summons, if served within this county; or, if served elsewhere, within thirty days. The said action is brought to dissolve the bands of matrimony now existing between yourself and plaintiff, on the ground of habitual intemperance on your part for more than one year past. All of which will more fully appear in the complaint on file herein to which you are hereby referred. And you are hereby notified that if you fail to appear and answer the said complaint, as above required, the said plaintiff will apply to the said Court for the relief prayed for in the complaint. Given under my hand and seal of said Superior Court at the City and County of San Francisco, State of California, this 9th day of April, in the year of our Lord, one thousand eight hundred and ninety-seven. C. F. Curry, Clerk. By Joseph Riordan, Deputy Clerk. R. Thompson, Attorney for Plaintiff.

DYNAMOS.
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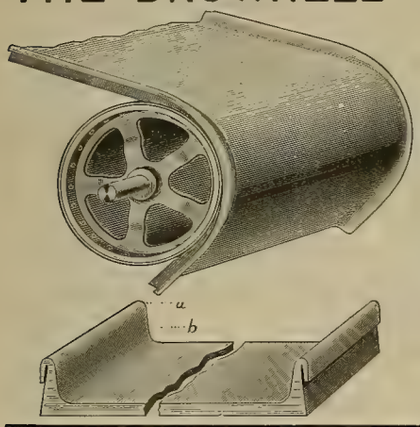
THE BROWNELL "PATENT LIP" FLANGE FRUE VANNER BELTS.



It has taken years of ceaseless testing and experimenting to produce the superior belt which we now offer, with elastic flanges and pliable body reinforced with specially woven duck. Every belt is manufactured by experienced workmen, and carefully tested on machines especially built for that purpose; consequently we are to-day manufacturing the best belts that mechanical ingenuity, combined with honesty of construction, can possibly produce.

RAWHIDE GOLD MINING COMPANY,
JAMESTOWN, TUOLUMNE CO., CAL., Feb. 21, 1897.

J. S. BROWNELL, ESQ.—DEAR SIR: Replying to your query of Feb. 15th, will say that I have used your Patent Lip flange belt more than one year, and judging from their appearance after more than one year of hard service, I do not hesitate to say that they are the best belt I have ever used and I take great pleasure in testifying to the fact. Yours truly, W. A. NEVILLS, President.

AMADOR CITY, CAL., Feb. 18, 1897.

MR. J. S. BROWNELL—DEAR SIR: I take pleasure in saying that I have used your Patent Lipped flange belt for several years while connected with this company, and I consider them the best that we have used. The quality of rubber in the flange seems to be the best, and we are not bothered with the flange cracking and thereby destroying the life of the belt. At present we are using 14 concentrators, and have in use several kinds of belts. We consider your Patent Lipped flange the best. Yours very truly, THE CONS. SOUTH SPRING HILL G. M. CO.
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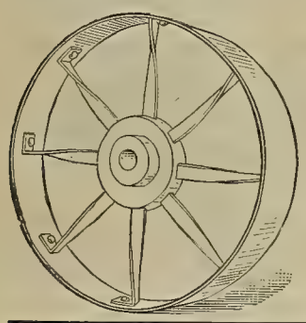

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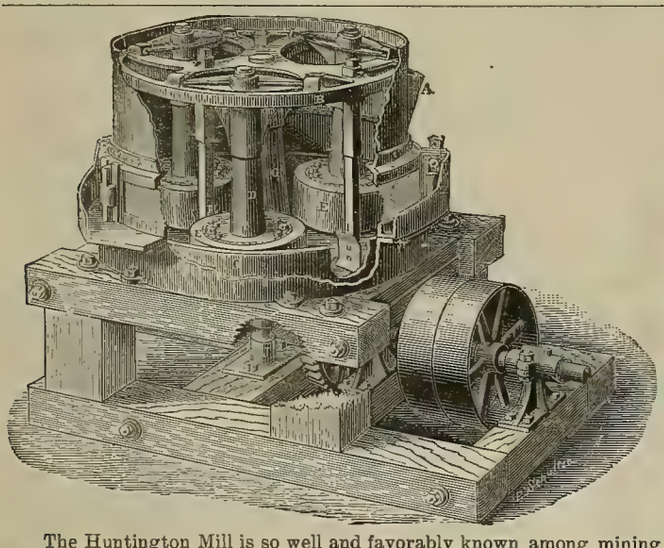

The Huntington Mill is so well and favorably known among mining men throughout the world that any description of it would seem superfluous. They are in use in the United States, Canada, Mexico, Central and South America, Australia, China, Japan and South Africa—in fact, wherever mines exist, and have given the best satisfaction of all quartz-crushing mills. The construction of this Mill has lately been much improved and we claim it to be the cheapest, most efficient, simplest and most durable Mill upon the market. Catalogue upon application.

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No. 1931.—VOLUME LXXV. Number 2. SAN FRANCISCO, SATURDAY, JULY 10, 1897. THREE DOLLARS PER ANNUM Single Copies, Ten Cents.

The Debris Commission.

A conference was held between committees from the California Miners' Association and the Anti-Debris Association of the Sacramento Valley last week in San Francisco. The committees had been appointed by their respective associations for the purpose of endeavoring to formulate some plan upon which they could co-operate with reference to the protection and improvement of the rivers in such a way that the mining interests may be fostered and the streams cleared and improved at the same time.

As the welfare of the two interests are so bound up with each other it has been the main object of the Miners' Association to secure unity of action. The plan is to endeavor to secure, at the next session of Congress, large appropriations for restraining dams and other work, to the end that hydraulic mining may be further resumed, and, at the same time, larger appropriations for the improvement of the Sacramento and San Joaquin rivers. It is generally conceded that there will be no likelihood of securing much recognition without concert of action between the two associations.

The Miners' Association was represented by President J. H. Neff, Secretary Julian Sonntag, Tirey L. Ford and Edward Coleman of San Francisco, and James O'Brien of Yuba county. The Anti-Debris Association was represented by Manager W. A. Phipps of Marysville, Attorney Robert T. Devlin and William Johnson of Sacramento, and Dr. Durst of Yuba.

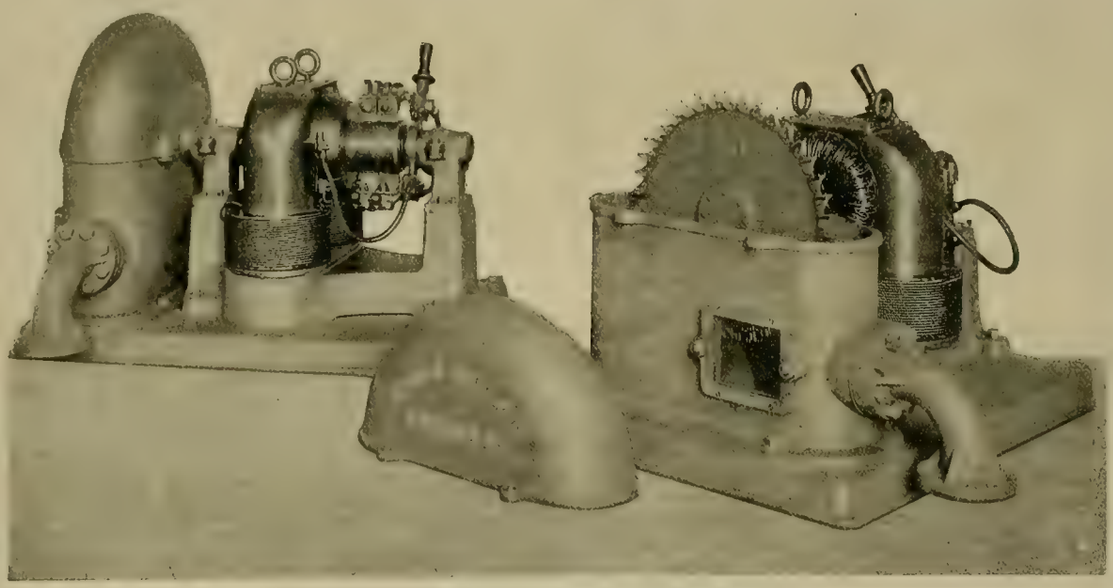
The conference developed evidence of most cordial good feeling on both sides. The whole subject of the relations of the miners and the valley people were gone over in a general way. No definite plans were formulated, but another conference was arranged for July 30.

Amending the Tunnel Law.

Bell of Colorado has introduced in Congress a bill amending the Tunnel Site Act to provide that if the tunnel owner wants to claim and hold a tract 1500 feet wide by 3000 feet on the tunnel line, he must keep two shifts of miners at work all the time. Failing to do this he can only hold the width of the tunnel for prospecting purposes, depending upon the discovery of lodes not discovered on the surface for his labor. The recent decision of the United States Supreme Court says in effect that so long as a tunnel owner works with reasonable diligence he can reserve the larger tract for prospecting. As the law at present does not define what reasonable diligence means, the amendment is timely.

Mine and Mill Lighting.

The accompanying cut illustrates a recent development in the application of electricity for the illumination of mines and quartz mills. It consists of a Crocker-Wheeler dynamo coupled direct to a water wheel, operating under a head of 1000 feet and developes a capacity of 7½ K. W.—150 16 candle power. The novelty of this combination lies in its entire independence in operation of any other machinery which may be driven from the same source, thereby assuring reliable and uniform light at all times, doing away with belting and countershafting and delivering power to the dynamo without intermediate connections. These combinations are made in different sizes to meet any requirements by the Abner Doble Company of this city.



DIRECT CONNECTED WATER WHEEL AND DYNAMO.

Survey Monuments.

The United States Geological Survey is definitely locating the boundary line between Idaho and Montana. All important points will be marked by large stone monuments and the rest of the line by iron monuments intervisible. For about a year the United States Geological Survey has been placing iron monuments at township corners in their surveys, particularly in Colorado and Wyoming. It is to be hoped that—the days of Benson and other frauds having passed away—all surveys made be marked so that they can be made use of by local surveyors. The Kootenay Mine Owners' Association proposes that the Canadian Government be urged to erect monuments in the mining districts to which surveyors may tie their surveys. If something of this kind were done in California and other States in the mining districts much trouble, expense, confusion of titles and unnecessary litigation would be saved.

It was proposed that the last Legislature enact a law providing that locators of mining claims may have their locations tied up to township or section corners by United States Deputy Mineral Surveyors, and that the notes of these surveys be recorded as the best evidence of the boundaries of the claims. Had the mine owners of this State been made to appreciate the value of such surveys, no doubt there would have been a strong demand for the passage of the bill. But the want of monuments and the heavy cost of surveys have prevented many miners from appreciating the advantage of a different state of affairs.

An Important Case.

In the United States District Court at Boise, Idaho, Judge Beatty has decided in favor of the plaintiffs, the owners of the Kirby mine, the case of Rutler et al. vs. the Shoshone Mining Company. Following the ledge on its dip and working through the Last Chance tunnel, parties connected with the Last Chance opened up a body of ore. They located a point in the surface immediately over the discovery marked it "Shoshone discovery" and laid out the Shoshone claim. The location was in conflict with the Kirby location, and when the Shoshone company applied for a patent this adverse case was started. The contest was really between the Last Chance and the Bunker Hill and Sullivan. The dip of the vein in the Last Chance carries it outside the Last Chance side lines, and into the disputed ground. This disputed ground the Last Chance sought to hold under a mining claim known as the Shoshone. The Bunker Hill and Sullivan claimed the ground through two claims covering substantially the same area. The Shoshone company, owned by the Bunker Hill and Sullivan, adversed the application. The case will probably be carried to the United States Supreme Court.

ANNUAL assessment work on an unpatented mining claim is not so much to keep a title alive as to prevent it from lapsing. That is, suppose one locates a claim and does no work on it for five or six years. His claim is jumpable, but, if let alone, at the end of the five or six years he can get a patent by making $500 worth of improvements. At any time during the period since location he took chances on its being relocated. His title was all right so long as no one thought the claim worth jumping. But to guard against that it is necessary to put $100 worth of work annually on the claim.

THE Colorado Mine Inspector, Lee, after spending two weeks looking over the ground, notified the owners of 120 shafts in Cripple Creek that certain repairs were necessary for the safety of the men, and the owners have made them.

THREE ten-horse teams are engaged hauling borax from southwestern Oregon to Winnemucca, Nevada, where it is shipped.

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TO THE PUBLIC.

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San Francisco, July 10, 1897.

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The Rights of Tunnel Owners.

The syllabus of the opinion of the United States Supreme Court in the case of the Enterprise Mining Company vs. Rico-Aspen Consolidated Mining Company, et al has been received. It gives a very clear idea of the rights of tunnel owners as laid down by the Court, and is as follows:

1. The right of the owner of a tunnel to all veins or lodes not previously known to exist, which are within 3000 feet from its face on the line thereof, is superior to the right of one who subsequently makes a discovery and location of another claim, if the two conflict.

2. The right to a vein discovered in a tunnel dates by relation back to the time of the location of the tunnel site.

3. The location of a claim to a vein discovered in a tunnel may be made on its discovery by taking the full length of 1500 feet allowed by U. S. Rev. Stat. Sec. 2320, on either side of the tunnel, or any such proportion thereof on either side as the locator may desire, and is not limited to 750 feet on each side of the tunnel on account of a failure to indicate, when the tunnel was located, what particular 1500 feet he would claim.

4. The Colorado territorial act of 1861 limiting the right of a tunnel owner to veins discovered in the tunnel, to 250 feet on each side, is, if not repealed by the Colorado legislature, superseded by the legislation of Congress in the Revised Statutes.

5. The failure of a tunnel owner to "adverse" the application for a patent for a claim located parallel to his tunnel and about 500 feet distant from it, when he does not know of any vein which will enable him to dispute the right of the other party to a patent, will not defeat his right to a vein subsequently discovered which crosses that claim.

County Mining Exhibits.

A number of the counties of the State in which agriculture is the principal industry maintain permanent exhibits of the products and bureaus of information that are of particular value to investors. The MINING AND SCIENTIFIC PRESS has suggested before this that something in this direction might well be done in the leading mining counties. The object of any permanent exhibit should be mainly to give information to those seeking it as to the different districts and mines in them and their resources, and, secondarily, to attract capital. Every day people call at the office of the MINING AND SCIENTIFIC PRESS to ask to see maps or look up data as to mines or districts in different counties of the State. Such is the experience, also, at the State Mining Bureau. These are men who know definitely what they want, and very often they complain that it is next to impossible to find such data as they require in the neighborhood of the mines they are to visit, except from personal investigation.

It would seem an excellent move on the part of the Miners' Association of a number of the leading counties of the State to induce co-operation of the county authorities in establishing, at the county seats, exhibits of ores from the different mines and districts, maps, reports and other data, that would be of value to experts, prospectors, mine owners and investors.

The failure to sell many a mine is due not to the want of merit, but to a lack of definite information furnished in regard to it. The material advantage of such exhibits of bureaus as are suggested cannot be overestimated. The cost need be but trifling. The Board of Supervisors of the different counties could, at very little expense, provide for the housing of them. An exhibit of minerals could be obtained from the mine owners themselves, and maps and reports and other data would nearly all be contributed.

The Object of Assessment Work.

There is an interesting case on trial in Colorado that brings into dispute again the question as to whether a location is valid or not before a vein or mineral in place is discovered. In this case both claimants set discovery stakes on the ground in dispute, which was in the Cripple Creek district, in 1892, and dug discovery shafts, as required under the State law. It is the contention of the plaintiff that neither of the locators found a vein in the discovery shafts and that, therefore, neither had a valid location. Leaving the discovery shaft after he had completed the record, the plaintiff sunk another shaft, in which a vein was found, and he claims that it was found before the defendant discovered a vein. It was admitted that the defendant's location was prior to that of the plaintiff.

The contention of the plaintiff is that no location is valid until a vein or mineral in place is discovered, and that such discovery need not be made in the discovery shaft, but will make the location valid if discovered anywhere on the claim, and that he, having first found a vein, has a valid location to the ground in dispute, notwithstanding the defendant's location certificate and discovery stake bears the earlier date.

In the Maid of Erin case, of property in dispute at Leadville, this question was brought up. The Maid of Erin discovery shaft was not sunk on the vein, but later some distance away a deposit of ore was discovered after sinking a shaft to a depth of 125 feet. Senator Teller of Colorado, who was then Secretary of the Interior, held that the Maid of Erin location was good, even though the mineral was not found in the discovery shaft. He held that the United States law does not require that a discovery of a vein must be made in the discovery shaft, although the Colorado statute does, and that the Colorado statute in this respect is void, because it is in conflict with the Federal statute.

In Colorado the statute requires that a 10-foot shaft or tunnel must be dug at the point of discovery to show by such work a lode or deposit of mineral in place to complete the location. In California the new law requires that $50 worth of work must be done within sixty days of discovery to complete the location. This is without reference to the vein or lode itself. In Nevada the law is similar to that in Colorado. The sole object of the framers of the California law was to compel development and prevent people from holding claims without work. As to the Colorado law there is confusion as to what was its purpose in requiring this work, whether simply to compel development or to prove the presence of a lode or mineral in place. The object of the Federal statute as to the assessment work is only a condition of continued ownership. In a Colorado case, referred to last week in this paper, Judge Field said: "Discovery and appropriation are the sources of title to mining claims, and development, by working, as a condition of continued ownership until a patent is obtained." As the source of title is from Federal ownership, it is possible that the United States courts will hold that the Colorado requirement of extra work can only be permitted on the ground that it is a *condition of continued ownership.* In this case the question of sinking on the vein or elsewhere would cut no figure. Now that nearly every State and Territory in which gold and silver mining is being conducted have adopted some such provisions as are in the California or Colorado laws, it might be well for Congress to take up and pass a general law as an amendment to the present statutes.

The International Gold Convention.

The first International Gold Convention was called to order in Denver, Colorado, last Wednesday, with nearly 800 delegates, representing about twenty States and British Columbia, Mexico and Venezuela. R. F. Hunter, chairman of the Executive Committee, called the convention to order. After prayer by Rev. M. A. Ellis, reading of the call by Secretary Irving Mahon and an address of welcome from Acting Mayor O. B. Scobey, the Governor of Colorado, who was chosen temporary chairman, delivered an able address, explanatory of the purposes of the convention. He said in part:

To increase the gold mining industry is the purpose of this convention. While local selfishness may have inspired the call, the importance of gold production reaches beyond the interest of the miner who mines it, or the State in which it is found, and becomes a question as wide as human commerce and civilization. "More gold" is the purpose of this assembly, and it is the only platform ever presented to a congress of delegates that did not meet opposing votes.

Gold is the only deity before which universal man has ever bowed. Religion has never reared an altar that has not been shaken by the clerk of heresy. Political wisdom has never devised a code or constitution that did not invite revolt. No moral system has ever won general approval. Only behind the banner of gold does there trail the hungry, enthusiastic, untrained hosts of the human race. It matters not what land bore them, what faith guides them, what altar hears their prayers, what color God tinted their skins; every heart pulsates with the same love of gold; no chasm of creed or race that will not be bridged by lives and swords in its pursuit. This convention represents States that produce one-fourth of the gold of the world and can, with encouragement of capital, double that production.

The depressed condition of commerce and industry, the unnumbered idle hands, should turn the attention of every patriot to the mines. All history teaches that nothing relieves business depression, loosens the bonds of industry and labor as quickly as an increased supply of the coinage metals of the world.

If California would equal her gold product of 1857, if some of the idle money and labor that now burden the banks and labor marts could be utilized to develop the mines of Colorado and other mountain States, there would come to our nation an industrial change and emancipation recalling the emergence of Europe out of the deep shadow of the middle ages under the influence of the gold which Spanish conquest sent eastward across the sea.

Since 1892 gold, silver and copper mines are about the only industry that has paid dividends. If this convention can turn the attention of capital from unproductive investments to legitimate mining it will have advantaged country and investor alike. Business care and sense in mining will pay better than most lines of investment.

Prospecting as a road to individual fortune may be an illusion; the pathfinder seldom enjoys his own discovery, as even good mines require large expenditure, but legitimate mining, as a vocation, is a profitable business. Many people act and invest as though mining was exempt from the requirements of prudence and judgment, which other investments demand.

A committee on credentials reported recommending B. Prince of New Mexico for permanent president; David T. Littler of Illinois, John Dern of Utah, and General Alexander Barara as vice-presidents-at-large, and that each State selected a vice-president and member of the executive committee from its delegation. Irving Mahon of Colorado was named for permanent secretary and O. W. Crawford of Illinois as assistant. It was also recommended that all discussions be confined to mines, mining and kindred subjects, and that every State, Territory or foreign nation be allowed ten votes, providing it had that many delegates present; if not, then one vote for each delegate.

Resolutions were adopted under suspension of the rules, one calling upon Congress to place cyanide of potassium on the free list and another authorizing the president to appoint a committee of five to investigate and report on the advisability of asking Congress to create a department of mines and mining, the head of which should be a member of the President's cabinet.

Concentrates.

THE Portland, Oregon, Mining Exchange has been incorporated.

THE Dexter mine at Tuscarora, Nev., has 125 men on its payroll

OVER 3000 prospectors are reported now at work in northern New Mexico.

A CINNABAR LEDGE is being developed in New River, in Trinity county, Cal.

RUBBER is vulcanized by heat. Benzine is not used in that way, but to dissolve it.

PIOCHE, Nev., has only one saloon, but it manages to support a respectable newspaper.

AT the Le Roi mine, at Rossland, B. C., a new engine, capable of running forty drills, is being put in.

THE product of tin plate in the United States has increased from 14,000,000 lbs in 1892 to 307,000,000 in 1896.

THE Topeka group of mines in Russell gulch, Gilpin county, Colo., has been sold to a New York syndicate for $160,000.

A MINING dredger is being built at San Antonio to dredge the auriferous sands of the Yaqui river in Mexico.

ARRANGEMENTS have been made to resume work on the Siskiyou copper mines, near the line between Oregon and California.

THERE are five carloads of machinery on the road for the Big Bug onyx mines in Arizona, which are to be worked on a large scale.

THE main tunnel of the Red Point drift gravel mine, near Damascus, Placer county, Cal., is now in over two miles on the channel.

THE net earnings of the large mining companies at Butte, Montana, as returned to the assessor for 1896, amounted to $7,799,077.66.

THE Bonanza mine at Baker City has been under examination for a New York syndicate, who are reported to have purchased it for $750,000.

THE Fortuna mine, in Arizona, is being worked to a depth of 400 feet where the ledge is 30 feet wide. The mill crushes eighty tons of ore daily.

THE Gold Creek Mining Company at Gold Creek, Nev., has made application at the United States Land Office for twenty-nine patents on placer mines.

DURING the past six months nearly sixty companies have been formed in London for mining, exploration and smelting purposes in British Columbia.

COPPER is the only product whose price has advanced in recent years. Gold and copper are the only products whose prices have not recently fallen.

A NEW 30-stamp mill at the Austin mine at Austin, Nevada, has been started up. With power supplied by the company the town is lighted by electricity.

THE suspension of the requirement for $100 worth of annual work or improvement on an unpatented mining claim applied only to the calendar years '93 and '94.

To date E. C. Brice, the "gold maker," has been unable to satisfactorily show the United States Government authorities that he can make gold and silver at will.

MACHINERY, tools, etc., on an abandoned mine are not "locatable." Failure to comply with any Government requirement affects only title to the mine itself.

P. A. BUELL of Stockton states that money has been promised for the projected smelter at that place, and that Eastern men who are to furnish it will arrive in a few days.

THE first stamp mill in California was built in Mariposa county in 1850, the second in Nevada county, on Wolf creek, nearly opposite the present Empire mill, in January, 1851.

THE Colonial Parliament of West Australia has sanctioned the building of water works which will cost $12,000,000 to supply the Coolgardie gold mines with 5,000,000 gallons daily.

IN the Thistle Shaft drift mine, in Plumas county, Cal., the water which came in last fall prevents working, and it will be two months before the large pumps have the water under control.

THE statement of the Isabella Company at Cripple Creek, Colo., for the quarter ending June 1st shows that the profits for March were $8284.81, April $2111.15, and May a deficit of $505.90.

A "FLOATING DEBT" is, practically, an unsecured debt. The unsecured liabilities of any corporation, mining or otherwise, the current unpaid accounts, etc., constitute a "floating debt."

THE only firms in the State handling antimony, so far as we know, are the Selby Smelting Works, 416 Montgomery street, and the Pacific Sheet Metal Works, 209-211 Mission street, San Francisco.

A TRAMWAY cable weighing 17,000 pounds was carried to the Nellie mine at Telluride, Colo., last week, on the backs of sixty-four mules. The mules were about 10 feet apart, each carrying a small roll.

THE Canyon City & Cripple Creek Gold Belt Railway Company will begin grading July 10, and its completion will increase the transportation and milling facilities of the Cripple Creek mines considerably.

AN indication of the results of the "revival of mining" in Arizona is seen in the fact that the Federal Government has increased the salaries of the postmasters at Bisbee, Globe, Nogales, Tucson and Yuma.

IN the Hahn's Peak district, in Colorado, a comparatively new camp, single individuals have located as many as half a dozen tunnel sites each, and a miners' meeting has been called to take steps to stop the evil.

LAST week the night shift—150 men—on the Iron Mountain mine, Shasta county, Cal., struck when asked to work ten hours instead of nine. The old schedule was ordered left unchanged and the men returned to work.

TWO-THIRDS of the gold produced in California in 1896 came from the following eight counties: Nevada, Placer, Calaveras, Amador, Trinity, Siskiyou, Tuolumne and El Dorado. Nearly half the yield was produced in the first five.

THE biggest piece of gold free of quartz ever found was taken from the Byer & Haltman claim, Hill End, N. S. W., May 10, 1872, weighing 640 pounds and worth $148,000. It was imbedded in blue slate 250 feet from the surface.

ONE Boggs of Pittsburg, Pa., for the purpose of selling a mine at Mercur, Utah, of which very little is known there, is making some remarkable stories regarding the gold fields of Mercur. He says the gold vein is fifteen by fifteen miles in extent and from five to ninety feet in thickness. In speaking of the ore in sight at the various mines, he says the East Golden Gate has $15,000,000 of gold blocked out.

OVER $42,000 has been expended since March 1 on assessment work in the Nelson district in British Columbia. In a few cases cash as allowed under the law has been paid into the mining recorder's office in lieu of assessment work.

ACCORDING to an Australian mining paper the London superintendent of a Kalgoorlie mine recently gave a working miner £25 to explain to him what a winze was so that he might be prepared for questions at a forthcoming meeting.

THE Boston and Fantasma Mining and Milling Company has been incorporated under the laws of the State of New York, and has taken over the Boston, Fantasma and Alert gold mines in the Silver Mountain district, San Bernardino county, Cal.

THE bill for the Crow's Nest Pass Railroad, to be built by the Canadian Pacific, has passed finally, and already active work has begun. It will be completed next year, probably, and will do much for the mines of the Kootenay country in British Columbia.

ANOTHER strike has been made in the Mollie Gibson mine at Aspen, Colo., and the shares have gone from 20 cents to 70 each. Prior to two years ago, when dividends stopped, there had been divided from this mine among shareholders $4,080,000.

W. A. CLARK, who is now in Europe, is negotiating for the sale of the United Verde copper mine at Jerome, Arizona, to a French syndicate. The output is about 2,000,000 pounds monthly of copper, which it is expected will shortly be increased to 12,000,000 pounds monthly.

THE payroll of the Comstock mines last month amounted to a trifle over $50,000, less than the payrolls of the mines of several counties in California. The Consolidated California and Virginia paid out $10,485, the Brunswick Exploration Company $6916 and the Choller $8105. No other mine paid out over $2500.

A NEW LAW of British Columbia requires all incorporated companies to take out a license costing $100, and at Grand Forks and other places, acting on the supposition that a number of stock companies had neglected to renew their free miner's licenses, a number of the best known claims were jumped at midnight June 30.

CARDWELL and his associates have built the wagon road from Cisco to within three miles of the mines in Meadow Lake district, Nevada county, Cal., and a daily stage has been put on. It is proposed to continue the road to Sierra City. A town has been laid out at Carlyle and a store and hotel are being built.

THE Rio Tinto, Tharsis, Aguas Tenidas and others in southern Spain, together with San Domingo, on the borders of Portugal, at present yield from 50,000 to 55,000 tons of copper annually, being about one-sixth of the world's output, besides 1,250,000 tons pyrites, for export, covering nine-tenths of the consumption of Europe.

THERE is a dispute going on between the mine owners and mill owners of Cripple Creek over the prices charged for milling low grade ores. There are at Cripple Creek immense bodies of low grade ore in the mines, running from $5 to $10 a ton, which cannot be handled at the prices charged. Some day it will all be worked.

AN attempt made to reduce the wages of white miners on the Rand, South Africa, resulted in a riot, in which seven men were killed, and the mine owners have abandoned the scheme of reducing wages. The rates were about $5 a day and a reduction of about 10 per cent was proposed. The miners have since formed a union.

WE are not acquainted with the name of any firm manufacturing for sale an automatic tailing sampler. On page 432 of the issue of May 22d, '97, was illustrated and described a device of that kind in successful use at the Idlewild or Taylor mine, Greenwood, El Dorado county, Cal. There is probably demand enough for the manufacture of such a machine.

CAPTAIN J. B. DE LAMAR has decided to go ahead with the building of a mill for the Golden Gate mine at Mercur, Utah. The plans, which are out, call for a daily capacity of 800 tons, although at first the mill will start with only 500 tons capacity. A great deal of development work has been done at the Golden Gate mine, and large bodies of ore are blocked out.

AT the San Francisco Stock and Bond Exchange for the first six months of 1897 the sales of stocks amounted to 129,206 shares, against 114,793 shares for the first six months of 1896, and 36,254 shares for the same period in 1895. The sales of bonds for the first six months of 1897 amounted to $1,728,000, against $1,254,900 for the same time in 1896, and $865,000 in 1895.

THE discovery of gold on Oak Point island, in Rainy lake, has raised the question of the international boundary line between Minnesota and Ontario. Canada claims the island and is issuing patents to many locations on it. American miners are protesting that, although the survey shows the island to be in Canadian territory, it in reality belongs to the United States.

UP to July 3 the value of exports of ores and product of the smelters for the Kootenay mines of British Columbia for 1897 is returned at $3,736,533.92. The ore shipments from seven mines via Nakusp amounted to 1247¾ tons for the week ending July 2, valued at $94.522 per ton. During the same week 448 tons of ore valued at $80.479 per ton were shipped via Kaslo.

CONGRESSMAN DE VRIES has introduced a bill to locate a wagon road between Mono lake and Yosemite valley. It provides for the appointment of three Commissioners, one to be an army officer, one a resident of either Mariposa or Tuolumne county and one a resident of Mono county, to locate the road. Aside from giving the people east of the summit of the Sierras a means of reaching the valley such a road would be of value to mining.

REGARDING the inexact use of the nautical term "knot," it may be stated there is no such distance as a "knot." A "mile" or a "league" is a regularly defined distance; a "knot" correctly refers only to the rate of speed at which a vessel moves in the water. While the distance between two "knots" on the logline is 6082 feet, that cannot be considered as a measure of distance. A mile is a mile, by itself; a "knot" is always in connection with time.

THE MINING AND SCIENTIFIC PRESS takes this method of returning sincere thanks for the hundreds of hearty notices and commendations it has received in the last three weeks. To reproduce one-half of the kindly printed and written paragraphs would take many extra pages. Our contemporaries and exchanges everywhere have been particularly kind in referring to our new building, and their cordial announcements are gratefully and thankfully appreciated. Such evidence of good will on all sides toward this paper is highly valued, and we shall try to deserve its continuance.

ON this page of "Concentrates" is weekly answered a multitude of inquiries from correspondents everywhere, whose questions are often of sufficient general interest to warrant such publicity, as it often happens that a good many have the same question in their minds. This explains why so often a brief statement is made on some general point. It is a "concentrate," a condensed answer to some practical inquiry. Such published announcement is usually the result of considerable inquiry on the part of the paper and put in such a shape that a busy man can catch the idea at a glance.

A GOOD way to free copper plates from gold is to put them over a charcoal fire and slowly evaporate the quicksilver. The plates should be cooled gradually, then rubbed with muriatic acid, put in a damp place over night, then rubbed with a solution of sal ammoniac and saltpeter, and slowly heated over a thin red fire, but not allowed to get redhot. When the gold scale blisters the plates should be taken from the fire and the gold scraped off. Where the gold has not blistered should be retreated with the solution and again fired. Collect the gold scales in an earthen dish, cover with nitric acid till all the copper is dissolved, when the gold can be smelted; after melting, corrosive sublimate should be used in the crucible till a blue flame ceases to burn.

TOPOGRAPHIC sheets of the United States Geological Survey may be obtained by addressing the Director at Washington, D. C., and enclosing the price, 5 cents each, which is about the cost of printing. The following sheets of California are in print: Alturas, Banner Hill, Bidwell Bar, Big Trees, Camp Mojave, Chico, Colfax, Downieville, El Cajon, Escondido, Genesee, Grass Valley, Honey Lake, Indian Valley, Jackson, Lassen Peak, Lodi, Markleeville, Marysville, Modoc Lava Bed, Nevada City, Oceanside, Placerville, Pyramid Peak, Red Bluff, Redlands, Sacramento, Shasta, Sierraville, Smartsville, Sonora, Taylorsville, Truckee, Wellington, several sheets from Los Angeles to San Bernardino, and the San Luis Obispo sheet. Yosemite is in press.

THE Canadian Parliament having empowered the Government to impose an export duty on silver-lead ores has led to a belief that this duty would be imposed immediately. The *Kootenaian* says on this subject: "What the Government has done is simply to give itself power to impose such a duty, and a man does not have to be a prophet to see that the power will only be enforced in case of any attempt on the part of the owners of Canadian mines to build smelters in the States. What the Government is desirous of doing is to encourage the building of smelters in Canada. When the Crow's Nest railway is completed the country, thanks to the Government, will be assured of a cheap and abundant supply of coal, and there will then be no reason to ship an ounce of ore out of the country for treatment."

THE State Mining Engineer of the South African Republic, in his report for 1896, shows that during the year 200 gold mining companies had been at work, against 170 in 1895. The nominal capital is £57,360,225 and the working capital £21,177,317. In 1895 dividends paid were £2,595,210 and in 1896 only £1,793,781. The capital invested in mining machinery was £5,322,494. The horse power used in the mines was 138,088. Of the total output 68 per cent came from the mill and 32 per cent by chemical treatment. The average yield per ton was 40 shillings, a decrease of 4 shillings. The number of workmen employed was 9375 whites and 64,012 natives. The average pay of white workmen was £302 per annum and of natives £48 per annum. During the year 541,152 feet were driven on the mines and 190,070 feet sunk, or nearly 140 miles altogether.

THE Le Roi mine at Rossland, B. C., is owned mostly by American citizens living at Spokane, Wash. It is proposed to erect a smelter. On account of supplies, flux, coke, proposed export duty of Canada and railroad transportation, they are having considerable difficulty in fixing on a location. One British Columbia mine owner, living in Spokane, said the other day: "This Le Roi incident is one of those things that is likely to become national in its importance before it is ended. It would not surprise me in the least to see the Le Roi smelter built at Northport, and then, if this attempt is made to coerce them by placing a duty on the exports from the province, to see the Le Roi mine closed down until the matter is settled. In such a case, Rossland and the entire camp would be the sufferers, for the Le Roi people can better afford to hold their property in *statu quo* than can Rossland afford to lose the Le Roi pay-roll."

THE Golden Cross mines at Hedges, San Diego county, are again in the hands of a receiver. Two years ago owing to large liabilities the mines were placed in the hands of W. W. Stewart as receiver. Having placed them on a good paying basis and paid off a large part of the indebtedness he was discharged about a month ago and the property turned over to J. Spiers, J. Sloss and others holding a deed of trust. Last week the Golden Cross Company entered into an agreement to sell to the Free Gold Mining Company the mines for $1,500,000, and last Wednesday this company, organized by Isaac Trumbo of this city, appeared in court and asked for a temporary injunction restraining these trustees from working the property and to quiet title. The writ of injunction was granted, and C. W. Pauly of San Diego was appointed receiver of the property, with his bond fixed at $25,000 and compensation at $400 a month.

THE United States Geological Survey has issued a statement of the mineral products of the United States for 1896, and corresponding figures for each year since 1886. The total value of all minerals is placed at $621,969,943 for 1896 against $622,687,668 for 1895. The non-metallic minerals for 1895 were valued at $339,774,029 and for 1896 at $334,187,374. Metallic minerals for 1895, $281,913,639; for 1896, $286,781,570. The greatest increase in value of the metals was in copper which for 1895 was valued at $38,682,347 and in 1896 at $48,694,267. Next came gold with an increase from $46,610,000 to $53,088,000. Silver increased from $72,051,000 to 76,069,236; zinc from $6,278,020 to $6,519,920; aluminum from $464,600 to $520,000; antimony from $68,000 to $84,290 and nickel from $3,091 to $4,464. There was a decrease in iron from $105,198,550 to $90,250,000; lead from $11,220,000 to $10,472,000 and quicksilver from $1,337,131 to $1,075,449. While there was, generally, an increase in quantity in most of the non-metallic minerals the decrease in price made the value somewhat less.

The Situation in the Comstock Deep Levels.

Written for the MINING AND SCIENTIFIC PRESS by DAN DE QUILLE.

It is evident from paragraphs appearing in Eastern and European papers that the impression pretty generally prevails that the Comstock lode has been explored to the greatest depth possible; that with the exception of a few scattering streaks and bunches of ore in old levels above the Sutro tunnel the mines are exhausted. Some assert that at the depth of 3000 feet, or a little below, the lode pinched out; others, that at the depth of about 3000 feet only barren quartz was found. But the notion most generally prevalent is that at the bottom of the deep shafts such rivers of water were tapped that the mines were all flooded and the miners drowned out, no pumps being capable of handling water that poured in from the subterranean depths. The conclusion arrived at by the majority of outsiders is that in depth the Comstock is dead and that work can never again be done on the great lode below the points where sinking was suspended in the Jacket, Union, Combination, and other deep shafts.

Now, the fact is that the big lode is very much alive and at no very distant day it will be pumped out and work at depth resumed. With the water out of the mines there is nothing to prevent the exploration of the lode to the depth of 6000 feet or more below the surface. A great mistake was made when pumping was stopped and the mines allowed to fill with water to the level of the Sutro drain tunnel. In resuming work on the lode at depth the greatest expense will be in draining the shafts, drifts and other openings of the water that has accumulated in them. Most of these openings, however, are at no great depth below the level of the Sutro tunnel and when they have been pumped out only the shafts will remain to be drained. As the water will at first have to be lifted but a short distance, it may be raised very rapidly by putting in a number of pumps to be run by electricity or compressed air. Such pumps may be used until the long drifts, crosscuts, winzes and other openings of the old submerged levels are drained, when it will only remain to pump out the shafts.

Although the mining men of the Comstock have always claimed to be world beaters, they failed to "fill the bill" when they backed out of their line of big shafts at the depth of 3000 to 3300 feet. They then took a back seat and have since been passed by the miners of Lake Superior, Australia, Bohemia and other countries. Doubtless they could have gone ahead had the order been given to continue, but the stockholders hungered for dividends and clamored for a return to the old upper levels (above the Sutro drain tunnel), where it was known that large amounts of paying ore had been left behind in the race after depth. So the work of exploration was stopped and the miners set to work on the sure thing to be found in the ore bodies lying high and dry in the old upper levels.

There was no trouble in handling the water at the bottom of any one of our deep shafts. The water that flooded the mines of the south end of the Comstock lode came in at a point 350 feet above the bottom of the Yellow Jacket new shaft, the deepest on that division of the lode. February 13, 1882, an immense "pocket" or reservoir of water was blundered into in a drift that was being run from the Jacket shaft into the Exchequer mine on the 2700 level. The Yellow Jacket shaft was at that time 3050 feet deep; the water from the Exchequer thundered down into it and caused the stoppage of all operations except pumping. The Jacket people pumped and bailed an average flow of 110 miners' inches a day for some days, yet the water gained on them and eventually raised to the source of supply on the 2700 level of the Exchequer. The water then filled all the mines of the Gold Hill end of the lode from the Jacket down to the Caledonia.

Pumping was continued, however, in order to exhaust the subterranean reservoirs in the Exchequer, till March 28, when the water had been so far lowered that it stood only 950 feet above the 3000 level of the Jacket shaft. Then, as no combined arrangement could be made among the several companies intrusted to continue the work and drain all the mines, the Jacket Company stopped pumping and shut down their works. This stopped all work below the level of the Sutro tunnel in the whole line of south-end mines, and they still remain flooded.

Had proper precaution been observed by the Exchequer people and a drill-hole kept in advance in the drift, there would have been no trouble. In such a situation a diamond drill should have been constantly employed in "feeling ahead" for water. When water was tapped, the drill-hole could either have been plugged up or a pipe and cock could have been put in and the flow drawn off as it could be handled. To blunder into such a big body of water was a piece of very bad management.

No mine at the north end of the lode, in Virginia City, was flooded by the water being tapped in the Exchequer. The Union Consolidated mine was down to a vertical depth of 3350 feet when work below the Sutro tunnel level was discontinued because of a general demand of stockholders of all the mines along the lode for a return to the ore bodies on the old upper levels. This is the greatest depth ever attained on the lode. At that depth they were able to handle all the water found without any trouble and were also able to obtain a good circulation of air. But the clamor was for dividends, and all the mines were left to fill up with water to the level of the Sutro drain tunnel, in order to save the expense of pumping while working at points above.

The return to the old upper levels was not a bad move, as good bodies of ore were found and an immense amount of bullion was obtained. New bodies of ore were found in the Consolidated Virginia & California, Hale & Norcross, Confidence, Yellow Jacket, Crown Point, Gould & Curry, Savage, Chollar, Best & Belcher and some others. The Con. Cal. & Virginia paid steadily $108,000 monthly in dividends; the Confidence and Hale & Norcross paid dividends in 1888 at the rate of $49,000 to $50,000 a month, and some others paid smaller amounts. At that time nineteen mines were at once producing ore—more than ever before at any one time in the history of the lode. A few examples will show the rate at which some of the mines yielded from the old upper levels after the return to them: Con. Cal. & Virginia, in 1888, for the quarter ending March 31, $921,903.77; Chollar, $21,795.70; Confidence, $42,-541.72; Hale & Norcross, $236,047.32; Kentuck, $13,-055.50; Potosi, $56,461.16; Yellow Jacket, $121,027.82. For the quarter ending June 31, the same year, several mines did still better, the Hale & Norcross producing $451,740 and the Confidence $401,293. During the year the Comstock pay-rolls aggregated from $250,000 to $300,000 a month. Thus it will be seen that the stockholders were not much to blame for wishing to cease pumping water for a time and go back to the "flesh-pots" of the dry upper levels.

At the time when operations were discontinued in the deep shafts and a return made to the old upper levels the Combination shaft had reached the vertical depth of 3250 feet. At that time there was but one deeper vertical shaft in the world—the Adalbert shaft in the silver mines of Bohemia, which was at that time 3280 feet deep, but has now reached a depth of 3672 feet. At the Combination shaft drifts were run west to the lode at the 2400, 2800 and 3000 levels. On the 3000 level the distance from the shaft to the east wall of the lode was found to be only 250 feet. The lode at this depth was of undiminished width and well mineralized; indeed the Hale & Norcross Company (through whose ground the drift was run) had a good showing of ore. So much for the story of the lode pinching out at depth. In the Belcher mine, south of the Jacket, excellent prospects were being obtained on the 3000 level when the Exchequer people let in the water and flooded the whole south end of the lode.

In the deepest workings on the leading mines of the Comstock from the Union Consolidated south to the mines of Gold Hill the lode was found to hold its width, and at several points was well mineralized on the 3000 level, as at the Hale & Norcross where they had a good showing of ore when the order for a shut-down and return to the old upper levels came. On the 3000 level of the Belcher good streaks and bunches of ore were making their appearance when the mine was flooded by the rush of water from the Exchequer. Though no rich bonanzas were in sight there were no discouraging features developed. At the Union Consolidated a change in the appearance of the material composing the vein was observed, which by some was considered unfavorable, as in the assays there was a falling off in silver and an increase in gold. The increase in gold was to the northward, and it is now thought that had work been continued paying gold-bearing quartz would have been developed. At that time, however, gold alone was not being much sought after.

No gold or silver lode has ever been found which showed paying ore continuously in all parts at the same time. Between bonanzas there is always a zone of barren or low-grade quartz. It is very probable that another line of bonanzas will come in a short distance below the zone reached in the Union Consolidated, Combination, Jacket and other deep shafts. The indications were that they were on the top of ore bodies at the Hale & Norcross and Belcher when work was stopped. There is nothing to prevent the drainage of the lower levels of either the Gold Hill or Virginia mines. No water exists in the mines above the 1600 (Sutro tunnel) level, therefore all there is to be handled is the dead water which has gradually accumulated in the shafts, drifts and other openings. Pumping operations at the Alta, Crown Point and other mines have shown that a single company was able to lower the water. Had other companies stood in with the Alta or the Crown Point at the time they were pumping the whole of the Gold Hill mines would have very speedily been drained.

In 1891, there was a grand excitement in regard to the resumption of mining in the deep levels—more than is now seen in view of the proposed drainage of American Flat. James L. Flood, John W. Mackay, Alvinza Hayward, W. S. Hobart, James G. Fair, S. L. Jones, B. F. Sherwood, R. F. Morrow, and all the big mining men on the coast were enthusiastic in regard to the resumption. Hayward said: "We now feel that deep mining on the Comstock should never have been abandoned." Flood said: "Within six months work will be in full blast from one end of the lode to the other." The Combination shaft was to be started first, then the Union Consolidated, C. & C., and other works were to fall in and assist. There were many meetings and consultations of leading mining men, both on the Comstock and in San Francisco; Charley Mathewson reported a plan of operations at the different shafts, Roger Prendergast was appointed superintendent of the Union Consolidated shaft, with orders to overhaul the plant and get everything ready for starting. At this time Flood said to a San Francisco newspaper man: "The Combination will start up again very soon—how soon, I can not tell you exactly, but it is only a matter of days now." Then there occurred some kind of disagreement and with some pulling one way and some another, the whole scheme, so enthusiastically received at first, died out in wranglings as to methods. No one thought there would be any great difficulty in sinking the shafts some hundreds of feet deeper, and all were quite sanguine that good bodies of ore would be found at no great distance below the 3000-level.

At that time the only example in deep mining that Comstock men could look to for light was the Adelbert shaft, Bohemia, and that was only 3,280 feet vertical, but 30 feet deeper than the Combination shaft when work was stopped. Now we have at Lake Superior the Calumet and Hecla shaft 4900 feet in depth; the Tamarack, 4450 feet, the Adelbert, Bohemia, 3672, and several other mines (principally coal) from 3600 to 3900. The Bendigo gold mine, Australia, has reached a vertical depth of 3350 and is still going down in good pay. With advanced methods and improved machinery no one now sees an end to the depth that may be obtained. In other regions the miners are still going ahead and many of them are now far beyond the point where the Comstocker halted.

By means of the Sutro tunnel a new and lower working surface has been created. The water pumped has only to be raised to this new surface, and through two miles of branch tunnels and many connections with shafts and winzes. There is everywhere a good circulation of pure fresh air. It is as though 1600 feet of ground had been cut out and removed. All kinds of mining work can be done on this new artificial surface as well as above on the old natural surface. This being the case we find that the deepest workings on the Union Consolidated have a depth of only 1750 feet below the new working surface, and that a shaft 3000 feet deep, measuring from the old natural surface, is only 1400 feet deep when measured from the new surface. By means of the Sutro tunnel, its two miles of branches along the lode and its many air connections through shafts and winzes, a base of operations has been established from which it will be as easy to sink to a depth of 3000 feet as it was to sink to that depth from the natural surface.

Mr. Flood, Hayward, Mackay, Hobart, with the other mining men mentioned above and very many operators in mining stocks that might be mentioned, were in 1891 very enthusiastic in regard to a return to the deep levels; the chances are now as good as they then were—whatever ore bodies were then in the deep levels are still there, and should be looked for. The whole of the mines on the lode need not be opened at once. The Gold Hill mines may be first pumped out, or work may be resumed in certain sections of the Virginia City division of the lode, starting wherever there was some ore in sight when work was discontinued.

There are no great difficulties to be encountered in sinking to a greater depth at any point. Pumps driven by Pelton wheels may be set up on the Sutro tunnel level, and these would throw out the water very rapidly to a depth of several hundred feet. Supposing this work to be commenced at the Combination shaft, the big hydraulic pumps would soon be reached and recovered. These pumps are at the 2400, 2600 and the 3000 levels. Where the water had been lowered 800 feet the upper pump would be reached and 200 feet below that the second pump would be recovered. At the Combination shaft are Cornish pumps that could be run until the big hydraulic pumps were recovered. With both the Cornish and the hydraulic pumps at work 5,200,000 gallons of water can be raised each twenty-four hours. As the accumulations of water in the shafts and drifts are not from living streams, to pump them out is like pumping out a cistern.

The resumption of deep work at the Combination shaft need not interfere with the scheme for the drainage of American Flat. Only a certain number of men can be worked in the proposed drain tunnel, and there are certainly enough believers in the possibilities in the Comstock at depth to stand in and make a test at some point. Such a movement would give new and real life to the stock market. Old-time stock operators who are unmoved by strikes in the old upper levels would all wake up and try their luck when it came to the exploration of new ground at depth. As things now stand, no one knows but what work in the deep shafts may have stopped just on the apex of a third line of bonanzas richer than any found above.

Condition of Gold Mining in California.

From an article written by CHARLES G. YALE for the State Board of Trade.

The character of mining carried on in California in these days is entirely different from that done by the miners who came to the State in the "days of '49," when very simple appliances were all that they required to obtain the gold which the concentrating forces of Nature had gathered in the gulches, ravines, canyons, creeks, river bars and river beds. The pick, pan, shovel, and rocker, long-tom or sluice, were all the implements necessary, for this was the era of placer mining, when fortunes were gained in a day, and labor, not capital, was the prime requisite for successful mining.

At that time all the mining done was placer or surface work, and only the richer diggings were touched. Very little skill or experience was necessary, and the early-day miner collected the gold in quantities which now seem wonderful. In the one year of 1852 the sum of $81,294,000 was taken out. Gradually the area for this surface mining began to be narrowed down, and attention had to be turned to other sources of the gold for which all were in search. To-day, however, many of these old claims are being worked over and over by Chinese miners, and, as they are satisfied with small wages, there are plenty of places for them to mine. White men own most of the ground, which they lease to Chinamen, and poor mining ground is now called "Chinese diggings."

After a time it was discovered that the great, red hills in the foothill and mountain counties in the central and northern part of California contained plenty of gold, though the material was much poorer than the concentrated shallow places, necessitating the handling of more dirt. Then hydraulic mining was invented. Then, too, men began to inquire into the sources of the rich placers, and commenced to hunt for, open and work the quartz ledges.

The collection of gold from these sources is a much more expensive operation than taking it from shallow surface placers, and very different systems have to be adopted. The method is practically the same as that pursued by nature — concentrating the heavier valuable material and washing away the lighter—but man's efforts are slow, and it takes time and money to handle the material.

With the necessary change in the character and system of mining came an entire change in the social conditions and methods of the miners themselves. People who only know about gold mining in California from the old stories of the mining camps in the "days of '49," would recognize none of the features should they visit the mining regions of the State in 1897. The nomadic habits of the miner have entirely disappeared, and with them the recklessness, drunkenness and extravagance which were supposed to universally prevail. It is proper to note, however, that such habits were not universal by any means, though among the thousands who came were numbers of men who made necessary lynch law and vigilance committees. Around all the larger mines of the present day are permanent settlements, where the miners live with their families, content to work for wages and a sure income. The larger mining towns of the State, where there are a number of mines in operation, have lost entirely the old features of mining-camp life. The people have settled down to mining as a permanent business, and conduct it like any other industry.

The principal producing mines of the State now belong to private companies or individuals. Many small claims and prospects are owned by individual working miners, but capital is required to open and work quartz and gravel claims to conduct the business on an economical and profitable basis. Many of the wage-working miners, of course, do more or less prospecting for themselves, and many own small claims, which they work in a desultory manner until they can be disposed of to people in a position financially to bring them to a producing condition. California, as the pioneer of the gold-producing States of the Pacific coast, and the one which has made the greatest aggregate yield, has very naturally long since passed its "boom" period, and its mining affairs are conducted on the same principles as any industrial business.

From all classes of gold mines the average annual product of the State for the past forty-eight years has been about $26,500,000, the total output of gold since 1849 having aggregated $1,282,398,779. The annual yield is now between $16,000,000 and $17,000,000, and has shown an increase in each of the last three years. In view of the many developments and investment of capital, the annual yield is expected to reach $20,000,000 before long.

The conditions under which mining is carried on have changed materially for the better. The mining country has been more densely settled, means of transportation have vastly improved, machinery has been perfected and cheapened, all supplies have become cheaper, and radical changes have taken place in the systems of mining and of handling and treating ores. High-priced officials and supernumeraries have been done away with; there is a closer system in conducting operations, and all the appliances necessary are not only more perfect but cheaper. As a result of all these factors, ore is now mined and milled at a much less cost than formerly, and mines that twenty years ago would run a company in debt can now be made to pay a handsome profit. Each year has shown a gradual reduction in cost, and improvement in the method of treating ores, and with every dollar off this cost, hundreds of mines have been added to the list of producers. The successful treatment at low cost of the rich auriferous sulphurets found in the ores of nearly all our quartz mines has been an important factor, as at one time little attention was paid to them, whereas, now all mills are equipped with appliances for saving them for ultimate treatment, in addition to the ordinary methods for saving the pure gold.

There is plenty of opportunity for investment in the gold mines of the State, but this should not be undertaken by those unfamiliar with the business, except upon the advice of persons of experience. Even those long in the business, and who have invested large sums, do not purchase properties or interests in them on their own judgment alone, but employ skilled experts to make examinations and reports. There are so many conditions to be taken into consideration that it is foolish to invest money in this kind of property without very careful examination in advance.

While the principal product of the mineral world in California is gold, there are many other substances mined, which swell the total valuation of the mineral output of the State to upwards of $24,000,000 a year. Several of these products are not mined in other States. Quicksilver, for instance, is nowhere else mined on this continent, and since we first began working it California has produced upwards of $77,000,000 worth, and continues to produce it at the rate of over $1,000,000 a year.

For the last seventeen years the total silver product has been over $20,000,000. All the borax in this country comes from California and Nevada, and eleven-twelfths of that is from California. The annual output of this substance is from $600,000 to $700,000. This State produces more rock asphalt than any other, and is the only one yielding natural liquid asphalt. Magnesite, used in paper manufacture and for furnace linings, is mined here only. The only product of chrome in the United States is from California, and all the antimony is from this State and Nevada. The only platinum found in the United States is taken with the gold from the beach black sands and from the black sands of the auriferous gravel mines. The mineral oils are very valuable, and we stand sixth among the other States in value of petroleum product. The oil fields are only partly developed, there being still large areas of oil-bearing ground yet unopened. The value of the structural materials, including cement, clays, limestone, granite, sandstone, macadam, paving blocks, slate, marble, onyx, etc., is over $2,000,000 a year.

Assaying of Gold and Silver.

NUMBER II.

By JACOB B. ECKFELDT, Assayer of the United States Mint at Philadelphia, Pa.

The proportion of silver in the alloy referred to is ascertained by the humid assay. For this purpose a definite proportion of the alloy is weighed, inclosed in lead with sufficient fine silver, for the proper working by the humid assay. The bullet is then placed in a cupel and retained in the furnace until the whole is melted, when it is immediately taken out, without allowing any absorption by the cupel. When solidified, the alloy thus formed is placed in a bottle and dissolved in nitric acid.

Another method of making this assay for silver is to weigh a definite proportion of the alloy and carefully fuse it under cyanide of potassium, with an excess of pure cadmium or zinc. As soon as fused, the alloy is poured, the resulting button, freed from cyanide, is dissolved in nitric acid, together with the proper quantity of fine silver for the humid assay working. After complete solution, the assay is proceeded with as further described.

The object of the cadmium is to form an easily partible alloy—that is, one in which the gold is thoroughly broken up by the acid, and any alloyed silver completely dissolved.

Within a few years an improvement has been adopted in the apparatus for assaying as conducted in the United States Mint. The cornets are prepared as previously described, but, in place of boiling them in flasks, they are deposited in separate cups of platinum, arranged in a basket-like apparatus of the same material, capable of holding sixteen assays in a small space.

This is placed in a basin or cup of platinum containing nitric acid of the required strength—acid at 22°, if three parts of silver have been used, and at 32°, if but two parts. Heat is applied and the acid boiled for ten minutes; the baskets containing the cornets is then withdrawn and placed in another similar vessel, and the acid at 32° is poured over them and boiled as before. This change is generally made the third time to insure a complete extraction of the silver. To prevent the escape of the fumes from the decomposition of the acid, a dome-shaped covering is placed over the vessel, which connects by a tube with a condenser, or a flue.

The boiling operation, or digestion, having been completed, the cornets are washed, dried and annealed without removing them from their respective separate compartments in the basket. The great advantage in this operation is the uniformity with which the cornets are treated, all being subjected at once to the same action from the acid. It also saves time and trouble in repeated decantings. It is somewhat liable to the danger of spoiling the whole set by the breaking up or by transposition of some of the assays, but with due care this will rarely happen.

The foregoing operation does not entirely remove the silver, although it was formerly supposed that it did, and thus the gold coins of the best mints showed a deficiency from the true or legal fineness, even when it was not intended. This small quantity of silver which persistently clings to the gold is called the "surcharge."

The surcharge of silver is very minute and varies, say, from two to seven or eight-tenths of a thousandth. It is ascertained in each assay or set of assays by the "proof" already mentioned, which shows the amount of silver retained by a known weight of gold under identical treatment with that given the sample under assay. The weight of the cornet from the proof strip will be greater than that of the gold in it by the amount of the "surcharge." The surcharge thus found is therefore to be deducted from the weight of such cornets as accompanied the proof through all the processes of treatment.

In assaying fine (or nearly fine) gold, we weigh the proof to 1000 parts of our test gold; but in assaying ingots for coinage and the ordinary class of deposits, a proof of 900 parts is used, and in lower grades of gold a synthetic proof is used corresponding to the approximate or supposed fineness of the metal, the object being to subject an alloy of known composition, closely similar to that under test, to identical treatment.

After the ignots have been made, the first and last ingot from every melt are carried to the assay room and a sample slip taken from each. These are assayed separately and their fineness reported to the melter and refiner. The ingots or melts which may be too far from the legal standard, or fail to show a uniformity of fineness in the assays, are condemned. They are then remelted with the proper addition of either gold or copper, as the case may require, to bring them to standard.

With every sample of gold assayed there is also a corresponding duplicate assay made, to guard against any error which might possibly occur in the various assay processes. Besides this, the duplicate serves to show if the alloy be of a uniform fineness throughout. If such is not the case (as shown by the variation of the assays), the mass from which the sample was taken is remelted and stirred to make it homogeneous, after which it is assayed in duplicate as before.

In case the gold for assay be of low fineness, or if there is but a small proportion of gold in the alloy, it is found to be expedient in preparing the assay to add sufficient fine gold so that the assay may contain 900 parts of gold in the 1000. By this course the exact fineness of the alloy is ascertained, otherwise an allowance would have to be made for a slight absorption of gold by the cupel, which will happen when a large proportion of alloy is present. When the weight of the cornet is ascertained, the amount of fine gold which was added must be deducted, the difference being the fineness of the original alloy.

It sometimes happens that the ordinary amount of lead is insufficient to cause the entire elimination of all the base alloy in the gold. It may be, too, that the cupel is not capable of absorbing the entire amount of lead which such an assay would require. To avoid these difficulties, it is customary to weigh the assay at one-half the usual weight, adding fine gold as described above, thus diminishing in like proportion the amount of base metal to be oxidized and absorbed by the cupel.

Assay of Silver.—The object of the silver assay is to determine the exact proportion of silver contained in any bullion, plate or coin. The assay does not regard the nature or variety of the alloying metals, but simply their proportionate weight to that of the pure silver. Incidentally, however, for the benefit of the melter and refiner (in the mint assays), or for his own information and experience, the assayer takes cognizance, in passing, of the nature of his solutions and precipitates; also, of the ductility of the metal to be tested.

When the silver alloy is melted, a sample is taken out for the assayer. This is done by dipping a small portion from the pot and pouring it into cold water. The resulting granulations are carried in copper cups to the assayer's laboratory. The reason for this method of sampling silver is elsewhere explained.

After drying the granulations by heat, about twenty-hundredths of an ounce are reserved in the assay room and the remainder returned. The sample lots are now laid out upon a board containing cup-like sockets bored at regular intervals and numbered. A granulation from each sample is next hammered and rolled into a thin strip, this being merely for convenience in cutting for the adjustment in weighing the assay. Each strip is laid beside its kindred granulations and numbered by stamping. The board is now removed to the assayer's "weigh-room."

(To be Continued.)

Mining Summary.

CALIFORNIA.

Amador.

Ledger: On the Pocahontas at Dogtown the crosscut from the shaft at the 400-foot level is progressing. A ledge has been encountered which shows good ore at a shorter distance from the shaft than was anticipated.

Hatch & Marshall, who for many years have held the Marklee mine in idleness, have sold the property to a company of mining men, among whom are Flint of San Juan, Wilson and Root. They have purchased a mill.

Two weeks ago workmen in the north drift of the Anita mine, who were driving toward the so-called Schober chimney of ore, came into a body of quartz, and at the same time opened up a flow of water which, before they could leave the face, had risen about two feet in the levels. The flow continued, and in spite of the constant and continual use of all the machinery of the mine the water continued to increase until the 1000 feet of levels were filled with water. Arrangements are now being made to construct a large permanent hoist on the property.

Dispatch: At the Monte Cristo or Robinson mine they have 68 feet of paying ledge matter. There are three tunnels on the property. The lower one will strike the ledge 450 feet below the surface at a distance of 600 feet from its mouth. Mr. Dillon has just put in a mill with a capacity of 70 tons in twenty-four hours.

At the Iron Mass in Robinson district Mrs. McLaughlin has recently erected a steam hoist over the shaft, which is now down 200 feet. It is intended to sink the shaft 450 feet deeper at once and then run levels from that station. Drifts have been run from the 200 foot level 180 feet east and 80 feet south, developing a well-defined ledge of white quartz similar to that in the mother lode, varying in thickness from 4 inches to 5 feet.

At the Amador Queen the shaft is now down 585 feet and a crosscut is being driven to the east to intersect the footwall. In excavating for a dam at the 500-foot level 30 feet of vein matter which assays well was gone through, but it was not of sufficient solidity to justify working.

The owners of the Valparaiso are sinking on their mine and the rich rock continues in the shaft. Last week 57 ounces of rock yielded 27 ounces of fine gold.

Work on the Doyle mine has not yet been resumed, but it is understood that the new company recently incorporated intends beginning operations within a short time.

The flow of water in the Alma mine still continues, but the management has been able to handle it so far, although the skips are kept pretty busy.

Republican: The tunnel to tap the gravel channel of Butte basin is in 1700 feet, with 300 feet yet to run to get to the point aimed at. No pay gravel has been struck as yet, but marl has been entered, and this is generally understood to be in the vicinity of the pay channel.

The repair of the shaft at the Zeila has been finished and the mine will be started in full blast in a few days. This resumption of mining will give employment to about 100 additional men.

Calaveras.

Chronicle: The Excelsior gravel mine, owned by Fahey and Knell, has been sold to the Hexter Mining Company. The claim consists of forty acres. The purchase price was $2,500.

A large flow of water has been encountered in the Esperanza mine, and it is a splendid indication of a large pay chute in close prominity to the present workings. The shaft has now reached a depth of 600 feet.

The work of grading for the mill which is to be erected on the Guiffra mine is completed.

El Dorado.

Nugget: At the Unity mine, Gold Hill district, the shaft has reached a depth of 370 feet. It is the intention of the Pine Hill Mining Company, the owners of the property, to continue sinking to 400 feet. A tunnel will then be run north from the 400-foot level and a crosscut will then be driven through the ledge.

The Oriental mine has been bonded to an English syndicate and the work of developing the property is going on rapidly. Rock has been recently taken from the property that assays well. The ledge is large.

Kern.

Californian: The prospects of the Amalie mine are very bright. Fine ore has been struck at the 400-foot level, while good ore continues to be taken from the 250-foot level.

Mariposa.

(Special Correspondence).—The Merced Gold Mining Company's mill is running full time. Thirty stamps are dropping on ore from the Mary Harrison and the rest are supplied from the Malvina mine. A body of very high grade ore has been opened on the 600-foot level of the Mary Harrison in the old shaft.

The Horse Shoe Bend group of mines, comprising eleven claims and a water right on the Merced river has been bonded to Conrad Kohrs the Montana cattle man. The price is said to be $50,000 and the bond runs to Jan. 1st, 1898. A. C. Cabel, formerly superintendent of the Louisiana mine has a force at work opening up the property.

A 3-stamp mill is being placed this week on the Deer Flat property operated by J. Leonard and others.

It is reported that Hamilton Smith and his associates, who recently purchased an interest in the Mariposa Grant, have secured an option for one year on the Red Banks and Crown Lead properties. The former is owned by Henry Bratnober and A. Wartenweiler, and consists of the Daisy, Jubilee, Stevenson and Syndicate claims on the mother lode, on the north side of the Merced river, opposite and adjoining the Mariposa Grant. These properties have been developed to a depth of about 400 feet by tunnels and a large amount of milling ore is in sight. The price is said to be $100,000. The Crown Lead property adjoins the Red Banks to the northwest and also partly overlaps it on the east side. It consists of the Crown Lead, Crown Peak, Adelaide, Anderson and Midas claims and four patented mill sites. The property is owned by Mrs. Mary McCrellish and the price is reported as being $125,000.

A force of men has been set to work extending the crosscut tunnels of the Red Banks to cut the Crown Lead vein. Valuable water rights on the Merced river go with each of these properties, which together comprise about three miles of the "west vein."

A small prospecting mill is being erected on the Louisiana mine.

Manager McSherry has severed his connection with the Bunker Hill Company. The mines have been temporarily shut down pending a reorganization of the company.

After crosscutting the ledge at a depth of 60 feet sinking has been resumed in the new shaft on the Bully Hill.

The new compressor plant on the Bondurant has been started up and is working satisfactorily.

The force at the Contention mine has been reduced for a short time.

There are more men working in Coulterville and its immediate vicinity this season than at any time in the past ten years.

The Garbarino property, comprising 3000 feet on the east branch of the mother lode and between the Virginia and the Mary Harrison has been bonded for $10,000 to F. H. Hill.

Coulterville, Cal. July 1st, '97

Nevada.

(Special Correspondence). — In traveling over the county, one is pleased to find the great amount of new prospect work, undertaken both by capitalists and by young men who, out of their savings, are making investments until compelled to go back again to their earnings for additional means. The county is attracting new people from week to week, and new work and purchases are recorded almost every day.

The Gaston Ridge Mine, a company incorporated under the laws of New Jersey, of whose extensive workings I wrote the MINING AND SCIENTIFIC PRESS a few weeks ago, has cut the ledge at 1916 feet, and thus far have 16 feet of ore and 650 feet backs, draining also the old upper works. The footwall is slate and the hanging wall is syenite. This work has been an expensive undertaking and has been watched with interest. Perseverance, coupled with careful previous study, is now rewarding the company, and Mr. Harmon, the superintendent, is in high feather.

The La Suerte Gold Mining Co. are erecting new hoisting works on the property recently purchased from Kirkham and others. They have a 2-foot ledge of good ore, a shaft 200 feet and a tunnel on the vein 1600 feet. The company (San Francisco people) are preparing to erect a 10-stamp mill.

The Mark Hanna, owned by four young men working in the Champion mine, has a tunnel 180 feet. They expect to reach the ledge within 25 feet. The croppings were from 8 to 12 inches and assayed $1.25. There are four claims in the group and they are owned by Rosewald, Oliver, Beedle and another.

The successful stipulation and consequent dismissal of the You Bet troubles give eminent satisfaction in this section.

The old-time Sneath & Clay mine, one-half mile from town, was sold yesterday to Sidney Smith of Cleveland, J. H. Schockley of Cincinnati and Dr. Tickell of this city.

A company has been incorporated which proposes to operate the large nickel and cobalt ledge between Nevada City and Washington, of which a notice appeared in the MINING AND SCIENTIFIC PRESS some weeks ago.

Nevada City, July 4th, '97.

Herald: The Champion Mining Company have a few men at work at the Merrifield, and are preparing for more extensive operations on that property.

Some rich rock has lately been taken from the Reward mine which is looking well, and the ledge averages about 16 inches in thickness.

Union: Since the big ledge was struck at the California mine in God's country drifts have been started both ways and will be run along the ledge for some distance, after which a practical mill test of the ore from different points will be made. The company has over 1000 feet of backs to work on.

Union: J. Lyons has been running a tunnel from Deer creek to tap a ledge on the Deadwood ground. It is known that the ledge is still about 150 feet distant, but last week another ledge was struck on the way which assays very high.

The sale of the Sneath & Clay mine has been effected to English capitalists whose representatives are now in Grass Valley.

Poorman & Hasting have done a great amount of work on their claim on the Middle Yuba river below Pike City and have drained the river for a considerable distance. Everything will probably be in readiness to commence washing the gravel in about a week. The derrick is being put in place and about twenty men have been employed.

Placer.

On the Morning Star mine at Iowa Hill the adit tunnel is 4,200 feet in length. The gravel is worked from 7 to 14 feet in height, the channel averaging about 250 feet in width. The gravel is slightly cemented, which necessitates crushing. The mill has ten stamps, which crush about 135 tons per twenty-four hours. The development or dead work done in the mine is unusally large. Tunnels and drifts have been advanced ahead of the regular work, so that there is two or three years' steady work opened up. The mine has paid regular monthly dividends for the past seven years. The mine employs about sixty-five men.

The Big Dipper is worked through a tunnel 4,000 feet long. It has a 10-stamp mill and the workings are similar to the Morning Star. The pay channel varies in width from 50 to 250 feet. The gravel breasted out is never less than 6 feet, and sometimes as high as 20 feet. The work of development was commenced in 1890.

Plumas.

National-Bulletin: During the past week Mr. Hazzard has been cleaning up at the Plumas Imperial mine, and results are reported to exceed all expectations. During the last days of hydraulicking a well defined and rich channel was opened up.

Sierra.

(Special Correspondence).—The old Brush Creek quartz mine at the Mountain House, abandoned twenty years ago, is being reopened by the Goodyear Mining Co., composed of Chicago and Philadelphia people. John Myers has charge of the work.

Lewis and McGregor are running a tunnel about 100 yards from the hotel. At 260 feet they struck an 8-foot ledge. The footwall has not been reached. There are sulphurets in quantity and coarse gold is plainly visible. There is in this formation a species of gold-bearing ore that resembles jaspar rather than quartz, and old miners are puzzled what to call it.

Meehan, Benson and Tangway, who are taking coarse gold from their channel property on American Hill, have started a new tunnel on the opposite side of the ridge, from which a large amount of gold has been taken in former years of superficial methods of gravel mining. They will cut the same channel, on which they own 200 acres.

Craft and Smith are running several tunnels on the Scotia & Allis. The main tunnel is 250 feet. They have not attained much depth as yet, and are running mostly for pockets. The ledge is small but rich. It is a schist with bunches of gold-bearing porphyry. The property is at the head of French ravine, in which a piece of gold was found in pioneer days weighing $10,000, imbedded in a slab of quartz.

The North Fork Gravel Gold Mining Co., incorporated, just at the edge of Forest, are into the ridge 3300 feet, having taken up a tunnel worked thirty-eight years ago, and through which pay gravel was found the entire way. It is known from the old works that the channel is 200 feet in width. Mules draw a train of fifteen cars in a train through the tunnel. It is free gravel and is run through sluice boxes. J. O. Jones is superintendent.

Forest, July 3d, '97.

Shasta.

Searchlight: At the Iron Mountain mine from 300 to 400 cars of ore are removed daily. About 325 men are constantly employed, 175 working on the day shift and the remainder at night, the latter having nine hours of employment as against ten by the former. To the men working in the mine $2.60 is paid per day, the others receiving 50 cents less, except those employed in outside work who receive but $1.60 per day, under ordinary circumstances.

The Hidden Treasure, owned by the Mountain Copper Company, is showing up well. About twenty men are employed. The ledge was tapped by the lower or second tunnel at a distance of 250 feet. Drifting each way on the ledge was at once commenced.

Free Press: A new vein of ore about 11 inches wide has been struck in the Sabbath mine at Harrison Gulch.

Sam W. Cheney, manager of the Mammoth-Garfield mine in Old Diggings, will put in a power plant to operate the wire ropeway which was recently built to convey the ore from the mine to the smelter at Keswick.

Siskiyou.

News: The mining industry in the old Cottonwood mining district, which comprises Henley, the Klamath river for a distance of ten miles, Hungry creek, Beaver creek, Mt. Sterling, Empire creek, Bumble Bee creek, an area of twenty miles square, is looking up better than for many years past.

The Diestlehorst dredger operating in the Klamath below Oak Bar cleaned up $180 in two shifts last week.

Captain La Flesh has made a strike of good ore in his quartz mine on Rocky gulch, west of Henley.

Work on the Last Chance mine is going on, with a crew of twenty men working night and day shifts. The new machinery, including a hydraulic pump with a capacity of 5,000,000 gallons per day, has been placed in the pit.

The hydraulic mines of Hamburg Bar have all cleaned up and closed down owing to the lack of water. The present season has been three months shorter than usual, but the mines all yielded well considering the short time they were in operation.

Journal: Day & Co. of the Klamath River Flume and River Mining Company, are pushing their surveys as rapidly as possible.

The Minetta B mine, on Thompson creek, is still in operation, and the owners will commence putting in an elevator immediately. The mine will also be opened from the lower end.

LeLay & Utne will resume work on their quartz ledge west of Yreka next week, and will soon have enough ore out for another crushing.

At the Katie May mine on Greenhorn, they are still running a tunnel to tap the ledge lower down, and will be in a position, when the tunnel is finished, to take out a large amount of ore.

Journal: the old Bentz Bar mine on Klamath river, which was so rich a few years ago, and later sold to a Chinese company, has been turning out some rich gravel lately.

At the Phil Mott claim on the Klamath river they have commenced hoisting gravel.

The owners of the Minetta B Mine on Thompson creek have bought the Seattle placer mining property at that place for the sum of $12,000. This will give the Minetta B Company a splendid water right, as well as a good property, with a large amount of modern machinery. The mine just purchased was formerly the old Shiner mine, and was sold by T. J. Nolton several years ago to a company of Seattle capitalists for the sum of $10,000.

Trinity.

Redding *Searchlight*: At Hall City, across the divide from Harrison gulch in Shasta county, Hall & Carpenter have a mill with a capacity of five tons at work. On their Lucky Hall mine three tunnels intersect the ledge being in 70, 60 and 50 feet respectively. A winze is being sunk from the upper tunnel and is down 60 feet, following the ledge which has an average width of from 10 to 15 inches. Six men are employed at the mine, and considerable ore has already been stoped and treated.

Two 2-stamp battery mills are to be put up by Chambers & Harrison south of Hall City. The Green mines bonded by them and comprising the Yellowstone and White Rock mines are showing up well.

Tuolumne.

Banner: At the Jumper, next Sunday, will be one year since the twenty stamps started up—not one hour of that time being lost. The delivery of ore could easily keep eighty stamps busy.

There are about twenty lessees paying 25 per cent royalty to J. N. Gillis on the gross yield of the pocket mines on Jackass Hill.

Independent: Work on the ten additional stamps at the Dutch is progressing. When completed the mill will run twenty stamps.

At the Soulsby mine all is quiet, and no work is going on. When the property will be put in operation again is a matter of doubt.

At the Black Oak the ten additional stamps to the ten already in operation were started last week. The mine continues to prospect well.

This week twenty additional stamps to the ten already have been started up at the Confidence mine.

OREGON.

Monitor-Miner: Kennedy & Co. are operating the Oregon Bell mine on Forest creek. It is a free milling ore, running from 6 inches to 5 feet in width, and a tunnel has been run 60 feet on the ledge.

Rogue River Courier: John Bolt of Applegate has leased his Galice Creek mine to Santa Cruz (Cal.) parties.

Browning & Hannum have made a rich strike of decomposed quartz on Grave creek. They are putting up an arrastra.

The Oregon Bonanza mine is in good ore and the vein has widened out to 30 inches and is filled with pay.

Baker City *Democrat*: A clean-up of $5000 has been made as the result of 30 days' work by two men in a placer mine on Louse creek.

Z. C. Perkins is operating a placer property on the John Day river at the mouth of Big creek which promises good results.

R. Long has been washing dirt that averages 35 cents to the pan, and has found several nuggets that range from $3 to $12 in value.

The German mine is paying well. Pans in the wash run $1.35.

J. Clark has a claim that is showing up well, and most of the miners in the neighborhood are well satisfied with the results of their work.

WASHINGTON.

Spokesman-Review: The interest in mining properties on the reservation near Nelson is constantly increasing. Almost daily parties are coming in to do assessment work on their locations made last year. Quite a number are doing considerable development work and, as a rule, with satisfactory results.

On the Republic Clark Bros. have a force of 18 men at work. The Lone Pine is expected to open up with quite a force in a few days. The Tom Thumb is working with good results, as is the Black Tail and a number of other properties.

On the San Puel W. H. Greenbow and Dr. Powers of Ellensburg are working several properties. At Wolf's camp a large force is working, a Burleigh drill being operated on this property. On Lambert creek several parties are pushing work with success, as well as on San Pierre creek.

The Empire, west of Curlew, has grown to be quite a good camp. Over twenty men are now working on their claims.

H. E. Battin, manager for the Portland Mining Company, has done a lot of work on the Red Jacket and expects to sink 100 feet on the property.

Stewart & Fox are working on the Echo, Little Jennie and other claims. W. L. Curry is pushing work on the Crown Point and Morning Star. Charles McWilliam, associated with F. E. Baldwin and other Spokane parties, are working on the Minnesota Boy and Baldwin. John Ross is stripping quite a ledge on the Great Northern.

The Copper Queen, near Nelson, is now preparing to put a force of men at work.

BRITISH COLUMBIA.

(Special Correspondence). At Fairview the Tin Horn is working twenty-four miners and is putting up a new 20-stamp mill.

The Smuggler mine is dropping ten stamps all the time.

The Joe Dandy is working twenty-two men.

Dier, Davidson & Russell have thirty men working on different properties.

There are new strikes being made every day, not the least of these being two properties, one running 30 ounces gold and another 9 ounces.

Carr & Co. are shipping to the Tacoma smelter about 100 sacks per day. It has to be good ore that will stand wagon-hauling, freight and smelter charges. Five or six properties here could ship ore if people would push them. There is not another camp outside of Rossland or Trail where there are so many men at work and so many mills being built.

Fairview, B. C., July 3, '97.

Spokesman-Review: The bottom of the Le Roi shaft is now down 592 feet and has 6 feet of solid ore. It is said the mine never looked better, and is shipping from 200 to 250 tons of ore a day. The mine made a record Wednesday last, shipping during the twenty-four hours 470 tons of ore.

G. A. Pounder has sold his interest in the Early Bird Mining Company to Anderson Bros., of Albion, New York, for $10,000. The interest amounted to about two-thirds.

The Center Star sent three carloads of ore to the Trail smelter last week, this being their first shipment.

At Boundary creek a strike of galena in quartz has been made in the shaft of the O. B. claim, belonging to the Boundary Creek Mining and Milling Company, of Greenwood. The ledge contains about 3 feet of mineralized quartz, which is now for the first time showing galena.

The Anaconda, Columbia and Kootenay claims, situate in Providence camp, and owned by E. A. Bielenberg, have been bonded for an English syndicate by E. A. Woodhouse, M. P.

On the Golden Crown, in Wellington camp, the crosscut tunnel is now in the third lead, at 110 feet, which is about one-third of the distance it is at present proposed to run it.

Captain Moore and some of his associates, who recently sold the Idaho-Alamo and other groups in the Slocan, have secured a bond on the Roulette.

The final payment on the Silver Glance, on Woodbury creek, north of Ainsworth, has been made by John S. Baker, of Tacoma, and his associates. The claim was bonded January last for $10,000.

A new discovery of copper ore has been made in the Ainsworth camp, in the Jeff Davis mine. While some copper had been previously found, it was in small quantities, but the vein just uncovered carries about 16 per cent copper with some gold and silver.

At Slocan W. A. Coplen, one of the owners of the Skylark and Ranger, on which a bond was recently allowed to expire by the Hall Exploration Company, states that he intends to begin work at once on these properties himself.

The Ottawa concern, headed by Sir Charles Tupper, has bonded the Exchange group on Springer creek, in the Slocan district. The claims purchased are: The Victoria, Exchange, Skookum and Silver Plate. The property is thought to be of good value, and the consideration is said to be fixed at $42,500. Development work will begin soon.

On the Meteor, where the ledge has been stripped for a distance of 150 feet, there is an 18-inch ore streak showing the entire distance.

A strike has been made on the Alexander, at the head of Lemar creek, and adjoining the Black Prince group. This property, with the Dellie, were bought by Ralston McKaig, of Rosalia, Wash., about a month ago, for $4500, and a crew of men at once set to work.

The Howard Fraction made a shipment of ore last week to the Hall mines smelter at Nelson. The shipment amounted to twenty-two tons, and was packed over the trail nine miles to the Canadian Pacific Railroad dock.

Work is soon to be commenced on the Slocan-Liberty Hill group of claims southwest from Kaslo. Considerable work has been done in the past. It has been decided to run a 3000-foot tunnel through the main properties, which it was found would give a depth of over 1000 feet.

For the first six months of 1897 the returns of the custom house show the following shipments made:

BULLION AND MATTE.

	Pounds.	Value.
Trail smelter	118,809	.....

ORE.

	Approximate Tons.	Value.
Le Roi mine, Rossland	186	.....
Payne mine, Slocan	200	.....
Washington	32	.....
Whitewater mine, Slocan	15	.....
Noble Five mines, Slocan	53	.....
Black Diamond mine, Ainsworth	40	.....
Kootenay Ore Company, Kaslo	130	.....
Total for week	735	$ 85,176
Total so far for June	3,200	354,446
Total for May	2,995	397,797
Total for April	5,764	453,234
Total for March	5,822	677,881
Total for February	5,201	562,853
Total for January	4,543	675,506
Total via Revelstoke to May 12	2,296	223,382
Total so far for 1897	27,721	3,424,899

IDAHO.

Spokesman-Review: In the Seven Devils district almost the whole mineral belt is held by locations and relocations. This system has been carried on for sixteen years, with no development and but little assessment work. There are seventeen patented mines in the district and 15,000 acres in a solid body have been held for many years by methods adopted for the purpose of defeating the intent of the mining laws.

A report is made of a rich strike in the Poorman at Florence.

The Banner mine in Florence has started twenty men on development work. A mill will be put on this property within thirty days.

J. W. Kuykendall and W. E. Hines have discovered a ledge of high-grade ore on the reservation, thirty-five miles from Lewiston.

At Lakeview in the Keep Cool a rich strike has been made. Thirteen miners were employed in the lower tunnel and they struck a larger and richer body of ore than they had in the upper tunnels.

MONTANA.

Inter-Mountain: Several rich finds are reported from the Rochester camp in Madison county, and about ten different companies are engaged in washing the placer ground in that neighborhood with the small supply of water available.

The Watseka mine in Rochester basin has been leased and bonded to Butte parties and arrangements have been completed to sink the shaft 400 feet. The mine is owned by F. R. Merk and was worked several years ago by D. G. Bricker, the Colorado company and others.

Many of the scientific men of Butte have been experimenting for years to find a substitute for iron and steel in the precipitating process of copper water so successfully carried on in Butte for the past few years. During the past few weeks the Parrot Company have been experimenting with lime rock, a quantity of which is placed in the tank at the bottom of the shaft, instead of scrap iron. The copper is precipitated in the form of sulphides. No tests have yet been made to ascertain what percentage of copper was precipitated, the chief efforts of the company being directed to protecting the water column by robbing the water of its acid, the results obtained in that direction being very satisfactory.

The Montana Ore Purchasing Company last week sold 500,000 pounds of electrolytic copper at 11 cents.

The Anaconda's daily output is nearly 6000 tons of ore.

J. A. Finch and other Spokane men will develop the St. Lawrence and Richmond copper claims at Saltese, Mont.

Butte *Miner*: It is the intention of the Samson Mining and Development Company to put a force of men at work on their property in the New World district. This will consist of sinking shafts on both the Mint and Rosa, as shipping ore can be taken out from the time work is commenced. These shafts will be continued to a depth of 200 feet, when levels will be run and the shafts connected.

Operations have been resumed at the Eva May mine at Basin. About forty men will be worked at present. The mine is equipped with a concentrator of seventy-five tons capacity daily, and has been developed to the 50-foot level, where the ore body is said to show strong.

The Boston & Montana people are sinking in the Anderson mine and some good ore is being blocked out between the 200 and 300-foot levels. It is said that but little ore will be shipped from the mine unless the future work develops the fact that it will not pay the company to take up the bond now held on the property for $75,000.

The discovery of gold in placers on the Tongue river has caused a good deal of excitement in that section of the State. A movement is on foot among local capitalists to put in pumping machinery, water wheels worked by the current being the most favored plan, with the purpose of working the dirt on a large scale.

COLORADO.

Denver *Republican*: At Cripple Creek Duston & Whitney, who are working under a sub-lease from Vaughn, have shipped in June eighty tons of average $200 value. In the stope from the 60-foot level north they opened a 4-foot breast of ore.

Nobles, Crooks, Buckley & Lands are preparing for a hoist on their contract from Kellogg. They have some rich sylvanite and fluorite.

Two tunnels are being driven by hand from the Rosebud gulch for the big west vein of Beacon, the Standard and the Old Gold. In the latter at 300 feet a parallel vein was cut in the Columbia ground.

W. H. Pine, who is leasing on the Buckeye of the Old Gold Company, will put on a 50-horse power boiler, and a hoist competent to see the shaft down 300 feet on a good vein opened before the water stopped work.

A contract for 800 feet has been let by Manager Spurgeon of the Cripple Creek and Gold Hill tunnel, and the tunnel will be completed to the Anchoria Leland shaft as rapidly as possible.

Richer ore than ever is now being taken in the big stope from the 315-foot level in the Mahoney lease on the Orphan Belle.

At the Moon-Anchor during last month the mine has output from the big chute in the 400-foot level about 600 tons of ore. Practically all the mill ore taken from the mine last month has been stored for future treatment by the new mill planned to be built at Colorado City by officers of the Moon-Anchor, Anchoria-Leland and other properties. The level run at 500 feet has reached the ore chute, and in all probability the output will be steadily increased.

Nelson & Co. report a new strike in the Ironmaster, located on the southeast portion of Gold hill. In a shallow working a 15-inch streak of ore has been opened.

A good body of shipping ore was opened in the Reform Fraction on Bull hill by W. R. Phelps, in a shaft 170 feet deep. The ore shows in the bottom 3 feet wide and gives average assays of $60 a ton.

Two shifts using air drills are now being worked by James Doyle in prosecuting development work on the St. Patrick, in which he recently became interested.

In Saw Pit the Philadelphia, Commercial, Lizzie G. and Belle Champion are all steady producers now, and it will not be long until the Little Annie and Iron Cap will be placed in the same category.

A new company was recently organized by Milwaukee, Wis., parties, under the title of the Saw Pit Mining and Milling Company, who have put half a dozen men at work on the Arrow tunnel, on Willow creek.

On Mount Wilson the Tam O'Shanter is being worked under lease by C. M. Maddy and James McKuen, who are taking out some fine ore. They are working about twenty men.

The Silver Pick is working about thirty men. Some splendid ore is being taken out and lots of development work is under way.

The Special Session on Mount Wilson is being worked by the owners, McCullough & Bates, with eight to ten men, and are shipping ore steadily.

The Nancy Hanks, one of the best producers in the camp, which has a 30-foot body of good-grade ore, may soon get out from the meshes of the law courts and be opened up.

The Little Annie is in splendid working condition. A 580-foot tunnel has been driven in the hill, and from an upraise 60 feet some fine rock has been taken which assayed $14 gold, and now the management are sinking on the vein from the tunnel for contact, and have $7 gold ore and plenty of it.

At Idaho Springs the Newhouse tunnel has struck another lode in Seaton mountain. Within three months' time 1000 men could be placed at work on the lodes already cut, but it is known that none of this work will be done until one air connection can be put through to the surface.

Moscript, Finucan and others of the Idaho Springs pool have made a new strike in the Gold Medal.

A shipment of ore from Alma lately showed a decided increase. The shippers were: Hock Hocking, seven cars; London, to smelters and mill, eleven cars; New York, four cars; K. P., two cars; Moose, two cars; Champaign, one car; Ling, one car. Total, twenty-eight cars.

The Hale Mining and Milling Company, owners of the Hock Hocking mine, have taken up and put in place a new 75-horse power boiler to supply additional power for hoisting ore and pumping. This company have secured a tunnel site and will have a force of men driving a tunnel to cut the ore bodies at greater depth and also drain the mine.

The Bachelor, Wedge, Khedive, Pony Express and other mines in the Paquin district are making a splendid showing this season, and in consequence Ouray is shipping more ore than ever before in its history.

The Jenny Lind is about to be opened by Dr. Johnson of Montrose. The prospects bid fair to place the mine among the list of shippers.

A contract has been let for the working of the Grizzly Bear dump, and the output will be hauled to the new Fowler smelter.

The English syndicate has every reason to be gratified with the investment in the Guston, as the recent strike developed the largest body of high-grade ore ever known in the history of the property.

The Fourth of July has developed a good grade of copper, and the output will be hauled to the new smelter. The Poughkeepsie gulch district seems to abound in rich streaks of this mineral.

Denver parties have leased the All Lot mine, and operations will be resumed in the near future. In former years this mine produced many thousands of dollars.

The Humboldt, on Mount Sneffels, the property of the Old Dominion Mining Company of Richmond, Va., has reopened. It consists of the Humboldt, Sailors Fortune and Tom Paine lodes—4000 feet on the vein, a great true fissure extending for miles, and upon which more than 1000 men have been employed at one time. The Humboldt is 12,700 feet above sea level.

UTAH.

Salt Lake *Tribune*: The management of the Geyser-Marion has decided to increase its output, and to that end the Marion mill will be put in operation. The plant has a capacity of fifty tons a day. The capacity of the Geyser mill, which was in closer communication with the ore bodies, for some time has had an average capacity of 125 tons a day.

The directors of the Bullion-Beck have decided to add pans and settlers to their mill and to make its operation as nearly as possible like that at the Eureka Hill's plant, where excellent results are being accomplished. It is understood that with the plain principle of concentration the loss of a great deal of chlorides was sustained, and examination has convinced the management that this can be overcome and the percentage of metal saved considerably improved.

At the Eureka Hill the management is putting through eighteen tons a day in addition to the shipments of high-grade direct to the market.

At the Uncle Sam, in the workings is a 12-foot breast of ore which shows a valuation of from thirty to forty ounces of silver, 60 per cent lead and $6 gold. Of this an average of 120 tons a week are being marketed.

At Park City the general tone in mining circles is somewhat more hopeful than for some time. There are fewer idle men in camp than formerly which is partly due to some men leaving and others getting out in the hills, and the business tone is somewhat better, notwithstanding the cry of dull times in the diggings. Park City is to-day affording employment for over 1200 men.

As soon as the new Ellis machinery is in place, the Anchor concentrator will start up.

The Daly people have been drifting south on the 1200 level for some time, and last week after passing through a vein was encountered, and yesterday another and probably richer vein was encountered.

The Ophir Hill Mining Company will start up neither mine nor mill the present season, the management offering in explanation the low prices of lead and silver. The production of the property last year amounted to 6000 tons, while steady employment was furnished for about thirty-five persons.

Digging on the Homestake at Silver City has been renewed and the shaft will be put to a depth of 500 feet.

Bingham *Bulletin*: Whenever the great mines of Bingham decide on the right process for economically treating their ores, and can thus throw off their dependence on the combines which threaten them with ruin, the camp will emerge into an area of prosperity unknown in its former history. Its development is hardly begun, yet right now it is capable of producing 1000 tons daily of what ought to be pay ore.

Newman, Grandroot and partners have obtained a two years' lease on the old Thrush mine, next south of and said to be on the same vein as the Tiewaukee. Twenty years ago it produced ore which was shipped to Sacramento and sold for over $100 a sack.

Another shipment of seventy-five tons has been made from the Giant Chief. This increases the total of shipments since the strike to something over 200 tons.

Notwithstanding the Old Jordan mill has slowed down its output during the past two weeks, it having been making experimental runs on some of the old dumps, the amount of ore marketed from the Old Jordan and Galena mines in June will compare favorably with the tonnage of May.

Tintic *Miner*: The board of directors of the Sunbeam Consolidated Mining Company have decided to recommence operations on their properties on the 13th of July.

N. N. Brown is continuing the development of the Bertha mine in West Tintic, and is taking out some first-class shipping ore.

Mercur *Mercury*: The discovery of the second or lower vein in the Gold Dust mine proves to be of much importance and will add greatly to the value of the ground. The company will lease the Marion mill for a trial run, and intends to build its own mill.

From the Sacramento good reports are received. The mill is grinding steadily and treating about ninety-four tons of ore daily.

Tribune: The Mammoth mill will resume soon. The mill is capable of handling about 2000 tons per month, and is expected to pay all expenses of the mine, while the crude ore provides the dividends.

Salt Lake *Tribune*: It is understood that the Dalton & Lark have effected arrangements for the erection of a roasting plant, and after thirty days the company will be marketing its product in the form of a matte, instead of the crude which is now going out. The Dalton & Lark is in possession of an enormous amount of ore, and, by converting it into a matte, the profits should be increased at least 30 per cent.

A British syndicate has leased and bonded the Sulphides, Richman and Ruby claims for $25,000, and have commenced a 1000-foot tunnel. These claims belong to Clark Bros., Sullivan and Lynch.

The Creole mine is working two shifts, and continues to improve. They have a 5-foot body of ore.

J. B. Smithson with a force of men is sinking on his Hidden Treasure, and has a 4-foot vein of quartz.

Park *Record*: Weber & Kearns have their concentrating plant at the Silver King in working order, and it is now turning out about 1000 tons of concentrates per month, a force of forty-five men being employed in its operation.

The Putnam company is employing six men; the shaft is down 180 feet, from the bottom of which they are crosscutting for the ledge.

The Daily-West is closed down. The first of the month the last man working underground was laid off. Inquiry at headquarters elicited no information as to when operations would be resumed at this great property.

ARIZONA.

Republican: The Reward copper mine, southwest of Casa Grande in Pinal county, will shortly be placed among the producing mines. It has been lying idle for a number of years on account of dissensions among the people owning it. Last week ten men left for the mine to do the preliminary work preparatory to starting the mine and smelter.

Journal-Miner: The Sun Dance company has its mill running now full blast and is turning out five tons of concentrates per day.

On the King of Arizona Mining company's property the stamps are pounding away a good portion of the time. Within the next few days the contractors expect to be able to keep the mill going steadily night and day.

At Santa Maria the Waters Gold company is pushing work in the Waters and Sunset mines, and a contract will soon be let for extensive development on the Gold Standard, recently purchased by this same company from D. Thorne. Cyanide tanks have been ordered for the Waters mine, and as soon as the proper appliances can be put in place, the 20-stamp mill now on the property will be put in operation.

At Cherry Creek the Etta put on a night shift of five men last week to sink an 80-foot shaft. H. Bardshear is working twelve men on the Chicago Gold Mining and Reduction Company's B. S. B. mine, and is taking out pay rock.

The Gold Leaf has now 100 tons on the dump ready for his turn at the mill.

The Gold Ring is being worked steadily and the mill on the river has all the ore it can handle for some time to come.

L. A. Davies, General Manager of the Sun Dance Gold Mining Company, has just finished and is running a combination mill, with a 60-ton daily capacity and five 850-lb. stamps, with a plate capacity of fifteen tons per twenty-four hours.

LOWER CALIFORNIA

Lower Californian: Work on the Providencia mine at Jacalitos is being pushed and a quantity of good grade ore is in sight.

Don Emiliano Ibarra at his camp at El Burro is working four or five mines and is down 100 feet in each of them.

A power drill will be shipped to Alamo for the Aurora mine.

A great deal of prospecting is going on round Jacalitos and El Burro and several good prospects have been found.

A full force of men is at work again on the Fortuna mine at Agua Dulce.

Scientific Progress.

Advance of Scientific Knowledge.

Science has conferred one great benefit on mankind. It has supplied us with new senses. We can now see the invisible, hear the inaudible, and feel the intangible. We know that the universe is filled with a homogeneous continuous elastic medium which transmits heat, light, electricity, and other forms of energy from one point of space to another without loss. All attempts to "invent" a perfect ether have proved beyond the mental powers of the highest intellects. We must be content with the knowledge of the fact that it transmits all forms of energy in definite waves and with a known velocity, that it is perfect of its kind, but that it still remains as inscrutable as gravity or life itself. The wave differs from a wave of light only in its length or in its frequency. Electro-magnetic waves vary from units per second in long submarine cables to millions per second when excited by Hertz's method. Light waves vary per second between 400 billions in the red to 800 billions in the violet, and electric waves differ from them in no other respect. They are reflected, refracted and polarized, they are subject to interference, and they move through the ether in straight lines with the same velocity, viz., 186,400 miles per second—a number easily recalled when we remember that it was in the year 1864 that Maxwell made his famous discovery of the identity of light and electric waves. Any disturbance of the ether must originate with some disturbance of matter. An explosion, cyclone, or vibratory motion may occur in the atmosphere of the sun. A disturbance or wave is impressed on the ether. It is propagated in straight lines through space. It falls on Jupiter, Venus, the Earth; and when met with in its course, any machine, human or mechanical, capable of responding to its undulations indicates its presence. Thus the eye supplies the sensation of light, the skin is sensible to heat, the galvanometer indicates electricity, the magnetometer indicates disturbances in the earth's magnetic field. One of the greatest scientific achievements of our generation is the generalization of Clerk-Maxwell that all these disturbances are of precisely the same kind, and that they differ only in degree. Light is an electro-magnetic phenomenon; and electricity in its progress through space follows the laws of optics. Hertz proved this experimentally.

A New "Gold Process."

E. C. Brice attracts some present attention by his alleged discovery of what enthusiasts through the centuries have claimed could be done—the manufacture of gold and silver at will. Unlike other discoveries in that line Brice frankly gives the formula for making gold and silver. Here it is:

"Into a crucible, graphite preferred, place at the bottom a layer of carbon; upon this a layer of sulphur; upon this a layer of iron—preferably sheet iron—and upon this a layer of antimony—preferably Cookson's commercial antimony—the several layers preferably filling the crucible, which is then closed as tightly as possible with a cover and carefully luted with fire clay and wired down. The crucible thus filled is placed in a furnace and subjected to a direct heat, preferably a white heat, so that the crucible shall be heated to a white heat and the contents thoroughly heated, and the metals and sulphur fused together.

"The exact amount of each ingredient placed in the crucible is not at all essential, as the ratios may vary, but it has been found in practice that the following formula gives beneficial results and produces the desired result:

First layer of carbon	1 part
Sulphur	10 parts
Second layer of carbon.....	1 part
Layer of iron.....	2 parts
Layer of antimony.....	15 parts

"This double sulphite of antimony and iron may be treated in any way known to metallurgists for obtaining gold and silver. I prefer to scorify and cupel in the ordinary manner."

He says this can be tested in almost any laboratory fitted with an ordinary muffle furnace with a blast.

Further information is not vouchsafed, an obscure intimation being to the effect that while this will "create" gold or silver, his secret lies in about twenty subsequent manipulations necessary to produce the precious metals on a profitable commercial basis.

Of course Brice has his believers. All charlatans have. Since the rejection of his proposition by the Secretary of the Treasury, the inventor threatens to sell the secret to the British Government.

PROF. A. E. VERRILL in the *American Journal of Science*, writes of the color that fish assume while asleep. In most cases the change consists in an intensification of the colors. The markings have a darker appearance, and such modification is of a nature to better conceal the animal and render it less visible during the night. In certain of the species observed by Prof. Verrill the changes were more complicated. For example, the *stenotomus chrysops* while awake and in a state of activity was silvery white, with iridescent plays of color. At night it was of a dark bronze color, and from this ground stood out six transverse black bands. If it chanced to be awakened from its sleep at night, in an aquarium, by the sudden turning on of the gas, so that the light was bright, the color was instantly modified, and the normal tints of the awakened animal exhibited themselves immediately. Here again the protective role of the coloration of the sleeping state is evident, since the animal sleeps among algæ and the black bands are confused with the thalli and fronds, while the bronze color closely resembles the greenish yellow color common to many seaweeds.

CONCERNING the Polar basin, where this summer the explorers are again heading, Sir George Nares says that it is a locked-up bay continuing out of the narrowed Atlantic channel, with a warm stream of water constantly pouring into it between Spitzbergen and Norway, and a cold, icy one as constantly running out between Spitzbergen and Greenland, and also through the narrow straits between Greenland and America, the first conveying an enormous source of heat toward the north, the latter causing the intense cold of Canada and that on the east side of Greenland and North America.

IT IS probable that the depth of soil all over the world does not average more than 30 feet. But call it 50 feet, that would be less than one-hundredth part of a mile. As the globe is 8000 miles in diameter, the soil surface on it would be only one part in 800,000 in depth. It must be a clean face that does not show more dirt on it than mother earth has proportionately to her greater bulk. Yet from this thin strata of earth, with rock and molten fires beneath, all the possibilities of human life, progress and civilization are based.

FOR three years hundreds of workmen have been living in compressed air, during the construction of the Blackwall tunnel, each carrying a hundred weight of air to every square inch of his body, while people on the surface bear but fifteen pounds to the square inch. A feeling of exhilaration, amounting almost to intoxication, is produced at times. A cigar in this atmosphere burns out with a rapidity of a cigarette.

THE daily papers report that F. W. Christian has returned to Sydney, N. S. W., after two years spent in exploration in the South Sea Islands, having discovered ancient records, hand work, and weapons that prove that the Asiatic races traded in the islands, and that the ancient Chinese immigrated and colonized there and thus reached Central America.

Electrical Progress.

Tesla's Wireless Telegrams.

Experiments have been made attempting to prove the possibilities, but it has remained for Nikola Tesla to advance a theory, and experimentally prove it, that wireless communication is a possibility, and a by no means distant possibility. Indeed, after six years of careful and conscientious work, Mr. Tesla has arrived at a stage where some insight into the future is possible. He is averse to explaining all details of his invention, but allows it to be understood that he avails himself of what, for the present, may be termed the electrostatic equilibrium; that if this be disturbed at any point on the earth, the disturbance can with proper apparatus be distinguished at a distant point, and thus the means of signaling and reading signals becomes practicable once the required concrete instruments are available. Some years ago Mr. Tesla announced his belief in the possibilities, but he did so only after having satisfied himself by actual tests of apparatus designed by him. Much work had yet to be done, and he has since then given close attention and study to the problem.

Details are not yet available, and we now can merely chronicle Mr. Tesla's statement that he has really accomplished wireless communication over reasonably long distances with small expenditure of energy, and has only to perfect apparatus to go to any extent. Morse's forty-mile experiment in the old days was on a far less certain basis than the wireless possibilities of today.

Tesla's work with high frequency and high-potential currents has been notable. As long ago as 1891 he foretold the present results, both as to vacuum tube lighting and intercommunication without wires. The former had in his hands assumed a condition capable of a public demonstration of the phenomena of the electrostatic molecular forces. Numberless experiments were carried out, and from what then was a startling frequency of 10,000 per second, Mr. Tesla has advanced to what now is moderate work at 2,000,000 *oscillations per second*. Such almost inconceivable results are plainly out of all possible reach by any mechanical rotation of a commutator. And so long as efficiency of lighting is, as Mr. Tesla observes, dependent upon extremely high frequency, it would seem his efforts are in the one and only direction likely, in vacuum tube lighting, to lead to success. Success, according to Mr. Tesla, is already assured, but he will not come before the public until every detail of a practicable and commercial system is complete, and the day for such a consummation, he now states, is near at hand.—Electrical Review.

Copper and the Third Rail.

A railroad man thinks that within ten or twelve years not one of the roads now running out of Boston will issue, for the use of their patrons, local timetables. "It will not be necessary," he said; "by that time I firmly believe that all the roads will be operating their suburban service by means of the third rail electric system, and that will mean a reorganization of existing schedules and an entire readjustment of suburban transportation methods. I mean by that, that they will not only be forced to adopt the third rail system by stress of traction competition, which is ever increasing and becoming more powerful, but that the science of passenger transportation will have reached that stage by the natural and always logical progress of advancement. The third rail is the coming power. The adoption of the third rail system by the various systems of the country is, I think, an eventuality that requires only the passage of a certain length of time to become an actuality. It will mean a great deal to the copper market. The gradual adoption of the system will mean a heavily increased demand for copper, the possibilities of which are much greater than are at first sight apparent. When it is remembered that every foot of third rail track laid requires, at the lowest estimate, one pound of copper, you can figure out for yourself what an enormous demand will be created for the metal. Every mile of the third rail track that is laid requires five tons of copper. Put two and two together, and try to figure out the probable result that the adoption of the new method means to the copper metal market."

Electro-Capillary Light.

Herr O. Schutt of Jena describes a new electric discharge phenomenon, which he terms electro-capillary light. When the discharge of an induction coil is sent through a narrow capillary tube of about 0.05 millimeter in diameter, provided with aluminum or copper electrodes and filled with air under ordinary pressures, an intense luminosity of the thread of air is obtained —a luminosity which is intrinsically far superior to that of the arc, and would form an exceedingly powerful source of light if it could be made continuous. The narrow capillaries deteriorated rapidly, roughening inside, and were blown into a series of spherical enlargements. Wider tubes gave less light, but were much more permanent. At the same time the bright lines in the continuous spectrum in the original light became more prominent. At pressure above one atmosphere the phenomena were nearly the same, but the sparks passed with greater difficulty. At low pressures the light became less intense, the continuous spectrum faded, and the bright lines shone out more distinctly. The kind of glass is immaterial. It is stated that the tubes may be made 20 centimeters long, and make splendid line sources.

THE effect of temperature upon the magnetic and electric properties of iron as investigated by D. K. Morris relates to the measurement of the magnetic permeability, hysteresis, and electrical resistance of iron, simultaneously, at different temperatures. The specimens are formed into annular rings, made from iron strip. The strip is first lapped round with asbestos paper and mica, and then wound upon itself to the required thickness. A platinum wire is included in the mica lappings, for thermometrical purposes. Upon each annular ring are the following windings: (1) A primary magnetizing coil; (2) a secondary coil connected to a ballastic galvanometer; (3) an electrical heating coil. Further, the iron strip is itself connected to a Wheatstone's bridge, for resistance measurements. The coil can be heated to 1050° Cent. At the higher temperatures the surrounding air has to be freed from oxygen; this is done by enclosing the coil in a suitable vessel, and exhausting with an air-pump. When most of the air has thus been removed the residual oxygen is absorbed by an electrically heated iron wire. Curves are drawn representing the changes of permeability at the different temperatures; and at the same temperatures the corresponding hysteresis loops are plotted. The hysteresis diminishes with temperature; it nearly vanishes at about 764° Cent.

"SIGNALING Through Space Without Wires" was the subject of a recent paper read before an English scientific body by W. H. Preece. The author described the method he himself had worked out of sending signals from one place to another without intervening wires. In this system, which made use of electro-magnetic waves of low frequency, two parallel circuits were established, one on each side of a channel or bank of a river, each circuit becoming successively the primary or secondary of an induction system according to the direction in which signals were to be sent. Strong alternating currents were transmitted in the first circuit, so as to form signals in the Morse code. The effects of the rise and fall of these currents passed

as electro-magnetic waves through the intervening space, and if the secondary circuit was so situated as to be washed by these ethereal waves their energy was transformed into secondary currents, which could be made to affect a telephone. This system was successfully used in 1895 to telegraph across the Sound of Mull when the submarine cable had broken down. With reference to the distance to which it was possible to signal in this way, the lecturer mentioned that the curious law had worked itself out that the length of the two parallel circuits must be equal to the distance between them.

SOME of the MINING AND SCIENTIFIC PRESS readers may not exactly agree that the following is "electrical progress," but it certainly shows a perverted aptitude on the part of burglars who resorted to a novel scheme to open a bank safe at Chagrin Falls, Ohio, one night last week. They entered the bank of Rogers & Son some time in the early evening. They had previously attached a wire to a trolley line of the electric railway. The wire was run through an alley, over a transom to the safe. Another wire attached to the rail of the street car track was brought into the bank. At the ends of these wires were carbon points. With these carbons an attempt was made with the arc lights thus formed to melt the knob of the combination. The experiment worked all right and the knob had been nearly melted away when the current was shut off shortly after midnight. The burglars then gave up the task. The job was planned scientifically.

THE electrolytic refining of copper, according to a writer in the *Chemiker Zeitung*, is now greatly facilitated by the use of compressed air, following the systems of C. & H. Borchers and Siemens & Halske. The air is introduced under pressure through lead pipes, terminating in glass jets near the bottom of the vats. By this means arsenic and iron are both precipitated (as arseniate of iron), the liquid is circulated, and the current density may be safely increased from 30 to 100 amperes. When the electrolyte is saturated with bismuth and antimony taken up from the anode, it should be removed and treated with copper oxide or basic salts. After filtration and acidification the liquid can be used again.

THERE is described in *La Nature* a new method of preserving meats by immersion in a 30 per cent solution of salt through which a continuous current of electricity is being passed. In from ten to twenty hours the curing is completed, when the meat is withdrawn and set out to dry. For 3000 liters (2640 quarts), in which 1000 kilos (2205 pounds) of meat may be immersed, a current of 100 amperes and 8 volts is sufficient. The electrodes must be of platinum, for when other metals are employed noxious salts may be formed by the current. If the process proves a success, it will be possible effectively to prevent the putrefaction of meats.

LIGHTING railway cars by electricity is being practically tested by the Pullman company. A plain geared wheel attached to the car axle drives a pinion on the shaft of a 1 H. P. dynamo on the car truck, the current passed through a storage battery, the light thus made brilliant and uniform, both while the train is running and when it is standing still. Each car is independently provided with its generating and illuminating apparatus. The apparatus weighs about 500 pounds, and is automatic.

Electricity reports Harry L. Rood, electrician of the New Albany (Ind.) Light, Heat and Power Company, through whom 4000 volts of electricity passed a few weeks ago, as convalescent. Rood is the only living man in the world who has had 4000 volts of electricity pass through him. Two holes were burned in his back by the current, and one rib and part of a lung can be seen. His case has attracted considerable attention, and he has received communications asking for facts from several scientists.

THE spectacle of a fountain of water springing from the top of an electric tramway pole has lately been witnessed in Detroit. When a gang of men were set to work to discover the cause of the phenomenon, they came to a water pipe which ran beneath the pole. The pipe had been eaten through by electrolysis, and the water burst through, entered the hollow iron trolley pipe, and, having nowhere else to go, came out at the top. It is believed that such a demonstration of the necessity of looking out for bad work or accident in the insulation of a trolly line is unique.

THE Central Underground Railway of London is to be equipped with electric motive power, the apparatus for which will be manufactured in this country. A cablegram states that a contract has been signed in London with the Underground road by E. W. Rice Jr., the representative of the General Electric Company. The amount of first installation of the power under the contract is about $700,000.

Mechanical Progress.

A Test of Oils.

A good test of oil is to place single drops of different oils in line upon a piece of plate glass about 2 feet to 2 feet 6 inches long, one end being raised about 6 inches to 8 inches to form an inclined plane. This test should be conducted in a room where there is little or no dust. The drops of oil start from the top of the inclined plane upon a race with each other. The first day sperm oil will be found in the rear, but after a time it will overtake the others, and be found in motion even after some others have dried up. An oil having a light body runs quickly and dries quickly, but an oil that has both a body and a free flow will readily be detected by this test. An oil may have a good body, and yet tend to gum badly, which quality will also be easily detected upon the glass. A good test for the presence of acids is to put small quantities of oils in copper dishes, which are easily made by depressing bits of sheet copper with a round-faced hammer. If acid is present it will attack the copper and produce verdigris. As a result of experiments carefully made and extended over a year, it was found that iron was least affected by seal oil, and most by tallow oil when it is not deacidized. Brass is not affected by rape oil, least by seal oil, and most by olive oil. Mineral lubricating oil has no action on zinc. It was found that mineral lubricating oil has, on the whole, the least action on the metals experimented with, and sperm oil the most. For the journals of heavy machinery either rape or sperm oil, in admixture with mineral oil, is the best to use, as they have the least effect on brass and iron, which two metals generally constitute the bearing surfaces of all engines.

Nickel Steel Tests.

Some recent tests made by the British Admiralty show some advantages over ordinary steel. For twelve months plates of nickel steel, ordinary mild steel, and wrought iron were immersed in the sea, and the loss of weight in that time due to corrosion worked out at 1.36, 1.72 and 1.89 per cent, respectively. A number of bars of nickel steel and carbon steel, 1½ inches square and 18 inches long, were some time ago placed on supports 10 inches apart, and a weight of 1000 pounds allowed to fall on them from a height of 3 feet, the bars being reversed after each blow. The carbon steel was fractured after five blows and broken after twelve, while it required seven blows to fracture the nickel steel and thirty-five to break it —an increase of 147 per cent. It is claimed by engineers acquainted with the qualities of this material that if it should be adopted for cylindrical boilers that have very thick shells, such as are used in large steam vessels, a saving of 25 per cent could be effected in weight.

Ancient Arizona Engineering.

A correspondent of the Chicago *Journal of Commerce*, writing of Arizona, says that he saw in the Salt river valley a steam dredging scow, such as is used in deepening rivers and harbors for navigation, voyaging slowly and steadily through a wide strip of arid desert. It was started landward from Salt river and was excavating its own channel ahead, the river waters following and floating it as it advanced. But the work done was not, in fact, the making of a new channel, but the digging out of an old one, the irrigating canal made by a civilized people that lived and flourished and departed before recorded American history began. That there was a time when this wide valley, now being again redeemed to man, was a garden of plenty, teeming with inhabitants, is shown by the extensive and regular system of broad canals leading from the river, through which water for irrigating was conveyed out upon the cultivated lands. These canals, though choked for centuries with drifting sand and earth, still are plainly indicated on the face of the ground, and so skillfully were they planned and built that modern engineering science applied to irrigation can do no better than retrace their course and restore them. What race laid out the canals and built the towns whose ruins are strung along the valley is a question not yet settled by archæologists. Aztecs or Toltecs, or each nation in turn, probably tarried here in their centuries long migrations southward to the valley of Mexico, and the ruins may be of an older people than either of these.

A New Pyrometer.

The increasing use of high temperatures has caused considerable advance in forms of pyrometers. *La Revue Technique* describes the last, that of M. Latarche:

Briefly, the apparatus depends upon the radiant heat emitted by the furnace or other source of heat to be measured, and consists of two thermometers so placed that the rays of heat may impinge upon the bulbs from such a distance that the actual temperatures indicated will fall within the limits of the ordinary scale. The bulb of one thermometer is silvered, and that of the other is blackened; hence there is a marked difference in their respective heat-absorbing capacities, and, therefore, the temperatures which they indicate will not be the same. From this difference the actual temperature of the radiating source of heat may be computed, the principle being analogous to the measurement of a distance by observing two angles at the extremities of a base of known length, the base in this case being the difference in the readings of the two thermometers. A third thermometer, the bulb of which is immersed in water so as to be screened from the action of the radiant heat, is used to give the actual temperature of the surrounding air, and, when a given set of instruments has once been calibrated, the scales may be so graduated that the furnace temperatures may be read off directly.

Riveting with Compressed Air.

The master mechanic of the Santa Fe, speaking of the use of compressed air in their shops, says that by the use of a stationary riveting machine three men can drive 2000 rivets per day of ten hours, at a cost of $4.75, as compared with 200 rivets per day at a cost of $7 by hand labor; the truck riveters, machine being operated by two laborers at a total cost of $3 per day, drive 3000 rivets, as compared with 175 rivets driven by hand labor by three men in a day at a cost of $6; the staybolt breaker makes an average saving of $8 a day, and the tank riveter an average saving of $10 a day. The mud-ring riveters will drive as many rivets as can be handed to them, and will make a saving of $12 to $15 a day for that class of work. Not only does it make a great saving, but it insures every rivet hole being entirely filled and insures tight work, while with hand-driven rivets in mud-rings a large percentage of them invariably leak and have to be caulked and fullered up; the staybolt cutter will do the work of fifteen men.

Sound as a Measurer.

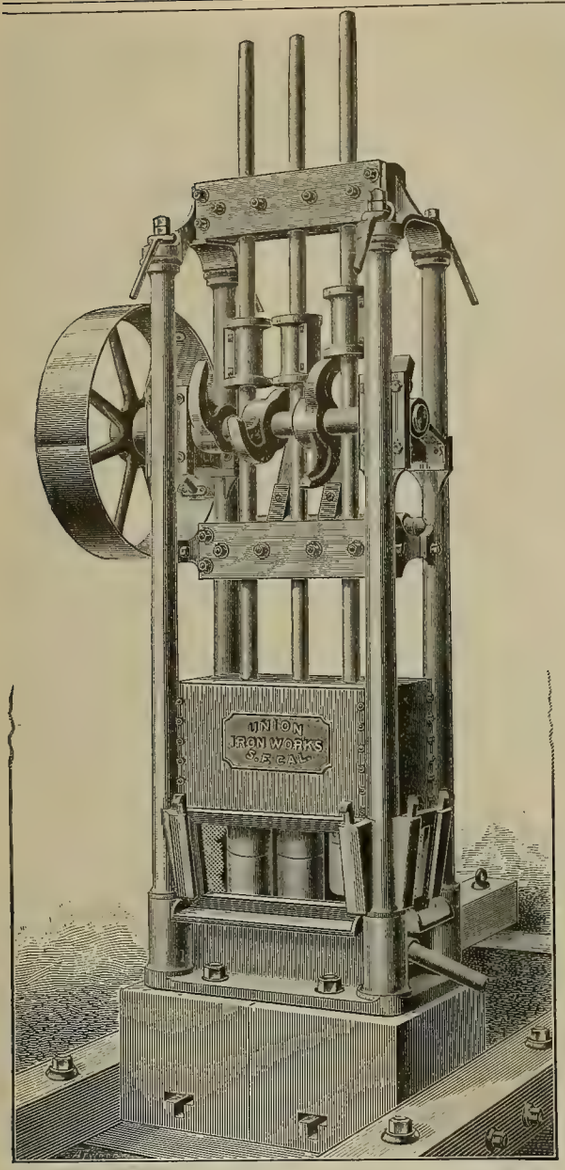
The principle of the reflection of sound is very ingeniously employed in locating the position of inaccessible obstructions in the pipes of the pneumatic tube service in some of the large cities of Europe. When a pipe is found to be constricted, a diaphragm, so thin that it will instantly vibrate under the force of a sound wave, is attached to the end of the pipe, and connected electrically with a chronograph in such a manner that when the diaphragm vibrates it will close the electric circuit and register on the chronograph. A pistol loaded with blank cartridge is then fired into the tube through an opening just below where the diaphragm is placed. When the shot is fired the sound wave causes the diaphragm to vibrate and registers the exact time on the chronograph. The sound wave will travel along the tube until it meets the obstruction, and will then be reflected back. When this reflected sound, or echo, returns to the end of the tube it causes the diaphragm to vibrate again and make another registration on the chronograph which will thus correctly indicate the exact interval of time required for the sound to travel from the end of the tube and back again.

THE wheelbarrow affords one of the chief means of travel and transport in China, especially in the northern part of the empire and throughout the Great Plain. The Chinese form is a decided improvement on the types used in western countries, for it is so constructed that the load, which sometimes is very great in bulk and weight, is carried over the wheel, and not between it and the man who propels it. The charge for carrying an average load is about 1 shilling and 5 pence per mile, but varies according to the load and the state of the road to be traveled over. The wheelbarrow has seating accommodation for four people, two on each side, and the fare for four people is 2½ pence per mile. On the Great Plain wheelbarrows are occasionally seen with a sail set, when a fair wind proves to be a great help to the trundling of the barrow over a level way.

A NEW safety igniter for mine shots, devised by Oberbergrat Ludwig Jaroljmek, depends upon the heat given out by quicklime when slaked, which brings into action a rhodanite-potassium igniter, the latter in turn causing the explosion of the detonator proper. At the same time the swelling lime cartridge forms an effectual tamping in the hole, thus preventing any issue of flame. The ignition, which is effected by the injection of water, ensues after a lapse of three minutes at least, and fifteen minutes at the outside. These detonators are put up in lime cartridges, covered with tin-foil; and the cartridges with the detonators and igniters are enclosed in a woven tissue.

ANOTHER new bridge is to span Niagara, taking the place of the upper suspension bridge and to be finished July 1, 1898. When completed the Canadian and American Niagaras will be connected by two fine steel arch structures. The bridge designed to replace the upper suspension bridge will be built on the parabolic principle.

A FEW years ago the idea of loading a ship with 2300 tons of flour in twenty-four hours by means of two small motors would have been looked upon as absurd. This was done recently in Tacoma.



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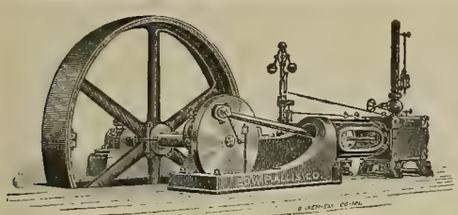

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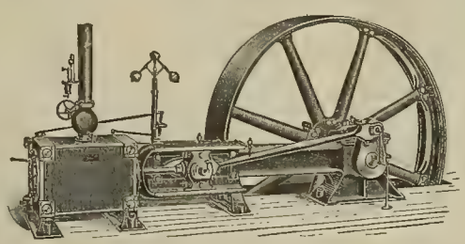

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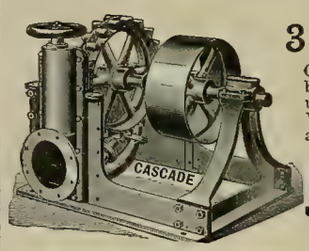

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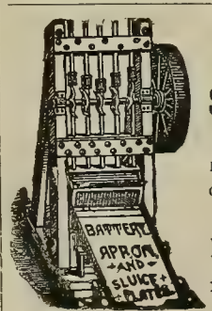

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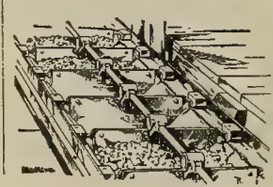

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Coast Industrial Notes.

—It is calculated that the oil output of southern California will be 2,000,000 barrels this year.

—The Secretary of the Navy will this year expend large sums in the repair of war ships at Mare Island.

—E. E. Souther, president of the Souther Iron Co., St Louis, Mo., is going to build a $100,000 iron foundry at San Luis Potosi, Mexico.

—California is in general well treated in the tariff bill which passed the Senate by a vote of thirty-eight to twenty-eight last Wednesday and now goes to the house for conference.

—Officials of the Santa Fe are investigating a scheme for a railroad to the Grand Canyon of the Colorado, the starting point to be Williams, on the Santa Fe Pacific. Besides tourist travel, it would draw a revenue from the new copper fields.

—During the year since the bonds were voted, the Southern California Mountain Water Company, to supply the city of San Diego, Cal., has expended between $250,000 and $300,000 on constructing its system. About $100,000 has been spent for machinery.

—Commissioner Hermann of the General Land Office has formulated rules for the government of the forest reserves, which have been approved by the Secretary of the Interior. Prospecting, locating and developing the mineral resources of forest reserves are permitted; water for domestic, mining, milling and irrigation purposes is allowed; reserves for irrigating canals and ditches are authorized, and the right of way across flumes and reservoirs is permitted. Owners of mining locations are authorized to fell and remove from their mining claims any timber growing thereon for actual mining purposes. The free use of timber is allowed to bona fide settlers, miners, residents and prospectors for mineral for firewood, fencing, buildings, etc. The sale of timber from reserves will be permitted in limited quantities for the purpose of preserving living and growing timber and permitting the younger growth of timber on the reservation.

—Fourteen bids for the construction of fortifications at Marrowstone point, across Port Townsend bay, Wash., were opened last week by Capt. H. Taylor, U. S. Corps of Engineers. The fortifications and the ordnance for Marrowstone Point, Admiralty Head and Point Wilson will require an expenditure of $7,000,000, and it is estimated that the work will require ten years to complete. The lowest figure put in for the contract was the Pacific Bridge Company's, $163,453.50; next H. C. Henry, Seattle, $166,056.50; third P. N. Coyne, Port Townsend, $167,415.50. There were thirty-two separate items in the bids submitted, and in the case of the Pacific Bridge Company, which submitted the lowest figures, they were as follows, in relation to quantities: Clearing, twenty-eight acres, $1400; excavation, 178,400 cubic yards, $44,600; concrete, No. 1, 500 cubic yards, $2975; concrete, No. 2, 2400 cubic yards, $11,616; concrete, No. 3, 15,900 cubic yards, $68,688; granolithic surfacing, 4500 square yards, $1800; whitewashing, 400 squares of 100 feet, $100; broken stone for blind drains, 150 cubic yards, $150; large rock, 750 tons, $1612.50; steel beams, etc., 154,000 pounds, $4620; cast-iron drain pipe, eight-inch, 1150 linear feet, $690; cast-iron drain pipe, six-inch, 460 linear feet, $207; tile drain pipe, six-inch, 1500 linear feet, $180; galvanized wrought-iron pipe, two and a half inch, 560 linear feet, $140; galvanized wrought-iron pipe, two-inch, 400 linear feet, $80; galvanized wrought-iron pipe, one and a half inch, 3400 linear feet, $510; cast-iron manholes, gratings, etc., 3500 pounds, $140; doors, steel double leaf, 6x8 feet, six, $390; doors, steel double leaf, 4x8 feet, six, $270; doors, steel single leaf, 4x8 feet, twenty-four, $1008; doors, steel single leaf, 3x8 feet, twenty, $700; cranes, twelve, $1500; lifts, double, twelve, $9480; trolley track, 19,000 pounds, $1995; trolleys, twenty-four, $1680; steel anchor bolts, 8400 pounds, $504; cast-iron anchor plates, 4200 pounds, $168; miscellaneous iron, 1000 pounds, $50; asphalting, 1700 square yards, $3230; piling, 11,000 linear feet, $1650; lumber, 80,000 feet B. M., $1040; iron, 7000 pounds, $280. Total, $163,453.50. All of the abstracts and bids will be forwarded to W. P. Craighill, chief engineer of the army, at Washington.

Recent California Mining Incorporations.

Independent M. and D. Co., Los Angeles; F. A. Stephens, E. E. Banta, J. F. Jenkins, A. E. Carpenter, I. M. Patterson; capital stock, $125,000; subscribed, $25.

Gold Bug M. and M. Co., Los Angeles; F. E. Kearney, C. H. Hastings, C. L. Hanson, O. Rutherford, E. L. Allen; capital stock, $2,000,000; subscribed, $1,500,000.

Marcot G. M. Co., Redwood City, Cal.; J. L. Ross, P. P. Chamberlain, W. M. Barret, W. D. and J. Crowe, M. Townsend, T. H. Ramsay; capital stock, $100,000; subscribed, $40.

Del Norte M. Co., San Francisco; G. H. Fairchild, D. W. Perley, H. G. Richmond, S. E. Starrett; capital stock, $250,000, all subscribed.

Diamond Con. G. M. Co., San Francisco; J. J. Schurtz, C. E. Dugan, A. S. Wolberg, D. C. Martin, P. H. Evans; capital stock, $750,000; subscribed $35.

Recently Declared Mining Dividends.

Pennsylvania Gold Mining Company, Grass Valley, 5 cents per share; payable July 1.

Moon Anchor, Cripple Creek, $6000; payable July 1.

Personal.

CAPT. J. R. DELAMAR has returned from London and gone to Salt Lake, Utah.

E. W. BEATTIE of Helena has been confirmed as surveyor-general for Montana.

E. A. HARDY has been appointed superintendent of the Santa Ysabel mine in Tuolumne county, Cal.

R. D. GRANT has been appointed secretary and general manager of the Parrott Silver and Copper Company of Butte, Montana.

H. C. WOODROW, recently of Angels, Cal., has become interested in some Tuolumne Co. property near Sonora, which he will develop.

JNO. C. GRAY, the Oakland, Cal., mining engineer, returned this week from a lengthened sojourn in New Zealand, where he had been examining mining properties.

OTTO MEARS, president American Cyanide Gold and Silver Recovery Co., who recently bought 150,000 tons tailings in this State, is visiting Wood River district, Idaho.

MR. H. V. CROLL, superintendent of the Denver Engineering Works Co., Denver, Colo., is visiting this State on business and pleasure combined and will remain a month.

JAS. CRONAN, who recently resigned the superintendency of the Hale & Norcross, Virginia City, Nev., is in San Francisco, en route to Rossland, B C., where he has extensive mining interests.

DR. GEORGE F. BECKER of the United States Geological Survey has arrived in San Francisco and will go to Angels Camp, Calaveras county, to make an examination of the gold belt north from that point. He will be several months on the ground.

MAJOR HEUER is expected to arrive here this week to take the place in the U. S. Debris Commission so ably filled for the past three years by Capt. Cassius E. Gillette, who is transferred to Savannah, Ga. Major Heuer was one of the original members of the Commission when first organized, is thoroughly familiar with all matters pertaining thereto, and will be welcomed by many old friends and acquaintances.

DAN DE QUILLE writes the MINING AND SCIENTIFIC PRESS that he is going to West Liberty, Iowa. If every one whom that veteran writer had delighted were to contribute a penny he would start on his journey a millionaire. He enriched all save himself and for thirty years rarely touched a subject he did not adorn. For nearly a generation he has written the chronicle of the Comstock, at Virginia, Nevada, and what he wrote, whether in the ephemeral form of a fleeting newspaper paragraph or in more pretentious binding, has been copied everywhere. Long ago the coast forgot there was such a person as William Wright, and as "Dan de Quille" he has been hailed by thousands as the wit and humorist of the Comstock. He was always lavish of his literary treasures and his money—Mark Twain, his former collaborator, knows considerable about that—and his best jokes were ofttimes published by and credited to others who better understood how to advertise themselves. He takes with him the kindly remembrance of many who loved to read what he wrote and who will think the Silver State will not be the same old Nevada without him.

Book Notices.

"*Stamp Milling of Gold Ores.*" By T. A. Rickard, M. E., State Geologist of Colorado. This work will be found to be timely and of practical value to the millman. It describes the best gold milling practices in the principal districts of the world. Mr. Rickard was well prepared and equipped by experience, observation and training for the work. It is a painstaking description of the practice rather than a discussion of the chemistry and mechanics of stamp milling. The book can be understood and appreciated as well by the practical mill man as by the educated metallurgist. Much data is given as to costs in detail, life of machinery, etc., that is of special value. The designs of mills and machinery, and drawings and other illustrations add considerably to the utility of the book. Published by the Scientific Publishing Company, New York and London; price, $2.50.

Commercial Paragraphs.

THE office of the California Powder Works has been moved to the new Clark building, corner of Market and Battery streets.

THE Risdon Iron and Locomotive Works will hold its annual meeting at the company's office, Beale and Howard Sts., S. F., on the 2nd prox.

MAJOR CHAS. E. L. B. DAVIS of the U. S. Board of Engineers, room 90, Flood Building, San Francisco, will receive sealed bids for a gun emplacement near San Diego, Cal., till noon, Aug. 9, '97.

A. S. HALLIDIE has moved his office to the new Clark building, at the corner of Market and Battery streets, where a complete working model of his ropeway transportation system can be seen.

THE following are among the thirty-third annual list of graduates from the Van Der Naillen School of Engineering in this city: Mining Engineers—G. L. Gruss, Genesee, Cal.; John Andrews, Middleton, Cal.; W. B. Duesler, Globe, Ariz.; C. Maack, Petaluma, Cal.; E. Matterson, Shasta, Cal.; R. Trengove, Neuman, Cal.; R. Von Reischach, Antofogasta, Chile. Assayers—A. Price, Angels, Cal.; T. Hanmore, Alaska; A. Keiller, A. L. Kievey, Amador, Cal.; R. Caption, F. L. Fletcher, R. J. Williams, L. McCabe, Oakland; A. Evans, San Dimas, Mexico; L. A. Pellett, St. Helena, Cal.; R. Remick, Taylorville, Cal.; M. D. Allen, Globe, Ariz.; W. L. Smith, Oregon; L. E. Bailey, A. C. Hall, San Jose, Cal.; J. Macklin, Buffalo, Ariz.; C. E Allen, Eureka, Nev.; J. H. Hennessey, Randsburg, Cal.; J. W. Young, R. A. Troyen, H. Pennett, J. M. Sullivan, J. W. Curry, A. E. Hanson, C. Rosenthal, C. H. Smith, F. B. Hink, E. B. Hornerton, San Francisco.

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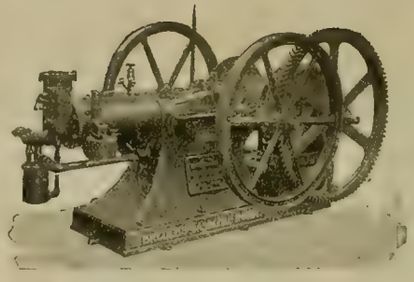

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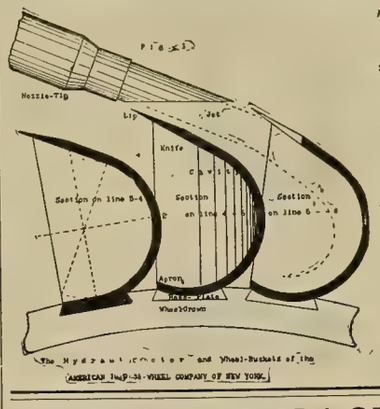

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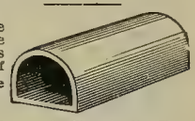

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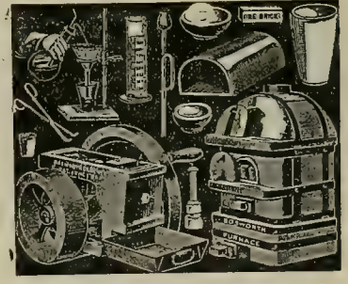

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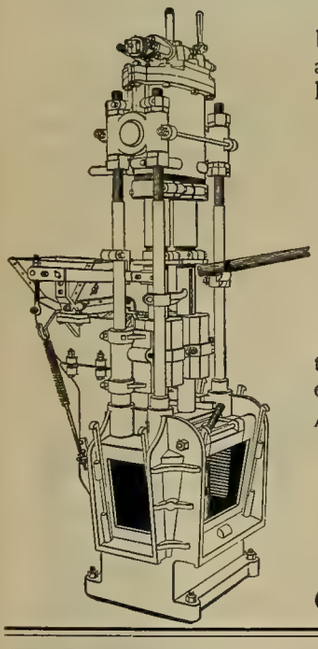

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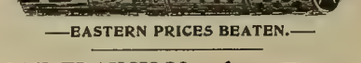

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JUNE 29, 1897.

585,458.—BICYCLE SUPPORT—R. G. Bailey, San Jose, Cal.
585,498.—DESPATCH APPARATUS—B. C. Batcheller, S. F.
585,375.—WEDGE SHAVING MACHINE—G. L. Bigelow, San Jose, Cal.
585,616.—BICYCLE SUPPORT—L. Bowles, S. F.
585,509.—SASH FASTENER—C. J. Clarke, Kingsburg, Cal.
585,510.—WINDOW—C. J. Clarke, Kingsburg, Cal.
585,200.—PUNCTURE DETECTOR—Freels & McKean, Hollister, Cal.
585,326.—VOTING MACHINE—F. H. Gilbert, Ridgefield, Wash.
585,328.—BICYCLE BRAKE—Humphrey & Murdock, Oakland, Cal.
585,361.—FURNACE LOCK BEARER—P. Maddocks, Midway, Cal.
585,221.—FREIGHT TRANSFER—McCabe & Anderson, Tacoma, Wash.
585,397.—BILL FILE—W. F. Ordway, Merced, Cal.
585,330.—RAILWAYS—G. J. Paehtz, S. F.
585,594.—PADLOCK—W. D. Roberts, Portland, Or.
585,370.—BICYCLE MECHANISM—H. B. Trickler, Albion, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

BUTTON FASTENERS.—C. H. Warrington, San Francisco, Cal. No. 585,142. Dated June 22, 1897. This invention relates to a device for securing buttons to garments and other like places. It consists essentially of a plate folded centrally so as to have parallel sides extending from the fold and adapted to receive the edge of the fabric to which the device is to be secured, this plate having a slot made transversely in one of the sides near the lower end thereof, a second plate extending loosely through the slot having an enlarged transverse serrated head upon its end between the sides of the first-named plate, a button or fastening having a shank fixed to the opposite end of the second plate, the button-carrying plate having a curved end which forms an elastic clamp that can fold over the bight of the first-named plate after the two have been brought parallel with each other so that the teeth or serrations in the head will engage with the fabric as it lies between the sides of the first-named plate and secure it firmly. By reversing or turning back this plate the fabric will be released and the fastening can be separated therefrom, thus being easily placed at any time at any desired point.

CONDUCTORS FOR UNDERGROUND ELECTRIC RAILWAYS.—Charles Petersen, San Francisco, Cal. No. 585,047. Dated June 22, 1897. This invention relates to a novel construction for underground conduits which are to be used in conjunction with electric railways. It consists essentially of a subway conductor formed of angle iron channels with supplemental angle iron plates fitting the inner adjacent edges and forming a slot between the channel irons, concaved arched conductors fixed beneath and within the angles upon each side of the slot, the exterior surface being coated and insulated and the interior concaved surface forming a conductor. A trolley shank extends down through the central slot and has insulated extensions fixed to it. These extensions have trolley wheels upon each end within the tube or tunnel so that these trolleys run in contact with the concaved conductors. One of these conductors may be connected with the outflowing and the other the returning current, and wires or conductors respectively connect the trolleys with the positive and negative parts of the motor upon the car.

AUTOMATIC WEDGE-SHAVING MACHINE.—Gideon L. Bigelow, San Jose, Cal. No. 585,375. Dated June 29, 1897. This invention relates to a device which is especially adapted for shaving wedges such as are used in fixing the spokes of wagons and similar vehicles, and for other purposes. It consists essentially of a base-plate, a guided slide, a lever and pitman whereby the slide is reciprocated upon the base-plate, an inclined surface adapted to receive the pieces to be shaved, a pushing block against which the ends of the pieces abut whereby they are forced forward simultaneously with the movement of the slide, side plates forming guides between which the front end of the slide is movable, with wedges to raise and depress said plate, a knife blade adjustably fitted between the side plates with its edge presented toward the reciprocating slide and the piece carried thereby so that the block is shaved to a tapering point, and a stop against which the rear end of the slide is arrested.

LOCK BEARER FOR FURNACES.—Peter Maddocks, Midway, Cal. No. 585,361. Dated June 29, 1897. This invention relates to a lock bearer for furnaces. It is designed to support the inclined tiles which are used in vertical roasting furnaces where the ore flows down over these tiles in thin sheets alternately upon opposite sides of the vertical chamber. The object of this bearer is to prevent accidents occurring from the alternate heating and cooling, and expansion and contraction of the tiles, and it consists of inclined projections from the furnace walls upon which the upper edges of the tiles are supported, and bearers with projecting lugs engaging openings made in the meeting edges of the tiles, with channels formed across the upper ends of the bearers to engage and support the edges of the oppositely inclined tiles above.

PROCESS OF AND APPARATUS FOR SUGAR MAKING.—Wilhelm Baur, New York, N. Y. No. 585,374. Dated June 29, 1897. This invention relates to the art of manufacturing sugar or other articles wherein lime, strontium and other substances are use for clarifying certain solutions and are subsequently precipitated and removed. The object of this invention is to utilize this precipitation which heretofore bas been waste substances, and this object is attained by reburning them so that they are converted into the original forms of the substances, and may be again used as in the first instance. I also obtain during the re-burning the gas necessary to precipitate the substances from their original solutions once more and thus provide a continuous process. In carrying out the invention the precipitated substances which have been used in purifying and clarifying the saccharine solution are delivered directly into a substantially closed vessel and subjected to the action of a gradually increasing heat while the substances are in agitation so that their confined carbonic acid gases are liberated, and the substances are reburned and converted into their original forms while the liberated carbonic acid gases are simultaneously withdrawn and augmented by that produced by the fuel, these gases being reused so that the process is continuous and uninterrupted. In carrying out the process I employ an apparatus consisting of a mixer, an inclined drier provided with interior rotating agitators adapted to receive the substances from the mixer, an inclined flue including a rotary kiln fitted closely thereto and communicating through a passage at one end with the drier and having a fire chamber at the other, with interior projections extending from the head or receiving end toward and terminating short of the fire chamber, and means for withdrawing the gases from the kiln.

BICYCLE SUPPORT.—R. G. Bailey, San Jose, Cal. No. 585,458. Dated June 29, 1897. The object of this invention is to provide a simple, convenient device for firmly holding bicycles in a reversed or upside down position so that they may be cleaned or any work done upon them which is more conveniently done while in this position. It consists of a flat, horizontally disposed plate having spaced concaved lugs rising from its top surface, a yoke centrally located on the plate and fulcrumed thereto; said yoke having spaced arms to embrace the upper sides of the handle bars, and an integral portion extending centrally from the arms having ratchet teeth, a pawl fulcrumed near the central extension of the yoke adapted to engage the ratchet teeth so as to lock the yoke when the arms are closed upon the handle bars and a spring whereby the yoke is disengaged from the bar.

BICYCLE DRIVING AND STEERING MECHANISM.—H. B. Trickler, Albion, Cal. No. 585,370. Dated June 29, 1897. This invention relates to certain improvements in bicycles whereby the power of the arms as well as the legs may be applied to the propulsion of the machine. It consists of a crank shaft with foot pedals, sprocket wheels upon the crank shaft and rear axle in conjunction with the main frame of the machine, a connecting driving chain, a bracket adjustable upon the steering head capable of being turned to a position either in front of or behind the post, a crank shaft journaled thereon with hand cranks by which it is revolvable, a sprocket wheel upon the hand crank shaft and a corresponding one upon the pedal crank shaft with a chain extending between the two so that a simultaneous movement of the feet and hands may apply power to drive the machine. A vertically extended curved bar has the lower end secured to the steering head, and a slotted head-piece fixed to the cap of the rider is adapted to slidably engage the upper end of this bar so that the steering may be effected by movements of the head while the hands and feet are entirely occupied in the propulsion of the machine.

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Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced, first-class agency. We have able and trustworthy associates and agents in Washington and the capital cities of the principal nations of the world. In connection with our scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us to give advice which will give inventors the expense of applying for patents upon inventions which are not new. Circulars and advice sent free on receipt of postage. Address **DEWEY & CO., Patent Agents, 330 Market St., S. F.**

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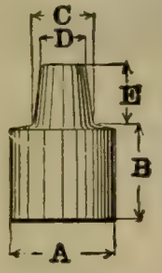

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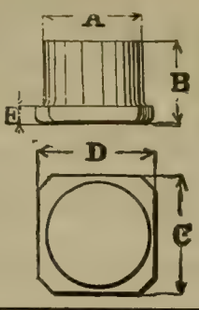

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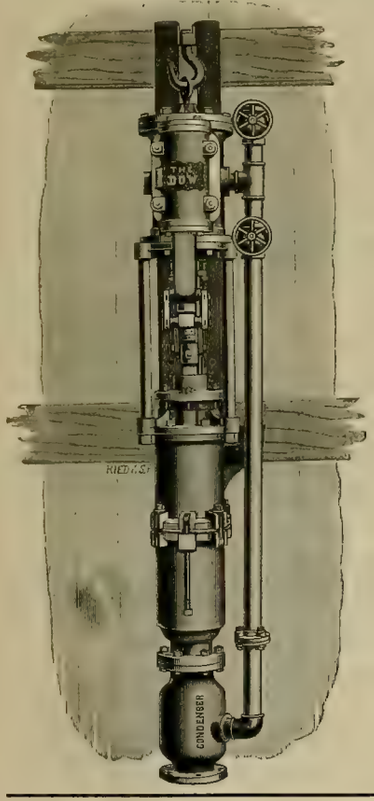

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Irrigation Pumps,

Artesian Well Engines,

Independent Air Pump and Condenser,

For Stationary Engines or Steam Pumps.

Power Pumping Machinery,

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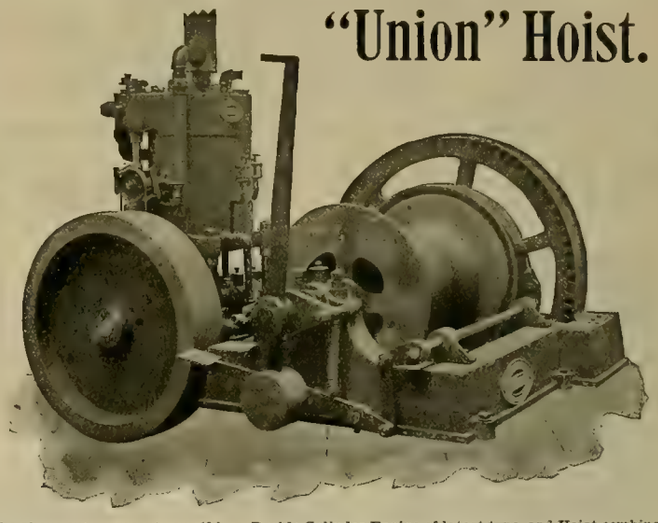
BALANCE VALVES AND PRESSURE REGULATORS FOR STEAM PUMPS,

Etc., Etc.

Correspondence Solicited. Send for Catalogue.

"Union" Hoist.



The above cut represents our 10 h. p. Double Cylinder Engine of latest type, and Hoist combined on strong iron base. This hoist is designed to raise one ton125 feet per minute from an inclined shaft, or 1500 pounds at the same speed vertical lift. The drum will hold over600 feet of ⅝-inch cable. The outfit weighs 3500 pounds.

THE UNION GAS ENGINE CO.

—BUILD THE—

"Union" Gas Engines,

Which use either Manufactured or Natural Gas, Ordinary Stove Gasoline (Naphtha or Benzine), Distillate or Kerosene.

STATIONARY ENGINES for All Kinds of Work, Built in Sizes from 3 to 200 h. p.
"UNION" COMBINED HOISTS in Sizes from 2 to 40 h. p.
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HOISTS and COMPRESSORS Can Be Built in Larger Sizes to Order.
"UNION" MARINE ENGINES, 4 to 200 h. p., of Single, Double and Four-Cylinder Types.
TEN YEARS' EXPERIENCE Building Gas and Oil Engines.
"UNION" ENGINES Are In Use All Over the United States.
"UNION" ENGINES Are Simple, Durable and Economical.

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ALBANY LUBRICATING COMPOUND.

The King of Lubricants!

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Genuine English Pump Leather

For Heavy Mining Pump Buckets. Will outwear any other material and give best satisfaction. Samples furnished on application. A. C. NICHOLS & CO., Leather Manufacturers and Dealers, 404 Battery St., S. F

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—MANUFACTURERS OF THE—

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Arc Lighting, Alternating and Direct Current Incandescent Lighting, Power Generators, Motors, Transformers, Instruments and Appliances.

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SACRAMENTO.

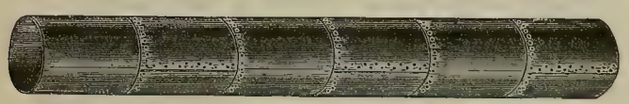
ROOT, NEILSON & Co. MANUFACTURERS OF

STEAM ENGINES, BOILERS

MINING AND AGRICULTURAL
AND NEARLY ALL KINDS OF
MACHINERY.

INCLUDING FLOUR MILLS, SAW MILLS AND QUARTZ MILLS.
REPAIRING DONE BY EXPERIENCED WORKMEN.
Send for Estimates FRONT ST., BET. N & O. SACRAMENTO, CAL.

Mining Pipe!



STEEL OR IRON.—We make pipe of either, but recommend STEEL, it being superior to iron in many particulars and inferior in none.

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SCHAW, INGRAM, BATCHER & CO., Hardware Merchants,
SACRAMENTO, CAL.

THE CHEAPEST PLACE ON EARTH TO OUTFIT A MINE
—IS AT—
THE J. H. MONTGOMERY MACHINERY CO., 1220-22 Curtis Street, Denver, Colo., U. S. A.

Just Listen—Reliable Common Sense Steel Whim, price reduced to $100. Steam Hoisters, $300 and up; hand hoisters $30; steel ore buckets all prices; prospectors' stamp mills $300. A 10-stamp mill, new, 850 lb. stamps, high mortars, latest improved. Only $800.

Ores tested and amalgamation and concentration mills built to fit the ore and guaranteed to save what we say. Coal Mine equipments, Screens, Jigs, Tramways, Arastors, Chillian Mills, Ore Sacks, etc. Cornish Rolls, 12x20, weight 6,000 lbs., price $350; Feeders, Bumping Tables; Blake Crushers, 7x10, weight 8,100 lbs, only $250. Our 100 page illustrated catalogue FREE.

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Rock Drilling, Air Compressing, Mining and Quarrying
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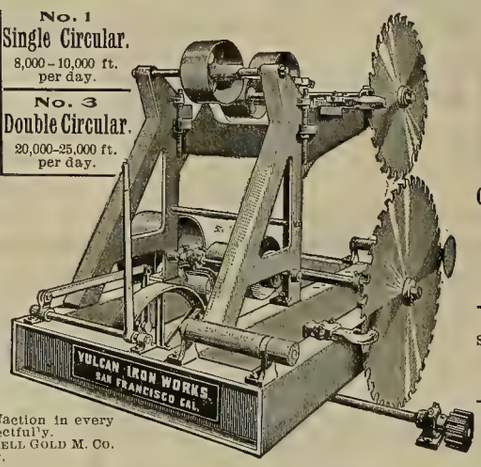
Portable Saw Mills.

No. 0 Single Circular.	No. 1 Single Circular.
4000-6000 feet per day.	8,000-10,000 ft. per day.
No. 2 Double Circular.	**No. 3 Double Circular.**
15,000-20,000 ft. per day.	20,000-25,000 ft. per day.

Alaska Treadwell Gold Mining Co.
SAN FRANCISCO.
Feb. 20, 1896.

Vulcan Iron Works,

GENTLEMEN: Our Double Circular Saw Mill of about 20,000 feet daily capacity, for which you made plans and built the machinery complete, including a set of three 6-inch beam Vulcan Head Blocks, 60-inch opening, has given us complete satisfaction in every respect. Respectfully,
ALASKA TREADWELL GOLD M. CO.
A. T. CORBUS, Sec'y.



For Mining Companies —OR— Other Consumers of Lumber at Remote Points.

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Manufactured by

VULCAN IRON WORKS, Office, 505 Mission Street, SAN FRANCISCO, CAL.

IF YOU HAVE A SMELTER--YOU WANT IT.
IF YOU HAVE A COPPER MINE--YOU NEED IT.
IF YOU HAVE A CYANIDE PLANT--YOU OUGHT TO HAVE IT.
IF YOU OWN CHLORINATION WORKS--YOU SHOULD BUY IT.
IF YOU ARE INTERESTED IN A MINE OR MILL--YOU CAN'T DO WITHOUT IT.

What? P. & B. Paint.

IT IS ABSOLUTELY ACID PROOF---TRIED AND PROVEN.

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You Can Order It From Your Dealer.

JOSHUA HENDY MACHINE WORKS,

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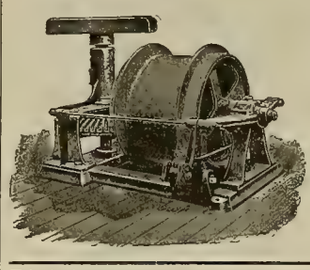
—BUILDERS OF—

"Davis" Horse Power Whims. Ore and Rock Cars.



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ORE and WATER BUCKETS.

"T" RAIL OF USUAL WEIGHTS, EITHER NEW OR SECOND-HAND, FOR SALE CHEAP.

ADAMANTINE SHOES AND DIES

—AND—

CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

STAMP SHOES.

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These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for illustrated Circular.

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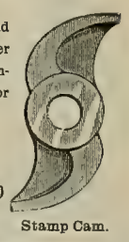
H. D. MORRIS & CO., Agents, 141 and 143 First Street, San Francisco

Special attention given to the purchase of Mine and Mill Supplies.



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H. D. MORRIS & CO., DEALERS IN MINING MACHINERY AND SUPPLIES.

141-143 First Street, San Francisco, Cal.

MANHATTAN RUBBER BELTING, PACKING AND HOSE,
SANDERSON DRILL STEEL,
MORRIS CENTRIFUGAL PUMPS,
LIGHT STEEL RAIL.

CONSOLIDATED

Kansas City Smelting and Refining Co.

Incorporated Under The Laws of New York.

Capital paid in..... $2,700,000.

Buyers of All Classes of

GOLD, SILVER, LEAD AND COPPER ORES,

Bullion, Mattes and Furnace Products,

GOLD BARS, SILVER BARS and MILL PRODUCTS.

SMELTING WORKS:
Argentine Kas.; El Paso, Tex.; Leadville, Colo.

REDUCTION WORKS:
Argentine, Kas.

We use the following Cipher Codes at our Argentine Works: A. B. C. Code; Moreing & Neal's Code and Bedford McNeill's Code.

WORKS OF THE CON. KANSAS CITY SMELTING AND REFINING CO. AT LEADVILLE, COLO.

AGENCIES:
In United States—
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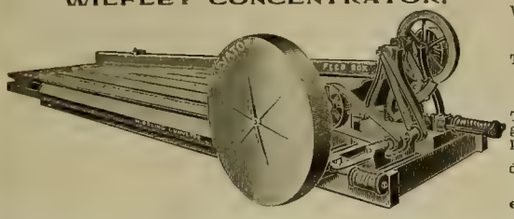
The Mine and Smelter Supply Co., Denver, Colo.

THE LARGEST STOCK OF MINING, MILLING AND SMELTING MACHINERY WEST OF CHICAGO.
PIPE, PACKING, RUBBER BELTING, AND SUPPLIES OF ALL KINDS.

SOLE AGENTS FOR WILFLEY CONCENTRATING TABLE,

And claim for it BETTER work than any Concentrator made, with a capacity of from 15 to 25 tons per day of 24 hours. It is simplicity itself. No moving belts or intricate parts. Any one can learn to operate in an hour.

WILFLEY CONCENTRATOR.



For confirmation of all of the above we refer to Henry Lowe, Puzzle Mine, Breckenridge, Colo.; Mary Murphy Mine, St. Elmo, Colo. W. E. Renshaw, Mayflower Mill, Idaho Springs, Colo.; H. E. Woods, Denver, Colo.

— GENERAL OFFICES OF —
THE DURANT MINING CO. THE LATE ACQUISITION CONS. MINING CO. THE COMPROMISE MINING CO. THE ASPEN SAMPLING CO.
THE CONOMARA MINE. THE SMUGGLER CONCENTRATOR. THE SMUGGLER MINING CO.

ASPEN, COLORADO, April 8, 1897.

The Mine and Smelter Supply Co., Denver, Colo.—GENTLEMEN: Your favor of the 5th inst. at hand and noted. In regard to the Wilfley Table I wish to say that I consider it to be the best device in use to-day for concentrating fine ores; that it will save everything that a gold pan will; that it combines the clean saving of a Rittinger with the capacity of a buddle. I think that without question it will supplant in time all other devices for handling fine and slimy ores. This includes all the vanning machines and buddles.

This is higher praise than I am in the habit of giving, but I feel sure that it is deserved, and you may make any use of this that you desire. Yours very truly, [SIGNED] S. I. HALLETT.

These Tables have displaced belt tables of almost every make, as is shown by letters in our possession.

PRICE, $450.00.

THE FINLAYSON PATENT WIRE ROPE TRAMWAY.

THIS TRAMWAY IS THE BEST THAT HAS EVER BEEN PLACED ON THE MARKET. IT HAS NO RIVAL. IT IS STRICTLY AUTOMATIC AND ITS CAPACITY RUNS UP TO 1000 LBS. PER BUCKET. ANY ONE CONTEMPLATING THE ERECTION OF A TRAMWAY SHOULD INVESTIGATE ITS MERITS BEFORE PURCHASING ELSEWHERE. . . . . .

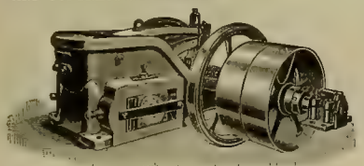
THE COLORADO IRON WORKS COMPANY, Denver, Colo.

SOLE AGENTS AND MANUFACTURERS.

WE ARE MANUFACTURERS OF AND CONTRACTING ENGINEERS FOR Gold, Silver, Lead, Copper and Pyritic SMELTING FURNACES.

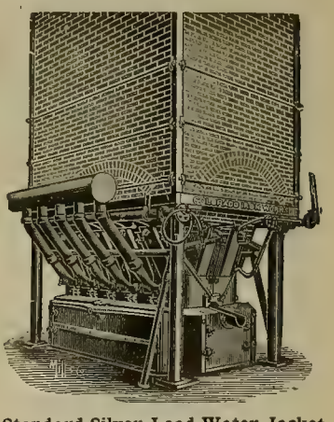
AMALGAMATION AND CONCENTRATION PLANTS.

Investigate Our Late Improvements in ORE CRUSHING MACHINERY.
We Guarantee Capacity Per Day to Any Degree of Fineness.



Improved Black Hawk Ore Breaker.

OUR PATENT HOT BLAST APPARATUS for all Smelting Furnaces is a Success. A great economizer of fuel, and enlarges capacity of furnace.



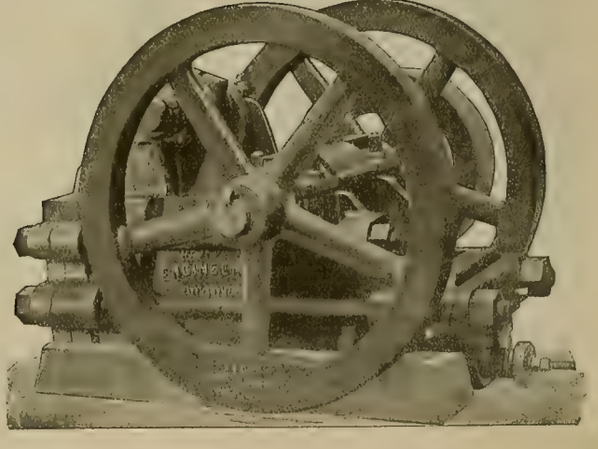
Standard Silver-Lead Water Jacket Smelting Furnace.

Equipped with Arch-Bar System of Mantles, insuring rigid and strong walls. No Cracks.

DENVER IMPROVED ORE CRUSHER.

Wrought Iron Tension Bars,
Safety Toggle Plates,

Increased Strength, Saving in Freight, Less Weight, Easily Transported.



.....SEND FOR CIRCULAR..... .....Mention This Paper.....

Denver Engineering Works Company,

DENVER, COLORADO, U. S. A.

Market Reports.

The Markets.

SAN FRANCISCO, July 8, 1897.

General trade shows a steady improvement. The Christian Endeavor convention has drawn large crowds to this city, among whom are numbers of merchants, miners and business men in general, many of whom have come so as to take advantage of low passenger tariff. Among the mining men one comes with the Connecticut delegation to attend the convention, and while here will investigate the gold mining industry in the interest of a moneyed syndicate at the East. This syndicate has large interests in the Black Hill mines. There are several men from other States here who will also look over the field before returning. The higher prices ruling for cereals and farm products in general are having a good effect, particularly so with the total yield proving larger than last year. In the mining districts employment is given to large increased forces of men.

In the local market money continues to work to more ease, with the banks showing a disposition to let out funds. There is an improving call for funds for crop-moving purposes; as it goes into circulation, it soon finds its way back. The disbursements in this month are in excess of last year. These disbursements cover National, State, county and municipal governments. With this money in circulation still more ease should rule in the money market. It is stated that there is a growing inquiry for good investments, which is accepted as a favorable sign. Remittances from the interior are increasing. The Eastern markets continue easy, notwithstanding a large increase in loans. The demand comes from nearly all sources as a result of improving business and enlarging speculations. The movements of money to the Central and Southern States out of New York is growing in volume. In accredited circles it is stated there will be more silver coin go out than even last year. It is said that the use of silver is increasing. European advices report general easy markets notwithstanding a freer employment of funds.

New York Silver Prices.

NEW YORK, July 8.—Following are the closing prices for the week:

	Silver in—	
	London.	N. Y.
Friday	27 9-16	60
Saturday	27 9-16	60
Monday	....	....
Tuesday	27 9-16	60
Wednesday	27 9-16	60⅛
Thursday	27 9-16	60¼

	Copper.	Lead.	Iron.	Tin.
Fri.	11 00 @11 25	3 70	10 00@12 25	14 00
Sat.	11 00 @11 25	3 70	10 00@12 00	14 00
Mon.	.... @....	....	....@....	....
Tue.	11 10 @11 25	3 70	10 00@12 00	13 90
Wed.	11 10 @11 25	3 72½	10 00@12 00	13 85
Thur.	11 10 @11 25	3 72½	10 00@12 00	13 85

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	17½c Prem
New York Telegraphic Transfer	20c Prem
London Bankers' 60 days	$4.87
London Merchants	$4.85
London Sight Bankers	$4.88
Refined Silver, per oz., 1000 fine	60¼
Mexican Dollars	49@49½

SILVER.—The market remained steady to yesterday when it strengthened slightly, moving up again, closing firm at the advance. The East reports a fair export movement. Our English advices continue to note Russia still buying. The East Indies is also drawing. China does not take as much as she did at the corresponding time last year. The steamer for the Orient leaving yesterday took out in silver bullion for China $60,530 and for Bombay $109,000.

MEXICAN DOLLARS.—Tho export movement is enlarging owing to an advance in exchange. The steamer that left yesterday for China took out 542,281 dollars.

QUICKSILVER.—The market is steady at quotation, with a fair demand ruling.

Our market is quoted at $40 for domestic consumption.

COPPER.—The market has held to fairly steady prices. The East reports a continued free export movement and an increasing demand for home use.

The following statistics show an apparent increase in the consumption of England, France and Germany at the rate of 19,373 tons per annum. The Board of Trade returns for the first five months show the following results: Imports into England, 1896, 55,049 tons fine; do 1897, 55,305 tons fine; exports from England, 1896, 29,900 tons fine; do 1897, 19,634 tons fine; difference, 1896, 25,149 tons fine; do 1897, 35,671 tons fine; difference in stocks, January 1 to June 1, 1896, 12,377 tons fine decrease; do 1897, 2951 tons fine decrease; apparent consumption in England (including sulphate of copper made and subsequently exported), 1896, 37,526 tons fine; do 1897, 38,622 tons fine.

The following shows the consumption of France for the same months: Shipments from United States, 1896, 9297 tons; do 1897, 10,641 tons; shipments from England, 1896, 2783 tons; do 1897, 1312 tons; imports from other countries, 1896, 4917 tons; do 1897, 6144 tons; difference, 1896, 16,997 tons; do 1897, 10,641 tons; difference in stocks, January 1 to June 1, 1896, 1211 tons; do 1897, 962 tons increase; leaving 15,786 tons in 1896 and 17,135 tons in 1897; the increased consumption of England and France is, therefore, 1349 tons.

The official German returns for the first four months are: Imports, 1896, 18,339 tons; do, 1897, 22,958 tons; exports, 1896, 2887 tons; do, 1897, 2998 tons; consumption, 1896, 15,458 tons; do, 1897, 19,960 tons. The consumption of Germany, therefore, shows an increase this year of 4502 tons, exclusive of the copper obtained from their own mines, and from pyrites imported. To Italy, Austria and Russia 2937 tons have been shipped from the United States, against 3061 tons in the same five months of last year.

The local market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@17
Bolt	¼ and 5-16, 20c; ⅜ and larger, 17

TIN.—The markets on this coast, at the East and abroad are slightly weaker. The East reports a good demand, but free stocks and a selling pressure are against sellers.

We quote as follows in a jobbing way:

Pig, per lb	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

LEAD.—The market is very strong, in sympathy with the East. The strong markets at the East is due to the fact that Judge Kirkpatrick, in the United States Circuit Court at Trenton, N. J., had decided in the Government's favor its appeal against the Balbach Smelting and Refining Company. It was the source of conversation in customs circles yesterday. In brief, the decision means that lead bullion imported into this country for refining in bond must pay duty on the entire weight imported and not upon the weight of lead after gold, silver, etc., and refuse have been extracted. The smelting interests claim that the decision means that they will, to a considerable extent, be driven out of business by the decision, as it means they must pay duty on gold and silver, which is admitted free under ordinary conditions.

Our market is quoted in jobbing lots as follows:

Pig	4 10	@	4 35
Bar	—	@	4 60
Sheet	5 75	@	6 25
Pipe	5 00	@	5 50

SHOT.—The market is strong.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 35
Drop, B and larger sizes, " "	1 60
Buck, Balls and Chilled, do, " "	1 60

POWDER.—The demand continues exceptionally large. The market is steady.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9c to 11c, according to strength and quantity.

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4½

IRON.—The market is strong with a continued heavy consumption. Stocks here are large with free consignments afloat. The East reports heavy consumption and free export movement.

AMERICAN.

	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

COAL.—The market is practically unchanged. The demand is steadily increasing for steam purposes.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$8 00@— —
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 50@ 6 00
Coos Bay	—@ 4 75
Cannel	8 00@— —
Egg, hard	12 00@13 00
Wallsend	6 50@— —

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	— —
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	9 50	@	— —
" spot, in bulk	10 00	@	— —
" in sacks	11 00	@	12 00
Cumberland	— —	@	— —

ANTIMONY.—The market is steady.

Our market is quoted at 7¼@8¼c in a jobbing way. New York mail advices quote 7⅛c for Cookson's, 6⅞@7⅛c for Hallett's and 6⅞@7c for Japanese.

NAIL.—With the tariff out of the way better prices are looked for. The market is active.

Wire, carloads, basis per keg	....		
" jobbing, " "	$2 35		
Cut, carloads, " "	....		
" jobbing, " "	2 25		

PLATINUM.—The market is quiet.

Our market is quoted in a jobbing way at $10 to $15 per ounce.

ZINC.—The market is barely steady.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 50 cents per pound for ingots.

Chemicals.

The tendency of the market in all lines appears to be to stronger prices, although quotations are not changed and are not expected to be until after the tariff bill becomes law, so importers and dealers know where they stand. The East reports the market steadying up.

SPELTER.—The market is quiet

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is steady.

Our market is quoted in a jobbing way at $1.50 a pound.

BONEASH.—There is a good movement at firm figures.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3¼c; No. 2, 2½c.

PHOSPHORUS.—The market is firmer.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firmer at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is quiet at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—There is a fair demand at 2½c a pound from stores.

NITRATE OF SODA.—Market is steady.

Our market is quoted from store at 4c for 95%.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

SULPHURIC ACID.—The demand is fair.

We quote in a jobbing way at 1½c per lb for 66%.

NITRIC ACID.—Our market is reported firmer from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is steady.

We quote in a jobbing way at 4½c per pound.

Mining Share Market.

SAN FRANCISCO, July 8, 1897.

The market has been fairly active the past week with cross orders largely in evidence, although toward the close there has been more outside buying. This buying comes from people who have big tips on the market; and having money to burn, they fall in line and take shares off the manipulators' hands at high prices, which they would not touch at lower prices. The special feature of the market has been the advance of Sierra Nevada to $1.20 a share. It has been many a long month since these shares sold at over $1, but assessments and no life to them cause many outside shareholders to let go. Their selling admitted of better concentrating; and with good-sized holdings, work was started which would admit of playing on the credulity of the public, causing those still holding shares not to sell at an advance and, at the same time, bring in new buyers. The market price was shoved up on reports of striking an unexpected to outsiders, but the expected to manipulators, of a body of ore which it is hoped will make into rich ore. With this expectation put out on the street, another crossdrift was started, causing shorts to fill and outsiders to buy. While a body of high-grade ore can be run into in Sierra Nevada which would bring about good prices for the shares, present work does not appear to justify the belief that it is the intention to do so now; but work in the mines has been changed, and if the general situation down here and at the East changes still more for the better so as to admit of a good-sized deal, then the ore will be shown up. These remarks are applicable to several other mines on the Comstock. After the upmove in Sierra Nevada is over, it ought not to create surprise if the shares in another mine receive attention. On the Brunswick lode in Best & Belcher there is joint work being done by Con. Virginia, Best & Belcher and Gould & Curry, which can be made to show well, or, at any rate, enough to admit of working a deal. The same can be said of Savage. Then there is work in several of the Gold Hill mines that can be made to run into enough ore to make a deal on without having to show up a large body of good to high grade ore The Comstock lode is far from being worked out, and some day it will come to the front again.

From the Comstock mines official, semi-official and outside advices do not give any material change in the general situation since last week's review. Considering the number of miners actually at work in the mines good progress is being made by all. Much of the work in about all is of more or less of a dead-work character, but this has been the case for years past and will probably continue for some time to come, or until shares of the more desirable mines are better concentrated. In Utah they are still driving a north drift from the main west tunnel. No material change is reported. Work in Sierra Nevada is continued on the Layton tunnel and 900-foot levels. That attracting attention from the public is on the 900-foot level. The work on both these levels is important, but it is not reasonable to expect much ore to be struck without many shorts on the market or until the times are propitious for making a successful deal. The letters from Union are again skeletoned and contain nothing of interest. In the southwest drift on the 1000-foot level of Mexican they have struck some water and incidentally 50-cent rock—this ought to bring out a 25-cent or 50-cent assessment before long. From Ophir nothing of interest is at hand. Work is to the west on the 1000-foot level, and to the south on the central tunnel level. Official and semi-official advices from Con. Virginia are confirmatory of active exploiting and dead work on the 1000-foot, 1550-foot and 1650-foot levels. So far our advices are not of an encouraging character to shareholders, yet this may change any day for the better. The clean-up from all the ore milled assays $36,060. This indicates an assessment before long unless a body of good to high grade ore should be run into soon. Joint work to the east is continued by Best & Belcher and Gould & Curry on the 800-foot level Bonner shaft. Work in Savage is being prosecuted quietly without exciting attention. We have nothing from Hale & Norcross. Chollar continues idle.

In Potosi they are raising from the tunnel level and also from the 100-foot level. Active exploiting will be done when connections with the surface have been made. There is nothing new from Bullion. The Alpha letter reports an improvement, but if the work is correctly reported we need not expect the management to show up the lode of high-grade gold-bearing ore lying to the west. This lode is said by informed miners to run from Mexican to the south end mines, inclusive, with varying richness. From the joint west crossdrift of Con. Imperial, Challenge and Confidence nothing of particular interest comes to hand through official sources. The work in Confidence, Crown Point, Belcher, Seg. Belcher and Overman is practically the

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Deling't and Sale.	Secretary.
Alpha Con M & M Co, Nev	19	10c	July 8	Aug 12..Sept 2	C E Elliott, 309 Montgomery
Alta S M Co, Nev	56	5c	May 21	June 25..July 16	J E Jacobus, 309 Montgomery
Best & Belcher M Co, Nev	62	25c	July 1	Aug 5..Aug 26	M Jaffe, 309 Montgomery
Brunswick Con G M Co, Cal	12	3c	June 22	July 22..Aug 14	J Stadtfeld, 309 Montgomery
Bullion Con G M Co, Cal	11	22c	June 22	Aug 2..Aug 23	C A Grow, Mills Bldg
Eureka Con D M Co, Cal	9	2c	June 30	Aug 7..Aug 28	D M Kent, 330 Pine
Gold Hill M Co, Cal	13	25c	June 16	July 26..Aug 12	C A Grow, Mills Building
Jamison M Co, Cal	9	5c	Nov 27	June 23..Aug 18	Sam W Cheyney, 120 Sutter
Nth G & C G & S M Co, Nev	18	10c	June 26	July 28..Aug 14	E W Sichel, 337 Pine
Osceola Con M Co, Cal	6	1c	June 30	Aug 2..Aug 21	Holland Smith, 307 Montgomery
Pine Hill G & S M Co, Cal	10	5c	May 10	July 1..July 22	Chas A Hare, 1003 Railroad Ave
Rose Creek M Co, Cal	1	15c	June 28	July 28..Aug 30	J M Wilmans, Crocker Bldg
Thorpe M Co, Cal	7	2½c	June 9	July 17..Aug 9	A F Frey, Phelan Building
Utah Con M Co, Nev	25	5c	July 6	Aug 9..Aug 30	A W Havens, 309 Montgomery

WILL NEGOTIATE with owners or their duly authorized agents only.

WILL INVESTIGATE only thoroughly bona-fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

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Marquette, Mich., U. S. A.

Operator and Dealer in

Mines, Mining Properties and Mineral Lands,

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T. R. MILLER, Vice-Pres't. JOHN D. FLEMING, Counsel.

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DENVER, COLO.
Branch Office, - COLORADO SPRINGS.

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same as has been given out as being done for several weeks past. In Yellow Jacket, it is stated, work is to be resumed on the 1000-foot level. As attention is being attracted to it it looks very much as if some person or persons have some shares to sell at higher prices. Yellow Jacket can be made to pay dividends. The joint work to the west by Yellow Jacket, Kentuck and Crown Point does not as yet attract attention. From Alta nothing new is to hand.

From the Brunswick lode our advices continue to report active work in Occidental, Chollar, Savage and Best and Belcher—the latter is done jointly by Con. Virginia, Best & Belcher and Gould & Curry. In Occidental the work is on the 550-foot and 650-foot levels, with low grade ore showing on the latter level. The work in Chollar on the 600-foot level is being closely watched, with the hope that when cross-drifting is done the downward continuation of the ore will be run into, which would justify better prices for the shares. They are still extracting ore from the levels above but the grade is poor. In Best & Belcher they are exploiting on the 300-foot level. Shaft No. 2 is being sunk.

The following illustrates the changes of the week:

MINES.	July 1.	July 8.
Alpha	$ 12	$ 15
Alta Consolidated	..	..
Andes	..	..
Belcher	23	..
Best & Belcher	45	45
Bodie	..	..
Bullion	10	..
Challenge	45	..
Chollar	1 10	76
Confidence	..	..
Consolidated California and Virginia	1 45	1 35
Consolidated New York	..	..
Crown Point	21	18
Exchequer	03	..
Gould & Curry	35	..
Hale & Norcross	..	87
Justice	..	..
Mexican	36	38
Ophir	76	..
Overman	11	..
Potosi	41	..
Savage	26	..
Sierra Nevada	92	98
Union	42	44
Utah	..	08
Yellow Jacket	51	47

San Francisco Stock Board Sales.

SAN FRANCISCO, July 8, 1897.

9:30 A. M. SESSION.

800 Alpha	$ 15	400 Mexican	37
100 Chollar	76	100 Sierra Nevada	98
100 Con Cal & Va	1 35	200 Union	44
500 Con Imperial	02	200 Utah	08
100 Crown Point	18	300 Yellow Jacket	47
500 Kentuck	05		

SECOND SESSION—2:30 P. M.

300 Mexican	38	200 Sierra Nevada	1 00
100 Best & Belcher	45	500 Utah	07
50 H. & N.	87	50 Standard	1 55
100 Alpha	14		

Obituary.

Abram Breece, one of the owners of the Paragon drift gravel mine at Bath, Placer county, Cal., which he and his partner, Judson Wheeler, had worked nearly a quarter of a century, died in San Francisco last Sunday.

WANTED.—A Second-Hand 5 OR 10 STAMP MILL.
Address, stating particulars, price, etc., A. B., this office.

WANTED.—An Assayer and Chemist.
Address, stating experience and salary expected,
LA TRINIDAD MINING COMPANY,
218 McAllister St., San Francisco, Cal.

WANTED.
Able, rugged man, as Roaster, thoroughly familiar with oxidizing dead roast of gold concentrates in Bruckner furnace. None other need apply. Address quickly, stating experience and qualifications.
JACKSON & LAKEVIEW MINING CO.,
LUNDY, CAL.

WANTED.
Competent Assayers and Chemists and Experienced Ore Samplers,
To take charge of our branch offices in the Republic of Mexico, through which we purchase Ores, Bullion and Sulphides, and sell Mining and Milling Supplies. Must be thorough, active and careful workers. Knowledge of Spanish desirable. Address, with references, THE LEWIS COMPANY, Apartado 71 B, Mexico City.

DIVIDEND NOTICE.
The German Savings and Loan SOCIETY,
526 California Street.
For the half year ending June 30, 1897, a dividend has been declared at the rate of four and twenty-hundredths (4.20) per cent per annum on Term Deposits and three and fifty-hundredths (3.50) per cent per annum on Ordinary Deposits, free of taxes, payable on and after THURSDAY, July 1st, 1897. GEO. TOURNY, Secretary.

CHANNEL GRAVEL PROPERTY, 170 ACRES, channel the entire length, sufficiently developed to warrant erection of 11-stamp mill. Requires new track in tunnel and half mile flume. Is on same channel between two properties that paid rich dividends for fifteen years. This is a cash proposition after examination and acceptance of property. For further information, address L, care of Mining and Scientific Press.

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In a Thriving California Mining Town.
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Cincinnati, ... Ohio.

Skeleton Mining Report.
NEEDED BY EVERY MINING MAN.
FIFTY CENTS POSTPAID.
Mining and Scientific Press, 330 Market St., S. F.

Assessment Notices.

BEST & BELCHER MINING COMPANY. Location of principal place of business, San Francisco, California. location of works, Virginia District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 1st day of July, 1897, an assessment (No. 62) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of August, 1897, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on THURSDAY, the 26th day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
M. JAFFE, Secretary.
Office—Room 33, Nevada block, 309 Montgomery street, San Francisco, California.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 9th day of June, 1897, an assessment (No. 7) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of July, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 9th day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
A. F. FREY, Secretary.
Office—Room 44, Phelan building, San Francisco, California.

ROSE CREEK MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Star, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of June, 1897, an assessment (No. 1) of 15 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 163, Crocker building, junction Post, Montgomery and Market streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 28th day of July, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 30th day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. M. WILMANS, Secretary.
Office—Room 163, Crocker building, San Francisco, California.

OSCEOLA CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Amador County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 30th day of June, 1897, an assessment (No. 6) of 1 cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 307 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 2nd day of August, 1897, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on SATURDAY, the 21st day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
HOLLAND SMITH, Secretary.
Office—307 Montgomery street, San Francisco, California.

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Developed and Undeveloped Free-Milling Properties.
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OUR "CROWN" WIRE.
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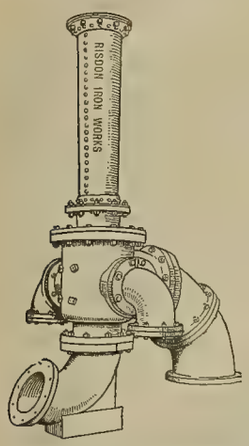
In the Superior Court of the City and County of San Francisco, State of California, Department No. 8. John Y. Kimball, plaintiff, vs. Mabel L. Kimball, defendant. Action brought in the Superior Court, City and County of San Francisco, State of California, and the complaint filed in said City and County of San Francisco, in the office of the clerk of said Superior Court. The people of the State of California send greeting to Mabel L. Kimball, defendant. You are hereby required to appear in an action brought against you by the above-named plaintiff in the Superior Court, City and County of San Francisco, State of California, and to answer the complaint filed therein within ten days (exclusive of the day of service) after the service on you of this summons, if served within this county; or, if served elsewhere, within thirty days. The said action is brought to dissolve the bands of matrimony now existing between yourself and plaintiff, on the ground of habitual intemperance on your part for more than one year past. All of which will more fully appear in the complaint on file herein to which you are hereby referred. And you are hereby notified that if you fail to appear and answer the said complaint, as above required, the said plaintiff will apply to the said Court for the relief prayed for in the complaint. Given under my hand and seal of said Superior Court at the City and County of San Francisco, State of California, this 9th day of April, in the year of our Lord, one thousand eight hundred and ninety-seven. C. F. Curry, Clerk. By Joseph Riordan, Deputy Clerk. R. Thompson, Attorney for Plaintiff.

RISDON IRON WORKS,



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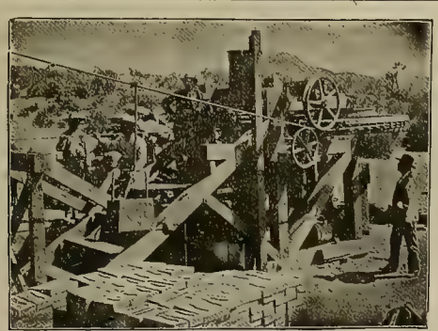

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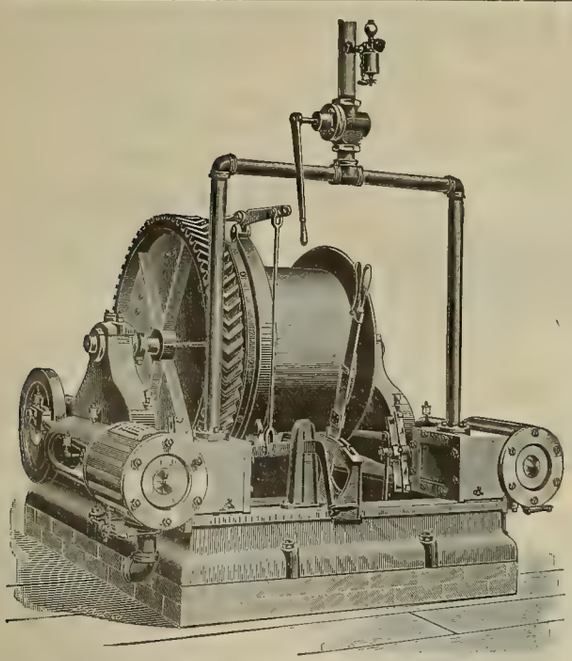
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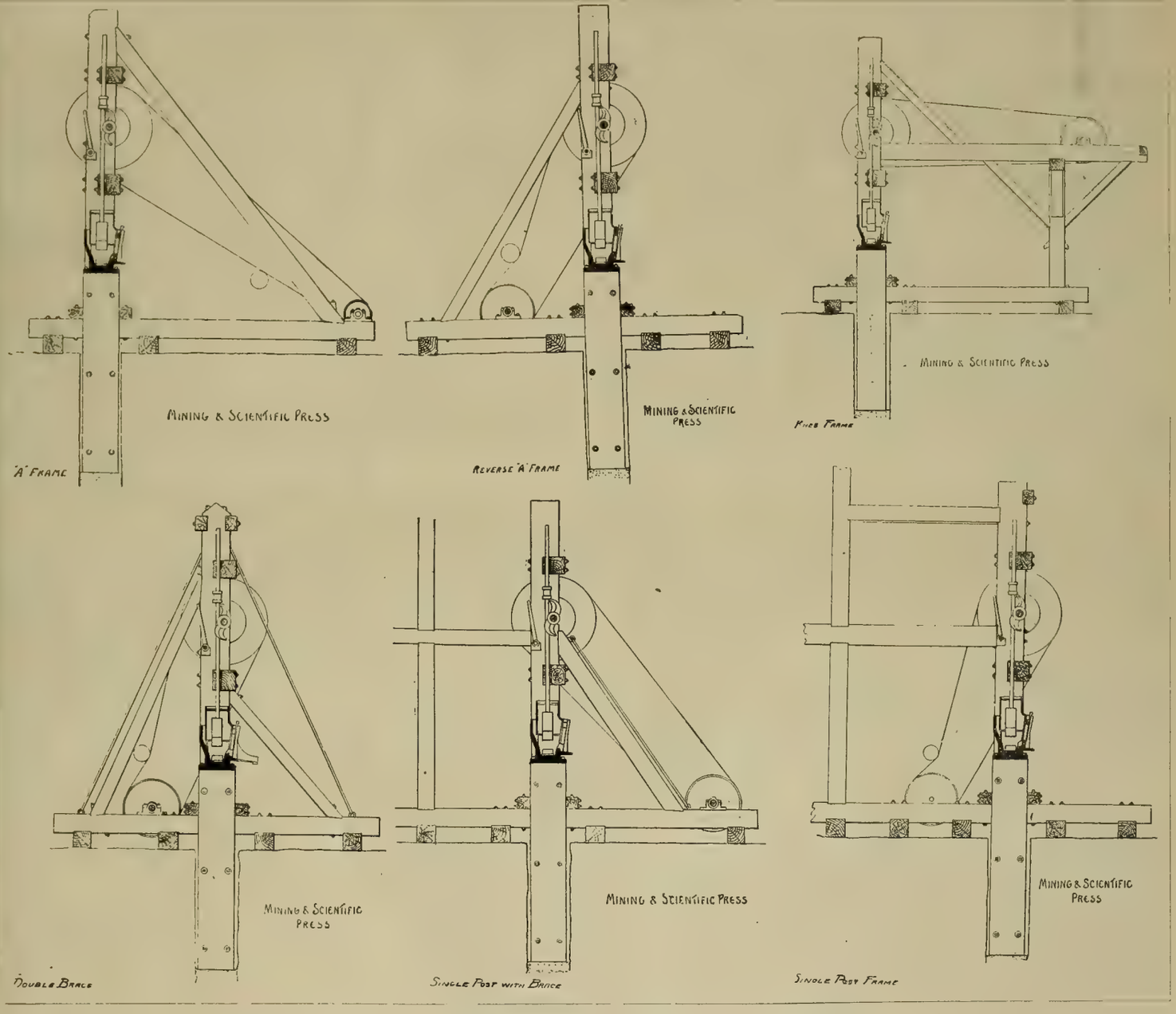
MINE BELL SIGNALS. Adopted, Used and in Force in Accordance with State Law.

FOR THE CONVENIENCE OF OUR READERS IN THE MINING COUNTIES WE PRINT IN legal size, 12x36 inches, the Mine Bell Signals and Rules provided for in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Mine Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and rules, printed on cloth so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS. 330 Market St., San Francisco.

MINING AND SCIENTIFIC PRESS.
AND PACIFIC ELECTRICAL REVIEW.

No. 1932.—VOLUME LXXV. Number 3. SAN FRANCISCO, SATURDAY, JULY 17, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.



DIFFERENT DESIGNS OF BATTERY FRAMES IN QUARTZ MILLS ON THE PACIFIC COAST.

Battery Frames.

The design of a frame determines the position of the shafting, which bears with importance upon the life of bearings and belting, to say nothing of the presence or absence of menacing belts and pulleys about the working floors. The size of the frame timbers is determined by the weight of the stamp.

The knee frame, no doubt, is the heaviest and most costly, but seems superior to all, at least in solidity, position of shafting and consumption of belting. The accessible line shafting receives the most attention, the bearings are kept clean, dry and quite free from dust, while the equal and nearly opposite pulls of the main and counter belts tend to keep the shaft in good alignment. This frame also best affords an opportunity for large pulleys, up to 114 inches on the line and 84 inches on the cam shafts, and practice proves that moderately long horizontal belts, run without tighteners on these large pulleys, wear longer and transmit with less loss than short, highly inclined ones. The position of the belting overhead permits the least amount of falling particles to cut them out, and leaves the floors entirely free from dangerous obstructions.

The "A," reverse "A" and "double brace" frames are commonly met with, especially in silver mills where plates are absent, and while simple and less expensive, they can be made sufficiently strong. Although the battery sills, so long as they remain sound, furnish the surest foundation for the line shaft, such a position is, in either wet or dry crushing mills, very severe on belts and shaft, the sweepings, dust and ore particles falling upon the former and more or less of the leakage through the floors upon the bearings, which in their dark, inaccessible position generally receive the minimum of attention. Whether the shafting be placed in front or behind the battery, the belting is in either case highly inclined and the distance between centers of shafting is short, even though the frame be a tall one. Short inclined belts require, on the loose side, powerful tighteners to produce the necessary friction, so as to prevent slipping on the lower or small line shaft pulleys. The horizontal and excessive vertical pulls on the main and center belts and the occasional decay of the sills sometimes throws the shaft out of line,

(Continued on page 48.)

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San Francisco, July 17, 1897.

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COMMISSIONER OF PATENTS BUTTERWORTH is doing some good work since assuming charge of that important office at Washington, D. C. He has recently disbarred eight fraudulent patent attorneys and is making it unpleasant for other rascals in that line of business. It was about time.

THE reports from the placers on the Yukon rival the tales of mining in early days in California. That exceedingly rich deposits are being worked there can be no doubt, and that the new discoveries made on the British side of the line are by far the most important seems certain from all reports. On the steamer Excelsior, which arrived in San Francisco last Wednesday, were fifteen miners from the Yukon. They and the Alaska Commercial Company brought down nearly $500,000 in gold. The new district at Klondyke is about thirteen miles in length on the Yukon. As an evidence of the value of the gravel wages have gone up to $15 a day and board.

The International Mining Convention.

The International Gold Convention, which met in Denver last week, was run upon lines that will give the miners of the West encouragement to take a more active interest in the next meeting, which will be held in 1898 at Salt Lake. The fact that the place of holding these conventions is changed from year to year will preclude the possibility of their becoming controlled by local, political or other interests not in harmony with the welfare of the industry that they represent. While the work done in a gathering so unwieldy as these conventions must necessarily be will not be apparently beneficial as far as the record of the proceedings go, they can do much through committees. Most of the good record made by the California Miners' Association was from work done by the executive committee and other committees appointed or arranged for by the conventions. In Denver committees were appointed for needed legislation for the industry, and it will be through such committees that most of the work of the International Mining Convention will be conducted in the future.

The mining industry is not represented as well as are nearly all other industries in this country by associations or by officials in the Federal or State governments, and, as a result, less has been done for the industry by the authorities at Washington and by the various State governments than for any other. The fault has been that the miners have never stated what they needed. The industry does not need any assistance that will be of expense to the Government, and its requests for legislation in the way of needed laws may easily be secured, if through such organizations as the International Mining Congress or the California Miners' Association the miners show plainly what they want.

Mining Machinery and the State Fair.

The advantages of making exhibits of mining machinery at the California State Fair to be held in Sacramento from September sixth to the eighteenth is well worth the consideration of the manufacturers. Sacramento is yet a point of importance more than any other city in the State except San Francisco as a base of supplies for the mines of a number of the counties leading in the output of gold. To many people farther away from the mining districts Sacramento is looked upon as rather a city supported by agriculture, and of further importance only as the capital of the State. Yet every year probably nearly as many people from the richest mining districts of the State make pilgrimages for shopping or amusement to the old capital as come on to the "Bay." The State fair has long been a leading attraction of the year for the miners and mine owners of Sierra, Nevada, Placer and El Dorado counties, which produce one-third of the gold yield of the State. To those counties Sacramento is a local metropolis with which they are much more in touch than people farther away generally imagine.

The exhibitor who is wise considers not only how many will see his wares, but whether they are the class of people who need them or can afford them. About the only class of people who are spending much money in these times are the miners. The most prosperous industries in San Francisco to-day and for several years back have been those supplying machinery for the mines, and this is true of all large cities of the West. It would appear that if it is worth while exhibiting any class of products of the factories at the State fair certainly it will pay to exhibit mining machinery.

It is generally understood that more money is being spent on the mines of California than is being taken out. This is due to the large amount of development work going on and machinery being purchased for newly opened mines. In a few years the proportion of money spent in machinery will be much less than at present. It behooves those interested to take the flood that leads on to fortune at its tide.

A Golden Jubilee.

It will soon be fifty years since Marshall discovered gold in Sutter's millrace at Coloma, California. Probably nothing done in modern times led to so much for the material progress of the world. Certainly no other event in American history was so influential in leading to the building up of this country. Within a few years, following the miners as their pioneers in every district, our people have opened up to settlement a larger area of territory, valuable as a source of supply for nearly all the necessities of man, than has ever before in the world's history been brought within the limits of civilization in so short a time. That this great advance, with its results to the trade and commerce of the world, has been achieved by the discovery and development of our mineral resources, more than all other influences combined, no man can pretend to deny. But for mining a large part of the great empire west of the Mississippi might yet be a savage waste.

It is proposed that there should be a semi-centennial celebration—a veritable "golden jubilee"—held next year. In six months—January 19th—will come around the fiftieth anniversary of the discovery by Marshall. If a celebration is to be held then the time for preparation is very short.

While gold was known to exist and had been mined in California long before this find by Marshall, it was that that stirred up the excitement that caused the opening of the great placer mines and the rush of immigration in 1849. Placers had long been worked, particularly in the southern part of the State, by the Indians. This was discouraged by the Missions as much as possible. In 1843 Manuel Castanares, a Mexican officer, tried to arouse the attention of his Government to the importance of these resources. Yet these facts should not prevent a celebration of a golden jubilee, in honor of the Coloma discovery or of the pioneers who came here in those days of hardship and laid the foundation of a mighty empire.

The Gold Yield of 1897.

The reports that have come from the gold mining districts of the world as to the amount of the yield for the first half of 1897 indicate that the output for the year will far exceed that of 1896. There is not one of the old districts of importance that does not show unusual activity and give promise of a larger output. Besides this, many new districts are adding something to the total. The African yield for 1896 was about the same as that for 1895; but for the first five months of 1897 the returns show a product of 1,136,902 ounces. At this rate, without any further increase for the rest of the year, the Rand would yield $10,000,000 more in gold than it did last year. It is more than likely, provided no political troubles arise, that the figures for the next seven months will be greater in proportion than those of the first five; for many new stamps are beginning to drop on large properties in which immense ore bodies have been developed, and there is a promise of more increase of crushings from this source than there will be a decrease from closing up of mines that will not pay a profit under present conditions. In the Australian colonies generally there is an increase in the output, so far as heard from, and particularly in Western Australia. There is less speculation and more mining in all the colonies than there was last year. Prices of shares have gone down, but the gold output has increased.

Russia is looked upon as the coming gold field—particularly Russia in Asia. Into Siberia and along the Caucasus of late a large number of experienced mining engineers from other gold fields have gone, sent by capitalists of Russia and other parts of Europe interested in gold fields. The crude and expensive methods in vogue there will soon be improved and the output of gold increased, not only through the opening up of new districts, but also through the working of lower grades of gravel. There is every reason to expect an increase in the Russian output for 1897.

The larger districts in British Columbia have increased their yield during the first months of this year. There are a great many mines being opened up with large capital in Ontario and in the newer districts in British Columbia. Besides this, reports that rival the tales of early days in California come from the Klondyke placers on the Yukon.

The United States in 1896 made a larger increase in the yield of gold than any other country in the world, and there seems every reason to believe that the output for 1897 will be far greater than that for 1896. In Colorado the Cripple Creek output has shown a large increase over last year, and there is also a perceptible increase in the receipts at the Denver mint from nearly all the other districts of that State. Many mills are being built and a large amount of low-grade ore, which under previous conditions could not be worked, is now being crushed. In California there is hardly one of the old mining counties in which a number of large new mills have not been erected. The best evidence of the fact that the gold yield of California is increasing is in this that the number of stamps falling is largely increased and very few mines or mills have been shut down.

Alaska is increasing its output largely along the coast from the quartz mines, and there will be forty per cent more stamps dropping in this than last year.

In Arizona, New Mexico, Nevada, Montana and Idaho more capital has been invested within the last eighteen months than for half a decade before.

Altogether, in the old districts—not only those which have continued their output, but many which have been abandoned—and in new districts the world over, there is greater activity and evidence of an increase of yield than there was last year. It is altogether too early to predict how much the increase will be over the output of 1896; but that it will be large there can be no doubt. What is best is the fact that development work now being done will insure a large yield for years to come and great activity in the industry.

Concentrates.

THE breast of the Sioux-Ajax tunnel at Tintic, Utah, is now 2700 feet into the hill.

WORK has been commenced on the Crows Nest Pass railway in British Columbia.

IN the Ajax mine at Tintic, Utah, they are to sink to the 1000-foot level from the 600.

A FOUR-FOOT ledge of nickel ore has been found in the Trout Lake district, B. C., near Ferguson.

SEVERAL copper claims have been located on the east slope of the Rockies west of Calgary, B. C.

DURING the year ending June 30, '97, there were coined 21,203,701 silver dollars at the U. S. mints.

THE output of the Cripple Creek district for the first six months of 1897 in gold is placed at $6,075,000.

THE owners of the Little Kid mine, near Bald mountain, Montana, will erect a large stamp mill shortly.

A RAILROAD is to be built into the Deep Creek mining district in Utah. This will give an impetus to the mines.

THE Anaconda Company of Montana has increased its output of copper lately, producing in May 12,262,501 pounds.

OUT of a pocket on Ash creek, Klamath river, in Siskiyou county, Cal., last week, two men took 217 ounces of gold.

A DISCOVERY has been made of nickel in the Cepango district, on the Little South Fork of the Poudre river, in Colorado.

NEGOTIATIONS are pending for the reopening of the Amador Consolidated mine, adjoining the Allison Ranch, Grass Valley, California.

AN air compressor plant has been put up at the Providence mine at Nevada City, Cal., to run four machine drills, a hoist and pumps.

THE owners of the Republic mine in Eureka camp, near Kettle Falls, Wash., are to put up a mill with a daily capacity of 100 tons.

IT is reported that the Albany group of mines in Wolf creek district, southern Oregon, have been bonded to Senator Jones of Nevada.

IN Rossland, B. C., several mining claims have been gotten rid of by the owners by raffling. One was appropriately named the White Elephant.

THE Palmer Mountain Tunnel Company, near Loomis, Idaho, have installed a five-drill air compressor plant for boring 3000 feet into Palmer mountain.

THE Boston and Montana Company is producing nearly 5,000,000 pounds of copper per month. The May product of the Calumet and Hecla was 7,794,916 pounds.

THE Sunset group of mines in Tennessee Gulch, Gold Creek district, Nevada, has been bonded to George W. Addison, representing Eastern people, for $50,000.

IT is reported that a rich ledge of copper, 30 feet in width, has been uncovered in Summit camp, in the Kootenay country, B. C. The claim is bonded for $50,000.

THE California mine, in the Cable cove district, near Baker City, Oregon, has been sold for $30,000 to Butte and Denver people, who will erect a 10-stamp mill at once.

IN a rock-drilling contest at Park City, Utah, last week, Eric Berg of the Daly drilled 97⅛ inches in 15 minutes, although he broke two drills during the contest.

IN the tariff bill which recently passed the Senate and is now under discussion by a conference committee, there is a reduction of the duty on cyanide of potassium to 12½%.

THE Oregon Improvement Company has purchased for $25,000, from Judge Orange Jacobs and others, 320 acres of coal lands adjoining the Newcastle mines in Washington.

THERE is reported a discovery in northeastern Alaska a lake of crude petroleum several miles wide and eight or ten miles in length. Surrounding it are said to be rich deposits of coal.

THE Northwest Pacific Exploration Association has been formed to operate mineral and coal properties near the Pend d'Oreille river between Spokane and the international boundary.

THE narrow-gauge road between Trail and Rossland is to be turned into a broad-gauge line, and the present rolling stock, which includes Brigham Young's private car, is to be sold.

THE deepest shaft in the Anaconda copper properties in Montana is the Bell, which is down 1500 feet, and the company now propose to sink deeper—probably to the 2000-foot level.

SUPERINTENDENT KARMEEN has made arrangements for the erection of cyanide works at the Dunderberg mine, near Bridgeport, Mono county, Cal. The mine has been showing up well.

THE Orphan Bell mines on Bull hill, at Cripple Creek, Colorado, have been sold for $450,000 to Eastern people, and the Vindicator mine on the same hill to D. H. Moffat of Denver for $300,000.

THE California one of the lost mines of the desert is reported to have been rediscovered by John F. James and Henry Blake in Arizona, south of Sentinel station, near the Mexican border.

THE Alaska-Treadwell reports for June: Bullion shipment, $60,073; ore milled, 23,596 tons; sulphurets treated, 372 tons; of bullion there came from sulphurets, $21,160; gross expenses for period, $28,891.

A FIELD FIRE caused the burning of the Seaton Mining Company's hoisting plant at Drytown, Amador county, Cal., and endangered the plants at the Pocahontas, Gover and California this week.

OWING to the recent reduction in wages of native labor in the Rand, South Africa, the supply is decreasing, many of the natives going home. In the last week of May 730 registered against 1341 who quit.

THE Keswick, Cal., *Miner* says that the Mountain Copper Company there annually produces over $1,750,000 worth of copper. It employs over 300 men, taking out probably 500 tons copper ore every twenty-four hours.

WORD comes from Toluca, Mexico, that a syndicate, headed by C. D. Lane of California and W. S. Stratton of Colorado, has purchased La Esperanza gold mining property, in El Oro district, for $6,000,000, Mexican money.

OVER 15,000 men are now employed in mining in Sonora, Mexico; in Hermosillo 4500, Ures 1000, Arizpe 2000, Moctezuma 1500, Sahuaripa 1500, Magdalena 1600, Alamos 1500, Altar 2500. The Minas Prietas employs about 3000.

AN Alaska man is to take 700 sheep by steamer to Dyea and from there drive them across the pass and along the shores of the chain of lakes to the headwaters of the Yukon, and thence into the placers at Circle City and Klondyke.

THE shipments from the Rossland mines for the first six months of the year aggregated 31,980 tons, while there were 3000 tons milled in the camp. Of this, 22,480 tons came from the Le Roi and 5850 tons from the War Eagle.

THE contest for the possession of the Candelaria mine has been reopened by the filing of another suit in a City of Mexico court by Mark Birmingham of Boston against Dan Burns and associates, who are now in charge of the property.

IN London last week a deputation waited on Sir Wilfred Laurier, the Canadian Premier, to urge the expediency of opening up a route to the Yukon country. Laurier promised to propose an appropriation for exploration purposes.

DIRECTOR OF THE MINT PRESTON writes that he thinks the world's gold product for 1897 will be $230,000,000. He thinks the United States will furnish $60,000,000 of this. He is not willing to credit California with more than $15,000,000 of that amount.

THE copper production for the first five months of 1897 in the United States is estimated at 88,998 long tons against 85,355 tons the corresponding period of 1896. The European production in the same period is placed at 36,628 tons for 1897 and 35,200 tons in 1896.

IN spite of a decrease in the valuations of property in the fruit and grain growing parts of Placer county, the assessment roll for 1897 shows a considerable increase over that of the previous year, due to the healthy growth in the mining districts of the county.

GENERAL GASPAR SANCHEZ OCHOA, owner of Mount Popocatepetl in Mexico, is building a cable railroad to the crater from Glamacus, to be used for the transportation of sulphur to be prepared for market. The road will also be used for carrying up sightseers.

ANOTHER increase has been made in the shipment of manganese iron ore from Leadville, Col., to the Illinois steel works, and they now amount to nearly 150 tons daily. It is stated by representatives of the steel company that still further increases will be made.

THE Elkhorn (Montana) reports for May: Estimated value of bullion shipped, $20,295; gain on April shipments, $25.58; net value of bullion, $20,320.68; returns from ore shipped, $6,837.71; total receipts, $27,158.29; current expenses, $26,703.80; profit for May, $454.49.

THE cases against Mining Experts Hague and Womble, charged with breaking into the Silver Peak mines, have been dismissed at Hawthorne, Nevada, as has also the charge against L. J. Hanchette. This is supposed to be preliminary to a civil contest for possession of the mines.

THE Gold Creek, Nev., Mining Company has made application at the United States Land Office for twenty-nine patents on placer mines. The patents cover 4480 acres, which at $2.50 per acre will cost $11,200. The Government charges $2.50 per acre for placer ground and $5 per acre for quartz claims.

NINETY carloads of machinery and iron have arrived at San Luis Obispo from San Francisco for the asphalt mines in northern Santa Barbara county. Two pipe lines each 28 inches in length are to run from the mines to Gaviota and a branch railroad will be built to the coast line of the Southern Pacific.

THE Cripple Creek, Col., correspondent of the Denver *Republican* estimates the gold output of that camp for June at $1,190,352. The yield for the first six months, with the promises for the rest of the year, make it not at all unlikely that the estimate of $12,000,000 for the year will not be far above the mark.

ANOTHER English syndicate has made an offer to erect a smelter at Vancouver, B. C., for a bonus of $100,000, payable as the ore is smelted. There are several companies after similar terms, and the Council are inclined to wait for some one willing to erect a smelter for the profits he believes are in it as his only reward.

FOLLOWING are the returns of the Ferreira, of the Rand, South Africa, for May: Eighty-stamp mill ran 29 days 6 hours, crushing 10,462 tons, yielding 8156 ozs 2 dwts; yield from cyanide works, 2782 ozs 12 dwts; concentrates caught, 290 tons, assaying 7 ozs 15 dwts—2247 ozs 10 dwts; total gold from all sources, 13,186 ozs 4 dwts.

GENERAL W. W. O'NEILL has interested Eastern capitalists with himself to develop copper mines in the Grand Canyon of the Colorado, in Arizona. Four camps have been established at points where development work is being done. Nature in this case, in cutting the wonderful canyon, has done a good deal of developing herself.

THE new 150-stamp mill of the Diamond Hill mines at Hassel, Mont., is ready for work. Everything is run by electricity, generated by water power from the Crow river. The cars taking the ore from the mine to the mill are operated by the trolley system, and all the drills and other works about the mine and mill are operated by electricity.

A BLOCK of 100 shares in the Homestake Mining Company, in the Black Hills, South Dakota, sold last week for $30 each, or at the rate of $5,000,000 for the whole of the stock. This company has paid in dividends $6,275,000. The same owners control the Deadwood Terra, which has paid $1,320,000 in dividends, and the Highland, which has paid $3,244,918.

THE four big pumps to be used in draining the down town mines in Leadville, Col., have reached that place. Two will go to the Penrose mine and two to the Bonair. Those at the Penrose will pump 1200 gallons per minute, and those at the Bonair 1000. This with other means will make the total handled by the Leadville Pumping Association 4000 gallons per minute.

THE total amount of money in circulation in this country on the 1st inst. was $1,646,028,246, which sum represents an increase of $136,300,000 as compared with the corresponding date last year. The Treasury officials estimate the population of the United States on July 1 at 72,937,000. On the basis of that estimate, the circulation per capita amounted to $22.57—an increase of $1.42 as compared with the corresponding date in '96.

HENNEN JENNINGS, who is one of the leading mine managers in South Africa, in giving evidence last month before the Mines Commission as to the dynamite monopoly, stated that he had a cable from Henry Pichoir in San Francisco, offering to put the article afloat in South African ports at 17 cents a pound. This offer would mean that but for the monopoly dynamite might be landed at the mines at about one-half the present price. The three companies in California, it was stated, could agree to increase their output to supply 16,000 cases monthly within three months.

THREE important strikes were made in Colorado in June. These were the discoveries of new and rich ore bodies in the Mollie Gibson, the Gregory-Bobtail and the Argentine-Juniata—all old mines, with records of the past. The Mollie Gibson has not paid dividends for two years, but the shareholders have divided four millions. These finds will do much to encourage belief in the permanency of Colorado mines. The Gregory-Bobtail is the oldest lode claim in the State.

THE recent deplorable explosion of giant powder at Georgetown, Cal., will serve a good purpose, if taken as an object lesson, illustrating the criminal folly of carelessly storing giant powder, as is so often done. In such a dangerous matter it is better to be foolishly careful than carelessly foolish. There is a State law regarding the sales, etc., of explosives, and it is an unwritten law of common safety that the utmost care be taken in the storage and handling of so deadly a compound.

THIS PAPER declines to be held responsible for the assertions or acts of self-constituted "agents." No one is authorized anywhere to transact business for this paper unless in possession of proper credentials. From British Columbia and Southern Oregon come complaints of courtesy abused and fraudulent collections. This is, of course, annoying, and a matter of serious regret, but a notice has been often plainly given in effect as prominently published at the head of the editorial page in this and every issue.

FOR the week ending July 3 the ore shipments from Rossland, B. C., amounted to 1806 tons, the largest in the history of the camp. This is at the rate of nearly 100,000 tons a year, valued at about $30 a ton. The Slocan country is shipping about 700 tons weekly, valued at about $80 a ton. The Nelson district is sending to the Hall mines smelter about 1200 tons a week, valued at about $20 a ton. The three districts, Rossland, Slocan and Nelson, are therefore producing ore to the value of about $130,000 a week, or nearly $7,000,000 a year.

REPORTS received at the Bureau of the Mint up to June 30, 1897, show that the balance of silver bullion at the several United States Mints, purchased under the act of 1890, was 115,438,426 ounces, which cost the Government $104,336,512. The coin value of the same in standard dollars is $149,253,769. The total number of silver dollars coined under the several acts authorizing the coinage of silver dollars is as follows: Act of February 28, 1878, $378,166,793; act of July 14, 1890, $68,748,477; act of March 3, 1891, $5,078,472; total, $451,993,742.

DURING the first half of 1897 this country exported 64,902 tons of fine copper, or 6,584 tons more than in the corresponding period for 1896; 30,687 tons more than in 1895; 25,133 tons more than in 1894; and 44,541 tons more than in 1893. For the half years of 1893–1897 inclusive the amounts produced and not exported were as follows in tons: 48,587, 42,232, 45,497, 43,062, 42,096. While the United States production has increased 55 per cent, the exports increased 218 per cent. Since January 1, 1893, four and a half years, the total United States exports of copper amounted to about 924,564,000 pounds, worth, at 11 cents a pound, $101,702,990.

THE duty on cyanide of potassium is reduced in the proposed tariff to 12½%. It and prussiate of potash have been paying 25%. Prime German red prussiate of potash, in cases, was quoted in New York this week at 38 cents per lb. The tariff recently passed by the Senate proposes a duty of 4 cents per pound on prussiate. American manufacturers of cyanide of potassium have asked for a duty on that article of 8 cents per pound. So far as the miner is concerned, the difference either way is very little, as a relatively small quantity is used in the process. The most recent New York quotation was 28 cents per pound in cases of 112 pounds.

THE copper market is improving rather in the foreign than domestic demand, the foreign consumption being in excess of the enormous consumption of last year. The British and continental requirements absorb all the copper this country can spare. The aggregate transactions in this direction during June are estimated at from 15,000,000 to 20,000,000 pounds on a basis of 11 and 11¼ cents. The stocks in this country and visible supplies throughout the world are at such a low level that any sudden increase in consumption would quickly influence the price. For some time strong influences have been at work to prevent the prices from going up engineered by the speculators.

AT the annual meeting of the stockholders of the Consolidated Tiger and Poorman Mining Company, at Spokane, the report of the manager stated that after the fire the rebuilding of the works was delayed and the mine was allowed to fill with water, it being thought at the time that it would be cheaper to pump it out when they got ready to start up than to keep it pumped out during construction. The construction account for the rebuilding of the plant, which consists of a 400-ton concentrator, ore bins, tramway, boiler house and boilers, carpenter shop and blacksmith shop, repairs and additions to the Poorman hoist, shows that there has been expended $101,552.23. The net liabilities of the company are about $90,000, but the profits over working expenses are now showing from $15,000 to $20,000 a month. The mine is said to be looking better than ever, the 1200 showing 10 to 12 feet of ore.

OF THE yield of Cripple Creek, Colorado, in June, amounting to between $1,000,000 and $1,150,000 in gold, 70 per cent came from high-grade ores sent to the smelters. The rest was from low grades. An increase in the amount of low-grade ores worked and a consequent increase in the total output may be expected for some time with the continued reductions in costs of working and increase of milling facilities. In this connection the *Mining Investor* says: "There are immense bodies of low-grade ore in the mines of Cripple Creek, and some large quantities of it taken out, that are at present lying idle—next to worthless, one might say—because they cannot be treated at a profit. They run in value all the way from $5 to $10 per ton, and that they cannot be handled is a very heavy loss to the owners of Cripple Creek mines. I think that the time will come, and at a date not so very far distant from the present, when this class of ore will be handled. It will come gradually, of course, but with every reduction in the cost of treatment the amount of the output will be increased and an incentive will be given to those who are operating to increase their efforts towards the one end. At the present time several new reduction plants are being built and several others already established are adding to their treating capacity."

Practical Workings of Chlorination.

Written for the MINING AND SCIENTIFIC PRESS by THOMAS G. TAYLOR, JR.

Ores that are now being worked by the chlorination and cyanide processes were until a few years ago left untouched, because they were considered rebellious, or, if they contained enough free gold to pay for the working, they were allowed to run off as tailings after the free gold had been extracted. In this age of invention and discovery it is a simple and inexpensive matter to save and extract the precious metals from many of those ores which were, not long ago, considered rebellious. The first successful step toward this was the invention of the concentrator, which separates those rebellious particles called sulphurets from the sands or gangue matter of the ore, thereby making a valuable product, which is treated by the chemical process to which it is best adapted.

As this article is to treat of the chlorination of ore I will say nothing of the cyanide process, except that it can not be used on all ores suitable to chlorination on account of their containing certain base metals and their salts, which have a greater affinity for the cyanide than the gold has, thus necessitating a stronger solution of cyanide, which increases the cost of extraction and in cases amounts to more than the value of the gold extracted.

With metallurgists it is still an unsettled question in some cases as to whether the gold in the sulphurets is in a mechanical or chemical combination with the base sulphides, but by giving the ore an oxidizing roast, which liberates the sulphur, it can be treated by the chlorination process, so that as much as 90 per cent of its assay value in gold can be extracted. Taking it as a good example of the practical working of a chlorination plant, I will endeavor to describe the process as carried on at the Champion mine at Nevada City. These works were among the first built, having been constructed for the Merrifield mine, which is now a part of the Champion property. Here they work between three and a half and four tons in twenty-four hours.

Besides gold and silver, this ore contains pyrite, chalcopyrite, galena, sphalerite and the sulphides of arsenic and antimony, with some sands of quartz and calcite. When the ore is brought from the mills it is piled on the drying platform, which is built over the furnace at the end near the stack, so that when a charge is put into the furnace it contains but little moisture. The furnace used is known as a hand reverberatory, with two hearths, the upper and lower or finishing hearth. It is 70x10 feet on the inside, one-third of the length being the finishing hearth and the other two-thirds the upper hearth.

The charges are put in through a hopper or opening on top at the upper end, by removing an iron plate and shoveling the ore in. At this end the ore is banked up so that there are ten charges receiving a preliminary roast before a charge is made. As one is roasted it is drawn from the furnace, the next moved from the upper hearth to the lower, the next in order spread on the hot end of the upper hearth, the others being moved forward in their respective orders and a new one put in at the hopper. The idea of banking the ore at the upper end is to save fuel, as some sulphur is being burned off for sixty hours before a charge is spread. In this way ten charges are occupying the space of one, and this end of the furnace can be run at a lower temperature. It also allows a slow roast, which is more beneficial than a quick one, as the ore does not cake as it would at a higher heat. When a charge is spread on the upper hearth it is raked every few minutes, so that a new surface is turned up and the sulphur burned off. After the one ahead of it on the finishing hearth is removed this charge is moved down and spread, the next in order spread on the upper hearth, and so on.

The temperature on the lower hearth being much higher than on the upper, the ore is raked more often. After nearly six hours on this hearth the ore is pushed to the center from both sides of the hearth and the furnace fired up. This is done to get the sides of the hearth hotter for the finishing roast. When this is accomplished the ore is divided, part being pulled to one side and part to the other, allowing the center to get hotter. Finally it is well spread over the hearth and thoroughly raked, until no signs of green ore remain in the charge. It is then salted and drawn. The salting is done by throwing the salt in through the stirring doors and mixing thoroughly; then a plate is removed in the hearth and the charge raked into the vault below. The amount of salt used is about 26 pounds to a charge of 1800 pounds of ore.

The ore is allowed to remain in the vault about six hours, or until just before the next charge is drawn, when it is spread out on the cooling floor. After being spread for a little time it is thoroughly moistened with water and screened, the latter for the purpose of breaking all lumps. The damp ore is gassed to a better advantage than dry ore, as moisture aids in the reaction with chlorine and the metals, and damp ore does not pack like dry ore, thus giving the gas a better chance to circulate.

After the process of screening the ore is shoveled into the gassing tub, care being taken not to pack the ore in filling the tub. There are five of these tubs, each one holding about three and a half tons of ore. They are 6 feet 8 inches in diameter and 2 feet 6 inches deep, inside measurements. Each is fitted with a false bottom containing half-inch auger holes, covered with burlaps for a filter, and coated inside and out with tar. The burlaps generally last for three fillings, care being taken not to cut them with the shovel in emptying the tub. When the tub has been filled with ore the cover is put on and the seams stopped up with flour dough, the tube from the generator connected and the gas allowed to enter. This connection is made through a hole in the side of the tub below the false bottom.

The generators are charged just before the connection is made, one charge being sufficient for each tub of ore. The generator charge consists of 32 pounds of sulphuric acid, 16 pounds of manganese, 20 pounds of salt and about three quarts of water, all being put in at one time, except the acid, which is put in a lead vessel over the generator and so fixed that a constant flow of acid is obtained, thus keeping the gas at a constant pressure. The following chemical reaction takes place in generating the gas:

$$MnO_2+2NaCl+2H_2SO_4=Na_2SO_4+MnSO_4+2H_2O+2Cl.$$

From time to time the contents of the generator require stirring, which is done by means of a stirrer fitted in the generator with a handle projecting through the top. The generator and all the piping carrying the gas are made of lead, as the acid has no effect on this metal.

There are two generators, situated side by side; thus two tubs of ore can be gassed at one time. A water bath surrounds them, with a small furnace underneath, where a slow fire is kept, as heat aids in the reaction which liberates the chlorine. All adjustable connections on both generators and tubs are covered with dough, so there is no possible chance of a leakage of gas. As chlorine has a very disagreeable smell and acts upon the passages of the throat and nose, causing irritation and inflammation, great care should be taken that none should escape into the works.

The gassing of a tub takes about six hours; that is, from the time that a tub is connected with the generator until the gas appears at the cover. This is found by removing a plug in the cover of the tub and holding a glass stopper, with ammonia on it, at the hole. If the gas is up, fumes will rise from the hole. When the gas is up, the connections from the generator are removed and the hole stopped up by means of a wooden plug and dough, and the tub is allowed to remain in this manner, with the gas, for about forty-two hours before being leached.

In order to prevent hydrochloric acid from entering the tub with the gas, the gas is forced through clear water, the water absorbing all acid that may form in generating the gas. This acid has a very harmful effect upon the ore, as it dissolves the oxides and causes—when sulphides are present, which would be in consequence of defective roasting—the formation of hydrogen-sulphide, which will precipitate the soluble gold chloride before it leaves the tub. Other substances which combine with the chlorine cause no reaction which will precipitate the gold before the solution is drawn off.

The chemical action between the chlorine and gold is as follows: When gold is treated with dry chlorine it forms the dichloride of gold, $AuCl_2$. This, when treated with a little water, breaks down into auric chloride, $AuCl_3$, and aurous chloride, AuCl, and by further treatment with water the latter yields auric chloride and gold. This auric chloride is drawn off and from it gold is precipitated, while the gold, which is the result of the last action, evidently remains in the ore.

As this amount in gold chlorination should not exceed 10 per cent of the assay value of the ore, it is not worth extracting unless the ore is very rich, as the ore would have to be dried, screened, regassed and leached, and then there would still be a certain per cent left in the tailings. That a higher extraction can not be obtained by allowing the gas to remain in contact with the ore for a longer period than is practiced was proven at the works a few years ago. The works were shut down for some time, a tub having been gassed previously and not leached until the works were again started. Samples assayed showed no increase in extraction over the other charges which are in contact with the gas for only the forty-two hours.

The process of leaching is next in order. At the expiration of the specified time a stream of clear water is forced through the opening below the false bottom, the plug in the cover being removed and a hose inserted, to carry off the excess of gas, thus preventing its escaping into the works. When the water has reached the top of the ore it is shut off and allowed to stand for an hour or more, when it is drawn off through the same opening, and a stream turned in at the top of the tub; thus there is a continuous percolation through the ore.

The first solution that is drawn off will give no reaction for gold, as it is the water which occupied the space between the false and true bottom, and is, therefore, allowed to run to waste. Every few minutes some of this solution is caught in a dish and tested for gold, the test being made by adding ferrous sulphate to the solution, and a dark brown precipitation will appear if the solution contains gold. As soon as this precipitate appears the stream is directed into the precipitating vats, which, like the leaching tubs, are coated inside and out with tar, but having no false bottom, and are 6 feet in diameter and 3 feet deep. Two of these vats are filled with solution before the leach is complete. When the solution ceases to give a precipitate with the ferrous sulphate the leach is finished. The water is then shut off from the ore and the tub drained of the remaining liquid. Enough ferrous sulphate is then added to the solution in the vats to precipitate all of the gold. The solution is thoroughly stirred and allowed to settle, and then tested to see if the precipitation is complete. This is done by dipping from the top and adding ferrous sulphate; if a precipitate still shows, more sulphate is added, the solution stirred, allowed to settle and again tested, and so on until no precipitate shows.

The following chemical reaction takes place between the solution and the ferrous sulphate:

$$2AuCl_3+6FeSO_4=Fe_2Cl_6+2Fe_2(SO_4)_3+2Au.$$

The solution contains, besides $AuCl_3$: $CuCl_2$, CaCl, MgCl (if any Mg. is contained in the ore), and $FeCl_2$ and $PbCl_2$ in small amounts.

For the purpose of settling, the vats are allowed to stand until the next morning, before the solution is drawn off. This is done through a hole in the side of the vat, about 3 inches above the bottom. As there is always more or less fine gold held in suspension in solution, the copper is precipitated in order to bring the gold down with it. The precipitant used is sodium sulphide, which is made at the works by boiling 60 pounds of sulphur and from 70 to 80 pounds of caustic soda with about 100 gallons of water, the boiling being continued until all the sulphur is dissolved. This precipitating takes place in another vat, called the copper vat. Another method also practiced at the works for precipitating the copper is by means of scrap iron. This copper product is very rich in gold and is sold to the smelter. The ferrous sulphate used is also made at the works, by dissolving scrap iron in sulphuric acid.

As the ore of the Champion contains enough silver to make it profitable for the leaching of that metal, it is done after the gold leach has been accomplished. The ore is shoveled from the gassing tubs into what are called the silver tubs, where it is leached with sodium hyposulphite solution. These tubs are the same size as the chlorine tubs, having similar false bottoms and filters. A continuous stream of the hypo solution is kept percolating through the ore from top to bottom, running into the silver precipitating vats, which are similar to the gold vats. Here the silver is precipitated as a sulphide with sodium sulphide.

Tests are made in the same manner as with the gold leach to ascertain when the leach is finished, and also when all the silver is precipitated. After the silver has settled the solution is drawn off and run into a storage tank, from where it is pumped into the supply tank, the same solution being used over and over, with an addition of fresh sodium hyposulphite from time to time, to keep it at the proper strength. The silver precipitate, like the copper, is dried and sold to the smelter.

Seven men constitute the force, including the foreman, three furnace men, one tub man (who attends to the gassing, leaching and precipitating) and two helpers.

Battery Frames.

(*Continued from page 45.*)

causing the rapid wear of both itself and the belting. Generally the pulleys are small, which, together with slow speed and increased tension, necessitates a heavier belt, much less economical in cost and subsequent wear than a lighter one. Even with small pulleys considerable grading becomes necessary for a belt-way, sometimes 8 feet deep.

All that applies to the "A" applies as well to the single-post frame. This intimate connection of battery and ore bin seems a detriment, as any settling or spreading of the bin timbers reacts upon and throws the battery frame out of line. Especially is this true where large quantities of wet, gougy ore are kept constantly in the bin. One case is recalled where the battery posts have long been out of line, to the rapid deterioration of battery and belting. Many mill builders advocate the entire independence of bin and frame.

Some frames seem to belong to no particular class, but are combinations of the few simpler forms, as the single-post with front brace. Often frames of this class differ greatly in the height of battery posts, length of braces, etc.

A design but seldom met with is that showing the cam shaft behind the battery posts. In a double mill, with batteries packed back to back and run from the same power, it becomes imperative to build one battery of this nature as shown in the Alaska-Treadwell and the Homestake mills.

Assaying of Gold and Silver.

NUMBER III—CONCLUDED.

By JACOB B. ECKFELDT, Assayer of the United States Mint at Philadelphia, Pa.

There are two methods of assaying silver—one known as the "dry" or "furnace" assay or "cupellation," the other the "wet" or "humid" assay, or the "volumetric process."

The method of furnace assay, or cupellation, already described for gold, when applied to silver, requires a nice regulation of temperature and so many extreme precautions, and is at best so liable to uncertainty of results, that it is now only used in a subsidiary way to furnish an approximate result, or a basis for the closer and more delicate manipulations of the humid assay.

The humid assay, with proper care and due attention to the condition of the liquids, may be regarded as a perfect process of analysis of silver both as respects accuracy and uniformity of results. The principle of the humid assay is that of determining the proportion of fine silver in an alloy by ascertaining the exact amount of a precipitant of known value required to eliminate the silver contained in a solution of a given weight of the alloy, so that the result is obtained without a final weighing of the precipitated silver. The necessary amount of the precipitating agent being found and the weight of the alloy known, the number of parts of silver in a thousand is deduced by calculation. For this purpose a solution of common salt, chloride of sodium, is used.

Standard Solutions.—Two solutions of different proportions are made; the first is known as the "normal solution," the second as the "decimal solution." The former begins, the latter finishes the operation.

The normal solution is prepared by taking the saturated solution of salt in water and adding water to it in the proportions, by weight, of 97.93 parts water, 2.07 parts saturated solution, together making 100.

By supposing an example, the successive steps of the assay process can be more readily followed and understood.

If the silver be of an unknown fineness, an "approximate" assay must first be made by cupellation or by a preliminary humid assay. If, however, as in the case of ingots, foreign coins, standard plate, or silver nearly fine, the fineness be supposable or approximately known, no previous assay is requisite.

Let us now suppose that the silver to be assayed be not far from .900 fine. The working weight will be thus determined: Divide 1000 by .900, and the result is 1.111; that is, we have a weight which will contain 1000 parts and will be precipitated by the fixed dose of normal solution.

For convenience in calculating, however, the table of weights increases and diminishes by fives; and as there is always more or less uncertainty about the supposed fineness, and also concerning the strength of the normal solution (owing to changes of temperature and evaporation of its water), and for another reason the next higher weight rather than the next lower weight is used, i. e., 1.115 in preference to 1.110. The object of this will appear more obvious hereafter.

We are now ready to weigh the silver. The balance in use is sensible to the tenth of a thousandth of a gram, to which point the result may be carried, if necessary, although it is not customary to report so closely.

With a pair of delicate forceps the assayer places upon the scales the weight 1.115 (i. e., one gram and one hundred and fifteen thousandths) of a gram, as previously determined. Upon the other side of the scale the granulations are added until the requisite amount is nearly obtained; the final adjustment is made by cuttings from the rolled slip.

The adjustment completed, the silver is poured from the pan through a funnel into a glass bottle of particular shape and size, then dissolved in, say, 10 grams nitric acid (26° Baume) by gentle heat.

It is during this process of solution that one of the especial advantages of the humid assay is reaped—in the detection of various foreign elements in the alloy, as gold, tin, copper, antimony, the sulphide of silver, etc., some of which dissolve with difficulty, others not at all, and all showing characteristic differences.

Precipitation by the normal solution is the next step in the operation.

The solution is contained in a large glass vase moderately elevated above the table. An india-rubber tube drops from a stop-cock at the bottom of the vase and lies loosely along the table, except about midway of its length, where it is intercepted by a smaller spigot; this is screwed down at a convenient working point for the right hand, the tube being free at the left.

The end of the tube is now slipped over the nozzle of a stationary, perpendicular pipette; with the right hand the table spigot is turned on, and the normal solution flows upward into the pipette, the top of which is drawn into a fine opening. Any overflow simply falls into a saucer surrounding the pipette. When full the flow is cut off, the finger placed upon the upper vent, and the tube withdrawn from the lower nozzle; we have thus an exact measurement of 100 cubic centimeters.

The assay bottle containing the solution of nitrate of silver is next placed under the pipette, the finger is removed at the top, and the solution falls into the bottle.

The immediate result of the operation is the formation of chloride of silver (also nitrate of soda), which is a white, flocculent substance, rendering the liquid in the bottle opaque. Other compounds, as the nitrates of copper and lead, etc., may remain in the solution, none of which seriously interferes with the assay, and some not at all.

It being necessary that the white precipitate should not thus pervade the liquid, the bottle is placed in a machine known as the "agitator," which gives it a violent agitation. This can, of course, be done by hand, but since several assays are made at once, the aid of steam saves both labor and time. The agitation is continued four or five minutes, whereby the precipitates curdle and quickly subside.

The bottle is next carried to the blackboard table—an upright slab of slate of the full length—and at the back of the table is marked off into ten divisions and numbered. If there be more than one assay in process, each bottle is placed opposite its respective number.

The agitation having caused the chloride to settle as a dense white precipitate at the bottom of the bottle, the liquid (nitrate of soda) remains transparent, though sometimes colored by the alloying metals.

It is to be understood that the charge of normal solution from the pipette is calculated to precipitate exactly one gram of pure silver; but as there has probably been either more or less than the exact 1000 parts of fine silver in the original weight of 1.115, we have yet to ascertain whether the normal solution has performed the whole work of the precipitation, or (in event of the alloy being baser than we had supposed) whether the precipitation has been overdone, i. e., whether an excess of salt remains in the bottle.

Accordingly the bottle is charged by a small hand pipette with a measure of the "decimal solution" of salt (previously described). This solution is only one-tenth as strong as the normal solution, and the single dose is, in bulk, the one-hundredth part of the large pipette, so that one dose of decimal solution precipitates only the one-thousandth part of a gram, i. e., one milligram. If the normal solution was not sufficient to precipitate all the silver, there will, upon allowing the decimal dose to run gently down the inside of the bottle, be a white cloud formed upon the surface of the liquid, the density of this cloud varying with the amount of silver still in solution.

The assayer now holds the bottle to the eye level and judges by the appearance of the cloud, as nearly as possible, how many more decimal doses will be required to precipitate all the silver remaining in solution.

Suppose the assayer now decides that three additional doses will finish the work of precipitation. He accordingly so charges the bottle, noting the charge upon the slate. The bottle is agitated again, and when the liquid is cleared it is tried as before with a decimal dose of salt water. If the judgment and application of doses have been correct, only a delicate trace will appear on the surface. This proves the assay complete.

It may be that the operation of dosing and agitating will have to be repeated several times, the assayer each time adding to the record upon the slate; but the process is always the same until the final trace is reached.

As the density of the normal solution may vary from day to day, or during the day, with the temperature and from other causes, assays of pure silver are made as a daily test of the state of the solution—in other words, an assay is made of the normal solution by silver of known fineness.

This assay is known as the "proof," and by it all other assays are adjusted, when the normal solution is proved by it to be at variance. Suppose, for example, our "proof silver" to have been weighed at 1 004. If the normal solution were exactly correct, it would precipitate the 1000 and leave the 4 to be precipitated by decimal doses. But supposing the proof assay is found to require only three and one-half additional doses; this shows the normal solution too strong by half a thousandth—in other words, every assay should have recorded for it a half-decimal dose more. This correction is accordingly made for each assay.

In our example three doses were required to finish the precipitation, but our proof has shown that another half should be added in the record since the normal solution was by so much too strong. The result upon the slate will then be three and one-half, instead of three.

The fineness of the silver is then obtained by the following proportion:

Weight.		*Normal Solution.*	*Decimal Solution.*		*Fine Silver.*		*Required Fineness.*
1.115	:	1.000	+3½	: :	1,000	:	.900

showing the silver to have been .900 fine. For the sake of expedition, however, tables are in use for the determination of both weight and fineness.

It may be that the original weight of the alloy was not sufficient to contain 1000 parts of pure silver, and, consequently, when the decimal charge is added no trace of chloride appears, or the same result would ensue from the assayer having overdosed the bottle with the decimal solution during the "working." In such cases a decimal solution of nitrate of silver is used.

This is the "descending," while the working by salt is the "ascending" assay. As the latter forms a clearer liquor after shaking, and for other reasons, too, the ascending mode is more satisfactory. It is now apparent why the greater (1.115) instead of the next smaller weight (1.110) is selected, thus allowing the assayer what is called "working room." It is necessary that the assayer in the above operation be correct in his eye judgment of the decimal dose required, since the slightest overdose precludes the appearance of the trace after the next agitation, and requires him to work back with the opposite solution.

It is the custom at the mint to work the one-fourth of a thousandth in silver, though in the higher grades of fineness the results can be carried on to the tenth, if necessary.

It sometimes happens that silver contains alloys which render the liquor in the bottle so obscure that the judgment of the cloud density is impeded and the final trace hardly discernible. This annoyance may be removed by the tedious and unsatisfactory operation of filtering after each agitation. But a quicker and better method is sometimes resorted to here, which consists in using 250 milligrams (one-fourth of a gram) of the alloy and adding fine silver to make up the full gram for precipitation. The result is obtained by substraction of the fine silver and multiplication for the full gram. Sometimes 500 parts and sometimes 1000 parts of alloy are used.

When silver contains sufficient gold to pay for its extraction a regular gold assay is made. If the gold be in large proportion the alloy must be rolled very thin (for the humid assay) and boiled in a stronger acid, or the metal may be fused with cadmium (and treated as described in the article on gold assaying) before proceeding with the humid assay. Duplicate assays are always made, to guard against error in the assay process, and also to detect any want of homogeneity in the mass of silver.

In the assay of ingots, five melts with their duplicates constitute a full "set." To prevent confusion and error, the bottles are all numbered, in sets, from 1 to 10, and are carried from place to place in a port-flagon made to hold ten. The assayer reports to the melter and refiner the fineness of each melt, condemning those which vary too far from the legal standard.

A Magnetic Mountain.

In the Arabian tales a story is told about a magnetic mountain which attracts irresistibly all ships, and when they come near extracts every particle of iron from them, even to the nails. Such a mountain exists in reality, although not quite as dangerous in its activity as the one mentioned in the oriental fairy tale. This island of Bornholm, in the Baltic, belonging to Denmark, consists almost entirely of magnetite, and its magnetic influence is very well known to the navigators of those waters, and also much feared by them, not on account of the possibility of its extracting the nails from their ships, but besause of its influence on the magnetic needles, which makes the steering of a ship almost impossible. This influence is felt even at a distance of miles, and when this island is sighted all mariners on the Baltic discontinue steering their course by the needle, but turn to the well known lighthouses and other holds to direct their course. Between Bornholm and the mainland there is a bank of rock under water which is very dangerous to navigation; because of it being constantly submerged vessels have been frequently wrecked at that point. The magnetic influence of that ore bank is so powerful that a magnetic needle suspended freely in a boat over the bank will point down, and if not disturbed will remain in a perfectly perpendicular line.

Alabama Gold Mines.

Before the Alabama Industrial and Scientific Society lately T. H. Aldrich gave an account of the work in which he has lately been engaged in preparing to mine and mill the gold-bearing quartz veins of Hog mountain, in Tallapoosa county. This is a low-grade ore, but it can be mined and milled at a very small cost, and as the quantity is very great the proposed operations are to be on a large scale. In connection with this paper, the discussion brought out the fact that the working of similar low-grade ores has been very profitably carried on for about a year in the Idaho district, in Clay county, and Mr. Aldrich predicts that a number of gold mining plants will soon be in successful operations in the State. The recent reports of the State Geological Survey have shown that low-grade gold ores occur in large quantity at several localities in Alabama, and, since the success of the operations at Idaho has been fully demonstrated, the attention of capitalists has been directed to this inviting field.

Mining Summary.

CALIFORNIA.

Amador.

Republican: The Bellweather, which has been under bond for the past two years, and worked a portion of that time on a scale far short of what the claim would justify, was surrendered into the hands of the owner, S. W. Bright, last week. He at once bonded it again to Messrs. Hepburn and Knapp, who were connected with the former company. It is held out that a new company is to be organized to work it.

Ledger: On the 19th of June sinking was resumed in the South Spring Hill shaft and from 3 to 5 feet per day have been made daily since. The old shaft was down 900 feet with a sump. The company proposes to sink to 500 feet deeper before taking out and milling ore. Their first level and prospecting will be done after 200 feet depth has been attained. John R. Tregloan is superintendent. At the same time work is being prosecuted on the Median and Talisman properties, which are in the same group and are owned in the most part by the same owners, all of Boston.

Butte.

(Special Correspondence).—Butte county, one may say, commences with Oroville, which, in a business sense, is headquarters for a large mountain section, extending even into Plumas county. Oroville has railroad connection with the Pacific and Atlantic lines, and stage lines for every mountain section of Butte, Plumas and portions of Yuba county. Nothing has revived "pioneer days" to my mind so much as the income and outgo of its many stages.

Butte county has long been known as a gold producer. In the early '50s she poured out vast sums of gold, as every gulch, ravine and river within its boundaries paid fabulous wages per day. Later on these washings gave way to gravel bank and drift mining, the latter being the dead river channels. Some of these channels produced immensely.

For the geologist there is no part of California more interesting, as a study, than the northern sections of Butte. It has been the center of great volcanic action. Within the distance of fifty miles from Magalia there are over thirty distinct craters of extinct volcanoes. At some points these dead rivers are covered with lava flows 500 feet thick. In other parts can be traced various stratas of lava, then layers of gravel, and upon this again another stratum of lava, and so on for some half a dozen of each. The Mining Bureau contains a bone of a mastodon taken from one of these mines, which lay below 500 feet of lava. There are many of these dead rivers in Butte county, and why there should be great riches in one or a few, and nothing in others, hardly looks reasonable. Drifting in the old dead rivers, like every other class of mining, requires capital and pluck. From gravel, at this time, a vast sum could be realized monthly, were it not for the debris question. It was in Butte, near Magalia, in the gravel, where was found the 54-pound gold nugget, the largest ever discovered in California.

In quartz mining Butte has been behind most other counties, yet there are quartz ledges, as lava does not cover the country like a blanket. About Forbestown there are a number of lodes. The mill of prominence of this section is the Gold Bank, having forty stamps, with all modern equipments, an up-to-date mill. About Enterprise are several smaller mills—in all, some fifteen or twenty stamps. There are several in other sections. The Banner quartz mine, some five miles from Oroville, was at one time a very large gold producer, and should be again with development and depth. The lack of development of the quartz lodes of Butte is really more prominent than in many of the mining counties of California.

ALMARIN B. PAUL, M. E.

Calaveras.

Chronicle: At the Eclipse gravel mine on Tunnel ridge an upraise has been made and the gravel encountered was it the bottom of the channel on the east rim. Present developments show the gravel deposit to be quite extensive and of a good quality, averaging $3 per carload. The gravel can be mined and milled for 50 cents per ton, and the capacity of the mill is 150 tons per twenty-four hours. There are twenty men employed under the superintendency of F. H. Hall.

El Dorado.

Nugget: Development work is being pushed ahead at the Bright Hope mine under the supervision of W. R. Wallace.

The Pocahontas mine has been purchased by J. F. Webb and P. A. Fusz, the latter president of the Grandite Mountain Mining Company of Montana. The first payment of $10,000 was made last week. The old workings are now down 400 feet and there are some tunnels. The present owners are cleaning out the old Burlingham workings. A large force of men will be employed and a mill erected soon.

Kern.

Randsburg *Miner*: C. C. Lane, superintendent of the Rand Mining Company, reports that for the month of May the mine product of ore was 113 tons, 370 pounds, which milled gave $5,170.70. The total mine expenses was $2820.22. Month's profit $2350 48. For the month of June the ore milled was 365 tons, 1536 pounds. Bullion produced 933 ounces, estimated value, $13,841.44. Total expenses of mining, milling, etc., $5926.51. Net profit for June, $7914.93.

The Wedge shaft has reached a depth of 335 feet, with the ledge looking as well as ever.

Twelve men are working on the Minnehaha, sinking a shaft and driving a tunnel.

Considerable excitement has resulted from the discovery of good placer ground on the flat between Randsburg and Goler. Enough is already know of the richness of the ground to insure a good field, for good wages can be made with the dry washer all over the placers from the surface of the ground, and many holes will be sunk that will pay to bedrock where the the best is to be found.

Nevada.

(Special Correspondence). —There are quite a few men here who are alive to the situation. They are joining forces and opening properties for the market. Capitalists are always ready to take up a developed mine, and Nevada county is alive in every direction, with the opening of new and rehabilitating of old mines.

On the Tomboy, three miles north of town, the shaft has reached 50 feet on a 16-inch ledge of rich ore, with a good percentage of high-grade sulphurets. A drift has been started on the 50-foot level. The property is owned by Hitchcock, Towle & Cleveland.

On the Searles, two and one-half miles from town, the shaft is down 40 feet, at which point the ledge is 18 inches. A mill test of the ore shows it to be very fair grade, such as will warrant the continuation of work, which the company will push to great depth. There are two claims—600x1500—in the property. It is owned by Buffington, Kirkham Bros., Cooper & Searles.

The Cadmus, one mile from town, has reached a depth of 430 feet, and the south drift on the ledge is 100 feet. The ledge is 2 feet and a good grade of ore. The property is owned by San Francisco people.

Hall & English began to-day to sink to greater depth the 50-foot shaft on the Bismarck. The ledge is from 18 to 24 inches and assays $12.

The Pioneer Reduction Works are doing a thriving business. Their assay office turns out considerable work, and the great smoke-stack shows that the fires are never dead, either by night or by day.

At the Mulligan Ranch gravel mine they have reached 600 feet with an incline shaft. The company expects to reach the channel within 200 feet. Their drift on the rim is 50 feet. The property is owned by Poolman & Hastings, and is near the Harmony and Delaware, both steady and rich producers.

The author of the saying, "What's the matter with the Father Lode of Nevada county?" is receiving compliments at all hands from mining men and newspapers, both, since his saying was first printed in the MINING AND SCIENTIFIC PRESS. There is more serious thought to this than one might at first accredit to it. The origin of the phrase rests with Fred Zeitler, superintendent of the Champion mine, near Nevada City.

Nevada City, July 12, '97.

(Special Correspondence). —The new life and activity displayed in mining in and about Grass Valley are bringing about an agreeable change in the prosperity of this city. New prospects are being developed, old and seemingly almost forgotten mines that were abandoned years ago at water level, are being reopened, capital is finding its way hither from the far East as well as from immediate home quarters, and from a hundred hills resounds the hum of the electric wheel and the dropping stamp.

The Omaha Consolidated (a corporation) has purchased 1300 feet adjoining the Omaha and Lone Jack. The entire property now comprises 4000x600 feet. The new shaft on the recently acquired property is 50 feet. The new hoisting works will be completed in about ten days, after which this shaft will be continued to a depth of 1700 feet. The shaft is on the vein, which will average 12 inches on a good grade of ore. The Omaha property has for years been milling $30 ore and paying good dividends.

The shaft on the Bullion has reached a depth of 840 feet. Levels at this point are run both way. The south drift is 140 feet, and at 400 feet it is expected to cut the old Irone vein, which (over twenty years ago) was very rich. The present works will be 300 feet lower than the old workings. Superintendent Mainhart is driving the work rapidly and expects ere long to have a richly paying property. The property is owned by Sacramento and San Francisco people. It comprises four claims.

The Diamond mine, situated between the Bullion and Osborn Hill, has been bonded to San Francisco parties, the principal among them being Mr. Widber, the City Treasurer. This property was abandoned at 200 feet over twenty years ago. The ore at that time was very rich, but at water level work ceased. Active development work will be started within a few weeks.

The Orleans (a San Francisco corporation formed by four people) is doing extensive development work. There are five shafts, the deepest being 800 feet, all averaging 500 feet. All the shafts are on the ledge, which has averaged 12 inches of high-grade rock. There is a 5-stamp mill used only for test work in the development of the property. This mine was opened in the early fifties and was very rich, but when the hard bar was reached, work ceased. The present shaft work went through the hard bar at the 700, where the ledge pitches from the wall at 32 degrees. The chute of rock is just beginning to be opened and the future of a great mine is assured. C. A. Brockington is the superintendent and co-owner. The Orleans is one mile southeast of town and adjoins the Empire on the south. J. F. L.

Grass Valley, July 10, '97.

Placer.

Record-Union: Near Sunny South on the Eureka, Felix Chappellet and his company have run a tunnel 2,100 feet and are now raising to strike the channel.

At the Centerville mine the gravel has been worked over 500 feet wide, and rim rock has not yet been encountered. Thus far the material is hauled out of the tunnel to the mill by horses, by the company is preparing to put in an electric plant to transport the gravel and light the town and mine.

The Sunny South, owned by the Hidden Treasure Company, has been pretty well worked out, though there are fifteen men working who have the mine under lease.

The Drummond mine, owned by C. F. Reed of Auburn, has been proven to have rich rock, and, to more systematically open it, a tunnel was started, and has been extended 600 feet. It is expected to tap the ledge in 60 feet farther. Mr. Reed has bonded the mine to Mr. Wiltsee, who will open the property on an extensive scale if the tunnel developments are satisfactory.

The Mayflower mine has a tunnel two miles long and a 20-stamp mill, which crushes 200 tons of gravel per day. It has paid regular dividends for years, and has levied no assessments in all that time. There are about seventy-five men employed there now. At present an upraise is being made in anticipation of finding an upper and unworked channel.

The Pioneer quartz mine, owned by a Boston company, has been worked by them for two years. The croppings of the ledge run down a steep mountain side and the ledge has been worked by a series of tunnels, one of which penetrates the hill 3000 feet. The ledge averages from 2 to 12 feet in width. There is a 20-stamp mill on the property. The company employs from thirty to seventy-five men. Jerry Sullivan is superintendent. Quite a rich strike has been recently reported in the mine.

The Golden River or Red Point drift mine at Pioneer was started by a French company with C. F. Hoffman as superintendent, about 1895. A tunnel was run 1800 feet before the channel was encountered. The same tunnel has been extended on the channel until it is now two miles long. The channel varies from 50 to 400 feet in width, averaging about 150 feet. The gravel is worked from 2 to 3 feet high. When Mr. Hoffman accepted a position to go to Siberia, J. A. Ferguson was appointed superintendent. There are sixty men employed at the mine.

Sentinel: A syndicate of English capitalists has purchased the Miner's Ditch property and claims of the Cedar Creek Company, owned by Gould & Doolittle and others, at Gold Run. J. E. Doolittle has been named for superintendent.

Supt. Fred S. Roumage, of the Horseshoe Bar Mining Company, states that they have reached bedrock at 36¼ feet. The gravel shows pay all the way down and the elevator is working well. More than forty men are employed.

In the Goding & Co. gravel claim at You Bet, while the miners were engaged in making an upraise from the 250 level, they cut into the channel and struck some fine-looking gravel.

L. E. Taylor and E. Atwell of Colfax are developing their placer mine near Emigrant Gap.

The Cash Rock Company are making extensive preparations to work the gravel in the river bed below Todd's valley. Electrical machinery will be used. A large force of men are employed building ditches and flumes and erecting mine buildings.

Plumas.

Independent: The Garnett Company has struck a channel of gravel in the lower tunnel of the North American mine on Gibsonville slope. Before the purchase of these properties by the present owners a tunnel 900 feet in length had been driven into the North American claim. The Garnett Company made an upraise of 30 feet therein and started a tunnel which reached good paying gravel when in 200 feet from the starting point.

Some months ago E. C. Robinson of this city bonded his mine in Granite basin, Plumas county, to a Chicago company for $100,000. The new owners put up a mill and drove the shaft down for some distance. The mill was started about twelve days ago, and the yield of gold thus far has been much better than was expected. So well pleased is the management that a new hoisting works will be erected and machine drills put into the mine.

At Granite Basin, Mr. Peppin has bonded the Plumas Quartz and Olive Quick extension of the Colwell ledge to Robert Blackwood of Minneapolis for $20,000. A tunnel 450 feet long taps the ledge, which is from 4 to 5 feet in thickness, with backs 50 feet in depth. Work upon the property is to begin at an early day.

The Robinson Company has a 15-stamp mill; at present five stamps only are in motion. Twenty men are employed and the company is arranging matters so that all the stamps in the mill will be kept at work.

Jolly & See are running five stamps on ore from a 5-foot ledge in the lower level of their mine, that is yielding good returns.

Shinn & Perkins are hauling ore from the Christie property, recently bonded to the Perkins mill, for reduction.

National-Bulletin: Dr. Welch has suspended hydraulic mining at the Joseph mine on Grizzly creek, owing to failure of the water supply. Late in the spring under adverse circumstance and at heavy expense the Doctor got machinery and supplies at the mine and fitted it up to work. The water season this year has been unusually short. The result of the cleanup, however, is very good.

At the Plumas Imperial hydraulic mine the mouth of the ancient channel formed by the breakaway into Rock creek was filled with a false bedrock, broken up and out of place, thus for quite a distance destroying what otherwise would have been a well-defined, permanent channel. During the latter part of June, this permanent channel was broken into and found to be entirely different in the character of the gravel from that previously mined, as well as in the nature of the bedrock. It will be necessary for Mr. Hazzard to run a bedrock tunnel to make a sluiceway under the mass of false bedrock near the break of the channel into Rock creek. To run this tunnel will require nearly a year's time.

G. P. Cornell has made arrangements whereby he will start work on the Arcadian mine.

Important development has been made in the Phœnix mine at the head of North canyon, near Greenville, owned by Firmstone & Richards. A 6-foot ledge of rich milling ore has been opened up.

Shasta.

Free Press: The London Gold Tunnel Company have awarded a contract to drive their tunnel at Mule mountain 265 feet and to fully equip the mine with machinery, drills, cars, tracks, etc., and to erect extra buildings, all for the sum of $10,000, the work to be completed before Nov. 1st, '96.

Keswick *Miner*: The Mountain Copper Company is putting in $4000 worth of machinery for a five-ton ice plant. They will also have a cold storage room 17x19 feet and 12 feet high. The company expects to erect forty new cottages for their employes. Nine thousand tons of copper ore in kilns three-quarters of a mile long is being roasted. The ore will burn three weeks before it is ready for the smelter. Yet this quantity of ore is only one-third of what is being treated about the smelters.

Sierra.

(Special Correspondence).—The El Dorado, nearly Alleghany, has two tunnels, one 300 ft. and the lower 400 ft., on a 3-foot ledge that averages $15 per ton; no sulphurets are saved. There is a stamp mill in operation. The property is owned by Lewis and the Fessler estate.

The W. F. Hanley & Co. gravel property has a main tunnel 2400 ft. which strikes the channel at 1500 ft. Additional tunnels amounting to 2400 ft. are all in pay gravel, which runs from 15 inches to 50 ft., and averages $1.50 per car by the sluicing method.

The Lucky Dog gravel property, 1½ miles west of town, taps the channel at 800 ft. The channel is 60 ft. wide. A mill will be erected soon. There are three additional properties, the Nellie Bly, the Page and the Sonntag, making a total of nearly 700 acres.

The South Fork uses a locomotive to haul its gravel, drawing 10 cars at a load. The North Fork Company uses mules, hauling 15 cars in a train.

The Young America had several shafts fifteen years ago, but water interfered. The gravel paid $8 to the man. The company is now running a bedrock tunnel which will reach the channel at 1200 ft. There are 250 acres in the claim. B. F. Derickson is the principal owner.

The Hope quartz mine, owned by a corporation known as the Minnesota Development Company, have a tunnel on the ledge at the north end 1000 ft. long, and on the south end the tunnel is 350 ft. The tunnels are 6½ ft. in the clear and provided with air piping. The sulphurets occur in large bunches and run $250 per ton. J. O. Jones is superintendent.

The Mabel Mertz gravel mine has a tunnel 526 ft. and is at the rim of the channel, and has been in pay gravel for 100 feet. There are 320 acres in the property.

Forest, July 10, '97.

Siskiyou.

Reporter: At Sawyer's Bar, as the result of a fifteen-ton crushing at the Jumbo, men have been put to work cutting timbers for a tramway.

Peters & Frazier have sunk a shaft 50 feet on their claim and report an encouraging strike.

The Gold Hill mine, one of the richest gravel mines on the river, has closed down for the season.

News: Wm. Chamberlin of the Mabel mine intends to start a force of men to work next week taking out ore.

The Gold Run mine, under the supervision of Danenbrink Bros., one of the best equipped and best managed mining properties in Siskiyou county, is a steady producer, with considerable good ore in sight.

Journal: Never before in the history of Siskiyou have the prospects for extensive mining operations been so bright as at present. Outside capital has been coming in of late, and in nearly every instance the investments have been successful, thereby encouraging others to do likewise. During the past year several immense plants have been introduced in the county, and their successful operation is causing the owners to enlarge these plants and introduce more extensive machinery. The output of gold last year was a little less than $1,000,000, but will probably be considerably larger this year. The rich mines of this county are not confined to one section, but are scattered all over the western portion of Siskiyou. They are found on the Klamath river, Salmon river, in Quartz valley, Oro Fino and numerous other sections. Quartz mining has also made a great stride during the past year, several mills having been erected, as well as numerous arrastras. At the present time there are more miners employed in Siskiyou than any other county in the State, the great majority of them working their own claims and putting the money they take out into circulation at home.

The owners of the Katie May mine, on Greenhorn, expect to take out a large amount of quartz. They have been running a tunnel the past few months, and will tap the ledge much lower down.

LeMay & Utne have again commenced work on their ledge near Yreka.

Trinity.

Journal: On East Fork all the old mines are being worked and new ones are being opened up and developed.

At the Yellowstone Mr. Skinner is taking out rock and crushing ore.

At the Enterprise and Lone Jack the company are running both mill and mine full blast.

At the North Star mine a force of men are at work developing the property and taking out ore. The mill is running steadily.

One of the most prominent of the new loca-

tions is that of Simpson, Given, Reed and Zuella. They have a 2 foot ledge of high-grade ore at the head of Newman gulch.

Hippler and Brown are doing development work on their locations and are showing up a good property.

Tuolumne.

Union-Democrat: At the Rawhide the shaft will reach the 1200-foot mark within a month. A station has been cut out at the 1100 level and drifting north and south commenced. The various underground workings continue to look fine, but the preponderance of rock reduced still comes from the stopes between the 10 and 9 and 9 and 8. The vein holds steadily at about 30 feet in width, with a splendid ore body. The forty stamps of the mill are crushing rock at the rate of 3000 tons per month.

At the App the main shaft is down to the 1000. Sinking will continue 50 feet more for a sump and then discontinued until stations are cut out and levels run. The shaft will be driven for the 1100 this summer. Rock for the mill of twenty stamps comes principally from the 700 and 800 levels, and is being reduced at the rate of 2000 tons monthly.

The Alabama is confining all work to sinking the new compartment shaft, which has reached a depth of 280 feet.

The Kanaka is worked by tunnels, of which there are six. In the lower one a shaft is being driven down. In four faces the rock is very good. The ten stamps of the mill are kept constantly at work. The ledges have a width of about 5 feet throughout.

Superintendent Chas. Shafer has a small force on the Punch Bowl, and the incline is now down about 185 feet and water has been struck; the ground is softening up. As the mine is where Table mountain is quite narrow, probably less than 100 feet more will break through the rim into the main channel.

At the Patterson prospecting is being done mostly on new ground north of the new workings. C. S. Long will visit the property during the week, when the selection of a power and mill location will be made.

West and Ricketts have a bond on the old Easton mine, near Cherokee, and have fourteen men at work. The property has shown plenty of good rock in the past.

The Grapevine mine, several months ago bonded to the Tuolumne Exploration and Development Co. by Charles Scofield, is showing up well, and next week a force of men will be put on.

NEVADA.

Eureka *Sentinel*: In White Pine work goes on in the Star and Grey Eagle mines as fast as circumstances will allow.

The North Mountain Company at Egan canyon is awaiting the arrival of the elevators. As soon as these are in place a force of men will be put to work.

The 5-stamp mill at the Ben Hur mine, Granite district, Steptoe valley, is in operation several days. The force in the mine taking out ore has been increased and a favorable showing is expected.

Pioche *Record*: The old leaching tailings from the R. & E. dump are being hauled to the Summit mill. They are used to facilitate percolation in the leaching now going on there of second grade Yuba ores. A contract has been let to haul over some 7000 tons.

Tuscarora *Times-Review*: Stamps are once more dropping in the Navajo mill after a long idleness, and will until cold weather puts a stop to it. At present it is being run as a concentrator, on some ore belonging to leasers, after which it will be worked on Nevada Queen ore and a lot of gold ore. Sperintendent McMahan states that a force of men will probably be put to work sufficient to keep things moving until cold weather. Large quantities of concentrating ore are known to exist in the Nevada Queen and Commonwealth and operations in those old time producers will undoubtedly result in some finds of high-grade ore such as has characterized them in the past, when silver was shipped by the ton from them. It is the belief of mining men that Tuscarora has a future if only depth is attained. No work has ever been done below 500 feet, though it is well known the ledges still go down.

OREGON.

Medford *Mail*: The Elk creek mining enthusiasm has revived somewhat this week, and there are a goodly number of people in the valley who are still pinning their faith to that country.

Grants Pass *Observer*: Conservative mining men who have visited the Elk creek district say that they would not be surprised if many good pay mines were found in that section. The surface showing would certainly indicate this.

Snowgoose Bros. & Treffren have their steam shovel and pumping plant in successful operation. The shovel and elevating feature of the plant are quite novel and worked after the manner of a hoist, delivering the gravel direct to an elevated sluice.

G. Dean will fit up a hydraulic mine on Pleasant creek.

D. Younglove, who owns placer mines on Louse creek, will soon commence the survey of a long ditch from Evans creek to his mines.

Blalock Bros. have ordered 1000 feet of 11-inch hydraulic pipe for their placer mine on upper Graves creek.

At Mount Reuben R. Jones has bonded his group of mines to Senator Jones of Nevada for $50,000, $3000 down.

C. D. Crane has secured a forty days option on the Oro Fino mine on Jump-off-Joe creek, and will commence work with five men immediately to sink the winze 70 feet deeper.

WASHINGTON.

Spokesman-Review: At Myers Falls the Niagara mine is now working a full force of six men, and the shaft is down over 70 feet. At this time the work is progressing in a full breast of ore at the bottom of the shaft.

D. W. Henley has purchased a half interest in the Spokane and Standard group of mines on Palmer mountain, in Okanogan county. The intention is to equip the stamp mill with three or four vanners as soon as possible to save the tailings for other treatment, and to work the mill day and night. Work will be started sinking on the 2-foot ledge right away, while simultaneously with the sinking a tunnel, to tap the ledge at a depth of about 300 feet, will be started for the purpose of draining the mine. As soon as the deal is closed an order will be placed for new hoisting and pumping machinery, and an air compressor plant will be put in.

BRITISH COLUMBIA.

(Special Correspondence).—Matters are improving in the mining world this week, as far as the coast proper is concerned. Trial smelter shipments have been made from several mines close to the mercantile centers, and have proven satisfactory.

The Blue Bell mine, on Frederic's Arm, a few miles north of Vancouver by water, has made its first shipment. The Blue Bell is an immense body of smelting ore, the vein being over 90 feet wide. An American expert, who recently examined the property, offered $25,000 for the prospect, which was refused.

The Providence claim, on Harrison lake, near the city of New Westminster, has made two shipments of ore. The last shipment returned $28 gross for sixty-five tons, which will pay well.

Claims are being worked on Lynn creek, a few miles across Burrard Inlet, Vancouver's harbor and opposite the city.

On Cayoosh creek, Lillooet district, the crusher for the Golden Cache mines is still in process of erection. Crushing will commence in less than sixty days.

At the Tinhorn, Fairview camp, Okanogan, thirty tons a day are being dumped. There are now some 700 or 800 feet of open cuts, tunnels and winze in this mine. Four tunnels are to be driven in the mountains. GOODMAN.

Vancouver, B. C., July 10th, '97.

The following are returns for 1897 up to July 2:

ORE EXPORTED.

	Tons.
From Slocan via Kaslo	12,651¾
From Slocan via Nakusp	4,080
From Rossland via Northport	8,951¾
From Rossland via Nelson	52
Total	25,745½

VALUES.

Through Nelson custom house	$1,405,231.40
Through Revelstoke (Nakusp)	424,836.65
Total value	$1,830,468.05
Average value per ton	71.083

PRODUCE OF SMELTERS.

	Tons.
Nelson (Hall mines) matte	786½
Trail smelter matte	3,265¼
Total	4,051¾

VALUES.

Value of smelter produce	$1,906,465.87
Total value of ore and matte exported	3,736,533.92

RETURNS FOR THE WEEK VIA NAKUSP.

	Tons.
Slocan Star to Omaha	880
Idaho to Omaha	149
Mountain Chief to Omaha	20
Reco to Omaha	40
Enterprise to Omaha	120
Monitor to Omaha	30
Hustler to Omaha	18½
Total	1,247½

VALUES.

Value of week's shipments via Nakusp	$117,917.00
Average value per ton	94.522

RETURNS FOR THE WEEK VIA KASLO.

	Tons.
Ruth to Everett	130
Ruth to Pueblo, Col	45
Whitewater to Everett	15
Washington to Omaha	32
Payne mine to Pueblo, Col	200
Sunset to Aurora	7½
Apax to Aurora	15
Antoine to Aurora	16¾
Slocan Boy to Aurora	15
Black Diamond to Pueblo	30½
Noble Five to Pueblo	33
Total	448¾

VALUES.

Value of week's shipments via Kaslo	$36,112.00
Average value per ton	80.472

RETURNS FOR THE WEEK VIA NORTHPORT.

	Tons.
Le Roi to Everett	466
Le Roi to Tacoma	320
Total	786

MATTE AND BULLION.

	Tons.
Trail smelter (matte)	159
Hall mines smelter	20
Hall mines (bullion)	150
Total	329

VALUE.

Value of matte and bullion	$182,165.30

IDAHO.

Spokesman-Review: Ever since the strike five years ago the mining industry of the Cœur d'Alenes has been under a cloud. A new era is now dawning. It probably began immediately after the Tiger-Poorman mills burned, on the 17th of March last year. The old ruins were not done smoking until the work of clearing the ground for a new structure was begun. The confidence of the Tiger-Poorman directors commanded the attention of other men of means, and the new mill was not finished before a controlling interest in the Helena and Frisco had been sold on a basis of about $1,000,000 for the mine, and work was suspended while mine and mill were put in shape to work on a much greater scale than ever. That work is now almost completed, at a cost for labor alone of more than $60,000, while the material, machinery and incidentals have amounted to at least twice as much more. Now, with a milling capacity of 800 tons per day, the mine has ore enough blocked out to keep the mill busy for three years. During that time, too, the Standard had completed a new tunnel half a mile long, which, together with the accessories and the improvements to the mill, had cost the company $100,000. In a smaller way, the owners of the Formosa had spent $10,000 in putting a mill on their property. This year five companies have been incorporated, and all have commenced work on their properties.

MONTANA.

Inter-Mountain: At the annual meeting of the Parrot Company directors it was decided to sink the Parrot shaft from the 1000 to the 1300-foot level and the work will be commenced at an early date. It was also decided to begin work on the Little Minah claim south of the Mountain Con. hoist. It is believed that by sinking to a depth of about 800 or 900 feet the property may be made a valuable producer.

Increased confidence in the ore deposits of Butte is shown by both the Parrot and Anaconda Companies, and in a few months the latter company will have one shaft near the 1800 foot mark.

There is a great deal of activity around the Norris district this season. The Revenue people have fifteen men employed on the Keller property, upon which they expect to do a great deal of work.

The Little Kid mine, near Bald mountain, was closed down owing to the breaking down of the roller mill. It is understood that the Minneapolis company operating the mine will at once begin the erection of a large mill to treat the ore.

The Rough and Ready 5-stamp mill was started up this week on ore from the mine. The company has a 4-foot body of fair grade ore in sight.

The new mill for the Mayflower group of mines, near Norris, has been ordered in Denver and will be in operation within ninety days.

UTAH.

Salt Lake *Tribune*: At Park City, now that the Marsac mill has started up, it will continue to run steadily. When the mill closed down last March but ten stamps were working, now thirty stamps are pounding the ore. The Daly mine, which supplies the Marsac with ore, has abundance of ore in the workings.

COLORADO.

Denver *Republican*: At Cripple Creek Anstie & Von Hemert have opened the C. O. D. chute in the fifth level at 400 feet depth, and are breaking rich ore in driving the work. A representative of the French stockholders is now in camp making an examination on which the future condition of the mine will be based. The lessees have been making steady production with a small force for the four months of their lease, and have established that the C. O. D. was not a worked-out mine when the directors ordered the work to stop.

Better ore than the Favorite has taken out for months is now being broken in the 200-foot level from the company's shaft. The shaft has been straightened and retimbered and now has a depth of 380 feet.

The Proper Company has found sufficient encouragement in the new shaft sunk on Globe hill to warrant it in putting on a steam plant and pushing the shaft down from its present depth of 50 feet.

The Newell tunnel into Grouse mountain has reached 340 feet and is nearing the big dyke along which values are expected. Several small stringers have been cut in its progress.

A Leadville syndicate is making an examination of the Moose on Raven hill, with a view to taking hold of it under a long-time lease. Much prospecting is now in progress on both sides of Eclipse gulch from the Moose to the Sheriff.

The station for the eighth level on the Buena Vista is about completed and a crosscut will be started in a few days for the vein, 75 feet away. The Lee shaft will rest at its present depth of 600 feet. It will require another month for the Isabella Company to gain benefit from the new level, but after that the mine should be again running at the usual production. Last month the output was 1000 tons of the usual grades.

Work on the Anaconda was suspended on the 1st inst., but will be resumed under the management of N. H. Cone, with J. Mullen as superintendent.

The Brakey & Conley lease on the El Reno at 80 feet has a vein 20 inches wide that shows free gold in abundance.

The lease of Caley & Reese on the Santa Rita has expired and the company will take charge of the property. C. Conant will be superintendent. The Santa Rita shaft is now 250 feet deep and the company will resume sinking at once.

The Tom Collins lease on the west end of the Gold King on Gold hill, south of the Anchoria-Leland, is looking well, and the property will soon be in shape to make heavy production.

The ore shipped from the Union Company's mine, the Orpha May, during the week closed was five broad gauge cars, four of which contained smelting ore, the fifth being a mill grade.

At St. Elmo the St. Elmo Recovery Company are pushing their works, with W. A. Stevens as manager, and will shortly have their cyanide plant in operation, with a certainty of 5000 tons of tailings from the Romley and Pawnee mills, which are settled in a dam just above the mill site.

The Quincy Mining Company have leased their claims to parties who will put up a mill on the claims and work the property.

H. M. Hogg, owner of the H. M. H. group on upper Bear creek, has recently let a contract for the erection of a 5-stamp mill.

In the next few days the Pulaski mill, Bridal Veil basin, will be in operation, treating ore from the Pulaski group of mines, owned by the Pulaski Mining Company, composed of Chicago capitalists.

At Telluride the Columbia-Menona 30-stamp mill is now turning out from ten to fifteen tons of concentrates daily, which is yielding very satisfactory returns at the smelters. The product is carrying gold, silver and lead. There are over 100 men employed in and around the mine and mill. Superintendent A. H. Brown is pushing every kind of work.

The owners of the Enterprise mine at Red Mountain, who have had a force of men developing the property all the past winter, commenced shipments from it a few days ago to the smelters.

On the Tomboy the mill is treating from 150 to 175 tons of ore daily, which on an average runs $20 on the plates by amalgamation and in the concentrates, and yields from 140 to 150 tons of tailings. Superintendent H. B. Adsit is having an 80 H. P. boiler and engine installed to supply power for a large compound duplex air compressor. After this machinery has been put in place the work of driving east and west drifts from the intersection of the mill tunnel crosscut, which recently cut the Tomboy lead 450 feet below the lowest of the upper workings, will be expedited, and the immense areas of ore between the intersection and the upper workings blocked out. The plant recently erected by J. W. Farwell below the Tomboy mill, for the treatment of the tailings coming from this mill, is about ready to be put in operation. The tailings assay from $4 to $7.50 in gold per ton.

On the Occidental mine, under lease and bond to Mr. Farwell, a force of fifteen men is engaged in exploitation work.

At Leadville at the present time there is a great deal of mining being done by lessees. The leasing system has been a boon to the camp, and especially so during the past few years, since silver fell so. In many cases where owners, as companies, have been unable to work their properties lessees have conducted developments, and have in most cases made a good living out of the work and in many instances have made a snug little sum out of it.

On the Leadville & Chicago Gold Mining Company's property sinking is to be commenced in a few days. The shaft on this property is already down some 200 feet and will be sunk to whatever depth is necessary.

It is understood that just as soon as the down-town pumps get well under way in their drainage work the Weber shaft will be started up and the shaft sent down to the contact.

At Ouray shipments of ore in car lots during the month of June amounted to 175 cars.

The U. S. is being worked by T. F. Walsh & Co., and ore has been sent down daily for shipment.

The Imogene basin is turning out its proportion of rich ore, and the average number of cars has run up to fifteen per week.

The Guston is shipping fifteen cars per week to the smelter.

The Monument mine, near Camp Bird, which is being operated by Dr. Henderson and partners, has struck a good pay streak of gray copper and brittle silver.

In Gilpin county J. Collins has taken a lease and bond on the Center claim, in Illinois Central district. The shaft has been unwatered, cleaned out and retimbered to a depth of 50 feet. The bottom shows a 5-foot vein, with considerable iron streaks in it.

At the Sleepy Hollow mine sinking was stopped this week at a depth of 800 feet, a lift of 100 feet having been sunk on the last contract. Drifts have been started east and west at that depth, the bottom of the shaft showing 18 inches of crevice matter, from which shipments were made while sinking. This mine ships about forty tons of ore a day, and is giving employment to about forty men. Leasers are working in the upper levels.

H. P. Lowe of Denver, who has sold the Topeka group of mines to Eastern parties for $160,000, is making arrangements for more extensive operations on these properties.

The Blair Gold Mining Company is operating the Blair property, in Lake district, and have eight men at work on development. The shaft shows improvement as depth is gained, and they have also opened up a 2-foot smelting pay streak of ore in driving the east 100-foot level.

Sinking operations were commenced last week at the Nugget mine, in Illinois Central district. The depth at that time was 130 feet, and the company intends to sink 300 feet deeper.

NEW MEXICO.

Denver *Republican*: In the Cochiti district outside of the six or eight big shippers, who send out nothing less than $40 ore, the miners of that district complain greatly over the lack of milling facilities.

A number of new and important mineral finds are reported, the most noteworthy being in the Lone Star, owned by Denver and Telluride parties, where in running an upraise they blocked out a solid body of about 400 tons of ore.

The Washington mine largely increased its working force yesterday and is to vie with the Lone Star as the heaviest shipper in camp.

In the Albermarle the main shaft is down 125 feet with numerous drifts and crosscuts. This is the property on which Howell Hines, the Cleveland, O., millionaire, has a bond for $125,000, which expires next month. He will certainly take the mine, and it is expected then that the Chociti district will not long be without a big mill.

In Grant county all the camps are flourishing. Both the lode and placer claims are being actively worked and the producers of lead are especially active now since it is pretty well understood that Congress is going to raise the duty 1½ cents per pound.

At Hopewell work has begun on the Red Jacket and Mineral Point tunnels. The new cyanide plant will get the bulk of its ores for treatment from these two mines.

Two shifts now push the work on the Iron Mountain tunnel. Superintendent Pace aims to cut a 4-foot surface vein at about 250 feet depth.

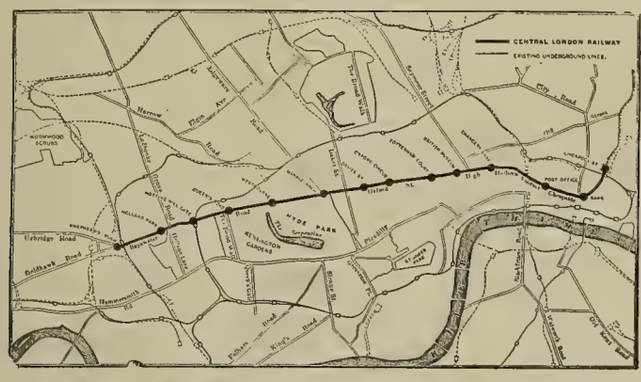
The Freeport, Cinnabar, Buckhorn and other tunnels are finding first-class ore and this has given a stimulus to the whole camp.

Electrical Progress.

American Electrical Equipment in London.

The most recent addition to the system of underground railways with which London is provided and the most important of all the present undertakings of a similar character in the world—the Central London Railway (underground) has an especial interest for Americans, due to the fact that the entire system of electrical equipment will be American. With the exception of the elevators the entire electrical contract has been assumed by the British Thomson Houston Co., Ltd., representing in Great Britain the General Electric Co. of Schenectady, while the elevator contract has been secured by F. J. Sprague of New York.

The road, laid in two deep subway tunnels, stretches through the very center of the great commercial district of the city and follows the line of greatest traffic in London. At this point crossing is a perilous task, and the railroad company is constructing a series of subways immediately below the surface for the convenience of pedestrians and as approaches to its own station below. From this central depot will radiate five underground tunnels, some eighty-five feet below the surface, each feeding a separate and



MAP SHOWING THE CENTRAL LONDON RAILWAY, (UNDERGROUND).

equally populous district of the great agglomeration known as London. The construction of the road itself has been carried out by the Electric Traction Company, which has also financed it. It is this company that has made the contracts with the British Thomson Houston Company, and which will turn over the road fully equipped and in working order to the Central London Underground Railway Co. ready for operation. Three years after the necessary parliamentary act was passed in 1893, the actual work of building was begun. Vertical shafts were driven at six different points to a depth of between 60 and 70 feet, and the tunneling was begun in four tunnels at once, two running in each direction from the shaft. At each of the stations were driven two shafts 23 feet in diameter and 87 feet deep, and one 18 feet in diameter and 76 feet deep—the two former containing two ingress and two exit elevators, and the smaller two spiral stairways, one for ascending, the other for descending passengers. The shafts are built up of cast-iron plates 1⅛ inch thick and 4½ inches in the flanges. All crevices in the back of the plates are filled with hydraulic lime grout injected under pressure. The glazed white brick passages leading from the bottom of the shafts to the stations are 8 feet 3 inches wide on the entrance side. On the exit side, where crowds might collect in front of the elevators, they are 13 feet wide. At the stations the widened tunnel is 21 feet in diameter and 375 feet long. The main tunnels are each 11 feet 6 inches in diameter, and are practically steel tubes driven forward through the clay. The plates used to line these tunnels are ⅜-inch thick, with flanges 4 inches deep. The shield for driving the small tunnels was 12 feet 8 inches in diameter and was pushed forward by six hydraulic rams giving a pressure of 230 tons. For driving the station tunnels the shield was 23 feet 8 inches in diameter and was pushed forward by twenty-two rams giving pressure of 840 tons.

Each tunnel will contain one track, one tunnel carrying the east-bound trains, the other the west-bound trains.

In laying the road bed the best modern steam railway practice has been followed. The steel rails weigh 100 pounds to the yard and are laid upon heavy cross ties. The system of contact will be the third rail, with the contact rail placed between the service rails of the track and insulated. The conductors will be fed at intervals from a copper feeder cable. This feeding will be controlled from the signal boxes and the operator will be able to cut out any section of the line when necessary. This method of contact is similar to that employed so successfully by the General Electric Co. in the installations on the East Weymouth, Nantasket Beach and Berlin-Hartford branches of the New York, New Haven and Hartford Railroad. The method of traction, however, will differ radically from that used on the branches above mentioned. Instead of passenger-carrying motor cars, with the motors mounted on the forward axle, locomotives similar in appearance to those used on the Belt Line Tunnel service of the Baltimore and Ohio will be used to haul the trains. The reason for this lies in the fact that the tunnel is only 11½ feet in diameter and that the bottom of the tunnel must accommodate the road bed. This materially reduces the clearance. The motors require to be suspended between 30-inch wheels, at least, to give the necessary clearance between them and the ground, and this fact has brought about the locomotive in place of the passenger motor-car.

The total length of the road is six and one-half miles, or thirteen miles of single track. There will be fourteen stations, including the termini. In designing the line a decided departure has been made in the arrangement of the station approaches. As the railway company is not embarrassed by any considerations of grade, as in the case of surface railroads, the plan was adopted of making the road act as an auxiliary to the operation of the trains as well as merely to carry them. On each side of the station is a 3 per cent gradient rising on the approaching side and falling to the level of the road on the departing side. This unique method gives a retarding effect to all trains approaching the stations equivalent to the application of considerable braking power, while materially aiding in the acceleration of all trains as they leave the platforms. Furthermore, the saving in power necessary to secure the requisite rapid acceleration is by the adoption of this plan calculated to amount to about 33 per cent.

The schedule speed of the trains will be fourteen and one-half miles an hour, with stops at each station of twenty seconds. The trains will be run at first under a headway of two and one-half minutes, which will be reduced as soon as the traffic demands, to a headway of two minutes. The generating station will be located in the open air at the extreme western end of the line near Shepard's Bush station. In building this the most modern American methods will be followed. The steam will be supplied from Babcock & Wilcox boilers, and the engines, of which there will be six, will be horizontal Allis machines, each of 1300 H. P.

The electrical system adopted is the three-phase alternating high-voltage primary, with reducing transformers and rotary converters, similar in general principle to that installed successfully by the General Electric Company for the roads between Lowell, Mass., and Nashua, N. H., and at Portland, Or., between Niagara Falls and Buffalo, and on the line between Dublin and Dalkey in Ireland.

The dynamos, of which there will be six, will each be directly driven by its own engine. These dynamos are of the newly developed rotating field and stationary armature type. Each will have a capacity of 850 kilowatts. The speed of revolution will be 94, the frequency 25 cycles, and the initial voltage 5000 volts. The total capacity of the power station will be 5100 kilowatts or 6800 H. P.

From the switchboard the current is carried to the converter substations, of which there are four. Two of these will contain seven step-down static transformers, six for service and one in reserve, each of 300 kilowatts capacity, and two rotary converters, each of 900 kilowatts capacity. The other two stations will contain four 300-kilowatt static transformers and one 900-kilowatt rotary converter. In the transformers the voltage of the current will be reduced from 5000 volts to 330 volts alternating, at which pressure it will enter the alternating side of the rotary converters, issuing from the commutator side direct railway current at 500 volts. The spare transformers mentioned above will be put into service when the headway of the trains is reduced. The static transformers are of the air-blast type, the windings being cooled by air forced through them by a blower. The rotary converters will be similar in construction to those used at Niagara, Buffalo and Nashua.

The use of the substation method of electrical distribution ensures a uniform pressure throughout the entire length of the line. Fluctuation, therefore, which would materially interfere with the lighting of the station and trains, is reduced to a minimum. The limit of variation fixed by the Board of Trade, to the rules of which department all electrical installations in Great Britain must accord, is ten volts. With the method adopted in this installation, the variation in pressure will not exceed three volts.

The locomotives will number thirty-five. Each will consist of a sheet-iron cab containing the controller, indicating instruments, air brake, pump and controller, sand boxes, etc., mounted upon a locomotive truck. The motors have been especially designed for this work. They are of the gearless type and, according to the new system of motor nomenclature adopted by the General Electric Company, are known as the G. E. 56. Four of these motors will be mounted on each locomotive, one to each axle, the total draw-bar pull being 14,000 pounds. The controllers will be of the series parallel type arranged for four motors. Each controller will embody the magnetic blow-out principle.

The weight of each locomotive will be thirty-five tons of 2240 pounds. The trains will be made up of seven cars, weighing when loaded 105 tons additional, giving a total train weight of 140 long tons. The seating capacity is calculated at 336 persons.

Access to and exit from the stations will be effected by means of powerful high-speed elevators. These will also be of American manufacture and will be built by the Sprague Electric Elevator Co. of New York. The elevators will be forty-nine in number, each with a seating capacity of 15,000 pounds, or about 100 passengers per trip. The speed of elevation will be about 150 feet per minute. These elevators will be of the double-drum type, similar to those built for the War Department at Washington but of much higher carrying capacity.

It is estimated that the number of passengers that this road will carry per annum is 48,000,000, which, at an average fare of 4 cents, will give an ample return to ensure dividends upon the capital stock.

Scientific Progress.

Molecular Physics of Cast Iron.

The committee of the Franklin Institute, in recommending the reward of the John Scott Legacy premium and medal to Alex. E. Outerbridge for his investigations on this subject, give in the journal of the Institute the following abstract of his paper and their conclusions:

These investigations have their origin in the observation made by the author that certain test bars of cast iron exhibited unexpected deviations from the strength which they were expected to exhibit. The only assignable cause for the abnormal (increased) strength of these pieces, which came to light in the examination of the facts of the case, was the fact that these specimens, contrary to the usual custom, had, previous to testing, been cleaned in a tumbling barrel.

The outcome of these observations was a carefully conducted series of experiments to determine the influence of vibration on cast iron. Experiments with a number of test bars cast from one pattern and one runner, some cleaned in the tumbling barrel and others with a wire brush, showed that those which had been subjected to concussion in the mill were from 10 to 15 per cent stronger than the others.

It occurred to the author that this increase in strength might be due to the "mobility of cast iron at ordinary temperatures when subjected to repeated shocks." To test the correctness of this hypothesis, a number of newly cast test bars were subjected to 3000 taps from a hammer upon one end. When these were compared for strength with other untreated bars from the same set, they showed the same proportionate increase of strength as had been observed with the bars cleaned in the tumbler. Numerous other experiments confirmed the fact that a substantial increase of strength, amounting in some cases to as much as 35 or 40 per cent, was exhibited by specimens of cast iron when subjected to preliminary repeated shocks.

Mr. Outerbridge has formulated the results of his scientific study of these phenomena in the statement that the molecules of cast iron are capable of movement without the necessity of heating the mass (as in ordinary annealing) and that, by the methods above described, a species of "molecular annealing may be effected in cast iron at the ordinary temperature, which will release the strains in the castings, precisely as does annealing by slow cooling in heated ovens or pits."

The report finds that, while it has long been known that a certain molecular change takes place in cast iron in the course of time, and that this change tends to relieve the internal strains and render the casting tougher, Mr. Outerbridge has been the first to make a careful study of the phenomena and to note that this change may be hastened by impact, and the whole effect produced in a short time.

One of the most difficult problems connected with the construction of the proposed tunnel under the Simplon range in the Alps is that of keeping down the temperature. The new tunnel will run 7000 feet beneath the summit of Monte Leone, and it is anticipated that the temperature will be 104° Fahr. During the digging of the St. Gothard tunnel the temperature rose to 88°. The heat affected the health of the workmen, more than half of whom were attacked by disease. The still more intense heat to be encountered in the Simplon tunnel can only be reduced by a careful system of ventilation.

Dr. D. K. Tuttle, melter and refiner at the U. S. Mint in Philadelphia, has

given an account of an examination he had been officially called on to make in connection with an alleged discovery of a process of transmuting base metal into gold. The investigation proved the fallacy of the alleged discovery, but disclosed the interesting circumstance that practically all the product sold as "pure" antimony by many chemical houses contains distinct traces of gold.

Improvements in Sterilization.

The completeness with which disease germs may be destroyed by the action of heat is well known, and many forms of apparatus have been devised for use in the convenient subjecting of food constituents either to the boiling pot or, in the system of pasteurization, to a temperature of 75° C. for a definite period of time. It has been found, however, that with many substances, such as milk, beer, wines, and others, the operation of sterilization partakes of the nature of cooking, imparting a peculiar taste, and sometimes materially changing the properties to an undesirable extent.

In a note recently presented to the Academy of Sciences by M. Duclaux, the process of M. Kuhn is described as successfully removing this objectionable feature of sterilization in a very simple manner. The principle consists merely in subjecting the liquid to be sterilized to the desired temperature in a closed vessel under high pressure and out of contact with air. The apparatus is equally simple, the sterilizer being a steel tube, silvered within, and surrounded by a steam or water jacket formed of a second cylinder of slightly larger dimensions. Suitable connections and stop cocks are provided, as well as thermometers and pressure gauges, and the apparatus is mounted so that it can be revolved by turning a crank.

The principle of the method is explained in the following manner: The cylinder being entirely filled with the liquid, there is no room left for expansion. As the temperature rises, the attempted dilatation of the milk, being restrained by the confined space, causes a marked increase in pressure, which, for the temperatures of pasteurization or sterilization, will reach five to six atmospheres. At such pressures the gaseous and aromatic constituents are unable to separate from the liquid. After the sterilization has been accomplished the cooling under pressure causes these same constituents, which may have become temporarily dissociated, to be entirely reabsorbed, thus delivering the liquid in practically the same condition as before, except for the destruction of the germs by the heat.

It is believed that this apparatus will be of especial value in the production of wines, since it enables the fermentation to be arrested at any desired stage, and, when used in connection with microbiological investigations, it should be most valuable.

THE most recent proposal in connection with the use of aceylene in laboratories is that made by H. G. Soderbaum in the *Berichte*. It appears that the gas can be employed for the quantitative precipitation of copper in ammoniacal solution, and for its separation from metals like zinc, which are not precipitated by ammonia. Acetylene possesses the great advantage over sulphuretted hydrogen, which is usually employed for this purpose, that it yields a precipitate which can be filtered and washed very rapidly, and which does not easily become oxidized and pass into solution. The washed precipitate is finally decomposed by dilute nitric acid, the solution filtered and evaporated to dryness, and the residue ignited and weighed as oxide.

FOR detecting carbon monoxide in the air of mines, M. A. Mermet, a French authority, finds a dilute solution of potassium permanganate, containing a little nitric acid, highly efficient, the effect being to decolorize the permanganate solution. The reaction goes on more rapidly when the solution also contains silver nitrate, one part of carbonic oxide per 500 to 5000 parts of air decolorizing the liquid in from one to twenty-four hours.

AT a meeting of the Committee on Mining and Metallurgy of the Franklin Institute, H. B. C. Nitze of Bethlehem, Pa., publishes a paper "On Monazite," giving its chemical and mineralogical characteristics, occurrence (chiefly in North Carolina and Brazil) and industrial application for manufacturing the rare earths used in the production of the mantles for the Welsbach light. The interesting fact was noted that the annual production of this once so-called rare mineral now exceeds 1,000,000 pounds. The finding of the mineral naturally concentrated in seabeach deposits on certain portions of the Brazilian coast, whence it is shipped as ballast, has so greatly reduced the price that the mining of the mineral in North Carolina has been abandoned as unprofitable.

IT is a fact that, notwithstanding all that has been accomplished in the field of electrical discovery, the attitude of the public mind toward electric research is that of confident expectation. This attitude is maintained by the frequent announcement of discoveries—results of experimental investigations—which, while not in themselves revolutionary, or, so far as present indications go, even calculated to initiate any important change in current practice, are yet of a character to show how narrow is the margin of the field already cultivated, and how broad and rich is that portion yet untilled.—Engineering Magazine.

LORD KELVIN, in a recent address upon the earth as an abode fitted for life, has summed up the latest evidence regarding this point, and was able to say with confidence that the earth solidified between 20,000,000 and 30,000,000 years ago. The latest estimate of the time required for the formation of all strata since the beginning of the Cambrian rocks is 17,000,000 years. Lord Kelvin declares that the earth could not have been habitable more than 30,000,000 years.

MR. C. J. REED, in the *American Electrician*, discusses the subject of the direct production of electricity from fuel, with incidental reference to the recently mooted processes of Jacques and Case. The author holds that the practical solution of the problem will depend on the discovery of new chemical elements, having properties radically different from those of any known substances.

Mechanical Progress.

Evolution in Mechanics.

When railroads were first started in England, the carriages for personal transportation were constructed by making a long body frame, mounted upon trucks, and placing on it three stage-coach bodies, all being well bolted together. The traveling public was thus given accommodations which, in interior arrangements at least, resembled very closely those to which they had been accustomed, and, after some demurring, the new order of things was gradually accepted. As the art of car building progressed, however, it was soon found much better to construct the whole affair as one piece of work, but the influence of custom was so strong that the British railway carriage is still built on the stagecoach model, and it is to this cause, rather than to any other, that the compartment system owes its being. Although the carriage is practically built as one vehicle, it is ornamented on the outside by mouldings, curved to follow the old lines of the stagecoach body, and even when these mouldings are omitted in the lower-class carriages, curved stripes of paint are put on to tell the story of the evolution of the car from the coach.

But there are other examples of the absurdity of imitating in form a construction of which the need no longer exists. The motor carriage is already in evidence, and it, too, bears the ear marks of its horsy, though horseless, origin. One of the latest forms of these carriages bear all over indications of the existence of the horse that isn't there. In front there is a high leather dashboard to protect the riders against the splashing from the heels of the absent animal, while the finish of the heavy trimmings could only have emanated from the establishment of a builder of carriages made for horses, and the whole vehicle looks as if it ought to have a pair of lively animals in front of it to make it look complete. It is, indeed, difficult to get rid of old ideas, even when the necessity of their presence is absent; but the mental inertia which makes such things possible, is probably inherent in human nature, and its elimination requires a long course of education and experience.—Cassier's Magazine.

The Uses of Exhaust Steam.

Exhaust steam can be utilized in various ways. Condensed and separated from oily matters, it becomes a comparatively pure material for the manufacture of artificial ice. The purest ice to be obtained in our city markets is made of water condensed from exhaust steam. Water so condensed and separated from oily matter is also the best obtainable for boiler feed. The use of surface-condensers not only effects an economy of fuel, but supplies pure water for steam boilers in situations where the water is of such quality as otherwise not to permit its use for generating steam. Another use for exhaust steam is for heating buildings. On this use, Mr. Willard Hatch has made some observations, which will be of use to those contemplating such an application. He assumes a building of definite proportions, using a given amount of steam power, and then considers the value of the exhaust steam for the two purposes of producing an increase of power by the use of a condenser, and the simultaneous heating of buildings, both of which applications may be made together during a considerable part of the year, in climates wherein the artifical heating of buildings is required. What the author calls incident heat in buildings—*i. e.*, heat developed mechanically, that derived from the persons of workmen, and that derived from gas jets—is shown to be an important factor in warming factories and workshops.—Engineering Magazine.

The Longest Bridges.

The longest bridge in the world is that over the Tay, in Scotland, which is 3,200 meters=9,696 feet long; and the next longest is also in Great Britain, being that over the Firth of Forth, 2,394 meters=5,552 feet in length. The following table gives, in meters and in feet, the lengths of the principal bridges in various countries:

	Meters.	*Feet.*
Tay, Great Britain	3,200	9,696
Forth, Great Britain	2 394	5,562
Moerdyck, Holland	1,470	4 820
Volga, Russia	1,438	4,715
Weichsel, Germany	1,325	4,340
Thoen, Germany	1,272	4,172
Grandenz (Elbe), Germany	1,092	3,580
Brooklyn, United States	488	1,601

The greatest single span of the Forth bridge is 521 meters=1,725 feet; of the Elbe bridge, 420 meters=1,378 feet; of the East River bridge, 488 meters=1,610 feet.

Freezing Check Valve.

A leaky check valve has recently been patented. In some instances it happens that the pipe beyond the check valve becomes partially filled with water. With a lifting check rising vertically there is the same tendency to trap water up to the level of the valve seat that there is in the common globe valve. This water frequently freezes, and to overcome this difficulty this inventor drills a hole through the partition separating the two sides of the valve, so as to let the warm water from the boiler keep the water warm in the space beyond, making purposely a leaky check valve.

The Rise in Steam Pressures.

The most prominent condition affecting all engines, whether marine, locomotive, or stationary, is a more general employment or higher steam pressure. This increase of pressure has been marked within the last fifteen or twenty years. In marine practice it has risen in that time from 60 to 150 pounds, and, in exceptional cases recently, it has reached 270 pounds. In locomotive practice it has increased from 125 to nearly 200 pounds. In stationary practice 150 pounds are not uncommon, and 200 pounds are occasionally employed, although in that field 100 pounds are a ruling average. In the future this average will increase, as the more general introduction of watertube boilers makes it practicable, and because it is a necessity if electrical apparatus is to be operated economically.

THE most conspicuous application of oil burning in Great Britain is that on the Great Eastern Railway, as perfected by Mr. James Holden. There are on the Great Eastern Railway 37 locomotives, 13 stationary boilers, and four furnaces fitted with liquid fuel firing at present. In the case of the locomotives, the oil fuel is carried in two cylindrical tanks placed on the tender, leaving the central space perfectly free to hold coal as before. Suitable provision is made for warming the oil in these tanks in the winter. From these tanks the oil is carried by pipes to the engine foot plate, where, after passing through the necessary valves, it is sprayed into the firebox by the injectors.

MORE than 500,000 sewing machines are made in this country annually, which is 90 per cent of the production of the world. Nearly 100,000 persons in one way and another make their living in this country out of sewing machines. In no branch of manufactures has a greater revolution been wrought by the sewing machine than in boots and shoes. In 1861 the first machine for sewing on soles was put into operation and a royalty of two cents on shoes exacted. By the aid of machines 350,000,000 pairs of shoes had been made up to 1877 in the United States, and probably an equal or greater amount in Europe.

ACCORDING to a calculation worked out by the *Revue Scientifique* of Paris, the proportion of paying load to total displacement of a steamship in 1840 was only 10 per cent,—that is, the hull, engines and fuel carried formed 90 per cent of the weight of the vessel. In 1850 the paying load had risen to 26 per cent; in 1860 to 33 per cent; in 1870 to 50 per cent. At the present time the Atlantic steamers show an average of 55 per cent paying weight. The advance since 1870 has been comparatively slow, chiefly because much higher speeds are now required.

AFTER the great fire of 1872, the cost of bricks laid in the wall was ordinarily reckoned in Boston at $36 a thousand. Now, better bricks, quite as well laid, with better lime and cement, cost there, in the wall, $15 a thousand. Fireproofing processes have been of late greatly improved and cheapened, so that an ordinary merchantile building can be erected, with floors, roof and partitions all of iron and concrete, or terra cotta, for 10 to 15 per cent more than it would cost with the cheapest wooden floors.

TELEGRAPH and telephone poles are the latest development in the line of manufactures from paper. They are made of pulp in which a small amount of borax, tallow and other ingredients are mixed. These are cast in a mould in the form of a hollow rod of the desired length. The poles are claimed to be lighter and stronger than wood, and it is said that the weather does not affect them.

The International Gold Convention.

Last week accounts of the assembling and first day's proceedings of the International Gold Convention at Denver, Colo., only had been received when this paper went to press. On reassembling on Thursday morning, resolutions were introduced as follows:

By A. A. Reynolds of New Mexico asking Congress to revise the mining laws so that the present complications in acquiring titles to mining claims may be abolished.

By B. F. Gilture of California:

WHEREAS, The development of mines in California, Arizona, New Mexico and Colorado is greatly hindered by reason of the claims of Spanish land grants as owners to all mineral that exists within the boundaries of such grants; therefore

Resolved, That Congress be informed through the secretary of this convention of the great drawbacks under which the people of these States and Territories are laboring; that Congress be requested to take as prompt action as possible toward affording immediate relief to the people of said States and Territories by such legislation as will throw open to prospectors, miners and mining operations all mineral land within such Spanish land grants.

These resolutions were referred to the Committee on Resolutions without debate.

The following papers were read: Prof. E. B. Kerby of Colorado, "The Treatment of Low Grade Ores by Concentration;" John Dern of Utah, "Utah's Great Mining Camp, Mercur." E. Bignell of Nebraska read a paper on "Concentration of Ores, Dry," and Prof. Arthur Lake of Colorado one on "The Geological Formation of Colorado."

Prof. George Knapp of Illinois presented the convention a gavel made of historic materials.

L. B. Prince, president, acknowledged the gift in a brief speech.

At the afternoon session a telegram was read stating that Senator Stewart of Nevada had secured a reduction of the duty on cyanide of potassium to 12½ cents in the Senate bill and asking that a resolution be passed urging the conference committee to accept this rate.

The selection of a place for holding the convention of 1898 being in order, T. J. Summers of Omaha presented the name of that city, Hon. O. W. Powers presented Salt Lake and Hon. J. O. Buckley, Milwaukee. After a long discussion the matter was laid over until next day.

The Committee on Resolutions sub mitted a report asking the convention to instruct its president to protest against the incorporation in the new tariff bill of a claim imposing a tax upon the sale of stocks and bonds. The request was unanimously adopted.

The Chair was instructed to appoint a committee of five to draft amendments to the Government mining laws, which Congress will be asked to adopt at its next session.

The convention then adjourned until morning.

On reassembling on Friday, the names of Milwaukee and Omaha were withdrawn from the contest for place of holding the convention of 1898, and Salt Lake was declared the unanimous choice of the convention.

The following resolutions were introduced and referred: By O. W. Crawford of Illinois, that for the purpose of stimulating the mining industry Congress be memorialized to establish in each United States land district in the mineral-producing States a Government experimenting and testing station, on plans similar to Government agricultural stations, where ore may be tested free of expense to the prospectors; by Judge Brown of West Virginia, to change the name of the convention from the International Gold Mining Convention to International Mining Convention.

The chairman appointed the following committee to take the necessary steps toward securing the passage of a constitutional amendment establishing a Cabinet department, to be knows as the Bureau of Mines and Mining: L. Pence, Colorado; M. H. Herring, Texas; J. R. Hodges, Pennsylvania; Wm. F. Bechel, Nebraska; E. V. Smalley, Minnesota.

The Committee on Resolutions submitted its report, which was considered section by section.

The resolution memorializing Congress to throw open all mineral lands on Spanish land grants in California, Arizona, New Mexico and Colorado to location as mining claims was adopted.

The resolution asking Congress to throw open the asphalt and gilsonite lands on the Uncomphagre Indian reservation in Utah to mineral locations was adversely reported upon.

A motion to lay the report on the table and to adopt the resolution was carried by a vote of 93 to 22. Then Angus M. Cannon of Utah spoke against the resolution and moved that the whole matter be laid on the table. His motion prevailed.

Two resolutions providing for the appointment of a committee to take such steps as may be necessary to secure a recodification of the mining laws were adversely reported on. The convention disagreed with the report and referred the resolutions to the committee already appointed for this purpose.

The resolution relating to the proposed new Cabinet Bureau of Mines and Mining was adopted and referred to the special committee already appointed.

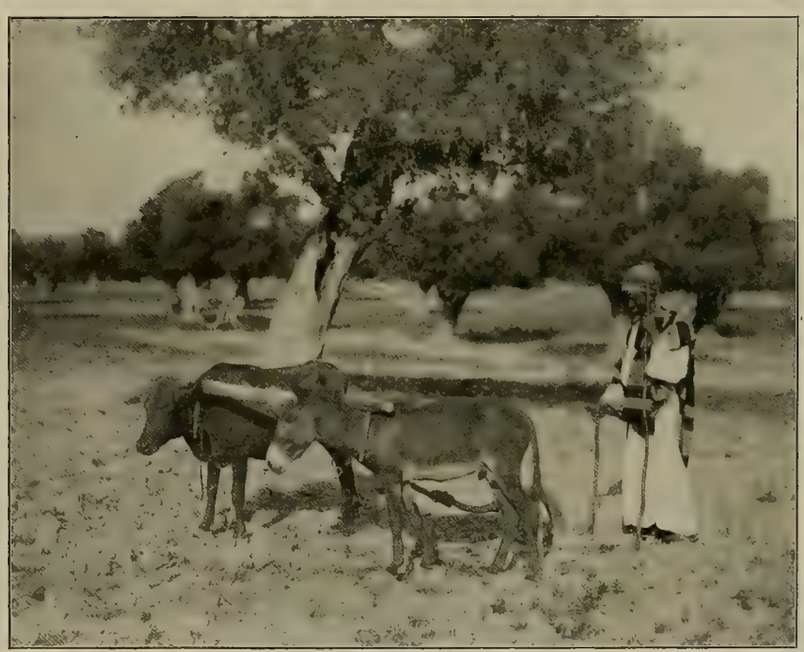
Resolutions of thanks to the Governments of Venezuela, Belgium, Italy, Sweden and Norway, Denmark and Mexico, for the interest they have taken in this convention and by sending representatives, and to Prof. George Knapp of Illinois for valuable relics presented to the convention, were adopted.

N. E. Guyot, a member of the Resolutions Committee from New Mexico, offered a minority report, declaring for the free and unlimited coinage of silver at the ratio of 16 to 1. The point was made against it that the order of business eliminated all political questions from discussion. The chair sustained the objections and the minority report was refused consideration.

Several papers were read at the afternoon session, including one by Chas. J. Moore, M.E., of Cripple Creek, on "The Cripple Creek Formation." The convention then adjourned *sine die* to meet next year at Salt Lake.

On Saturday the delegates left for Cripple Creek, where they were the guests of the camp until Sunday. A large number then left for Salt Lake to attend the Trans-Mississippi Congress there on the 14th inst.

DROMEDARY PLOWING FOR WHEAT NEAR CAIRO.



SYRIAN CULTIVATION OF OLIVE ORCHARD.

The Survival of the Ancient in Plows.

We recently gave several instances of the continued use of the most ancient types of plows, and different views in the same line are to be found on this page. One is a better view of Egyptian camel plowing for wheat near Cairo. The long tackling gives the dromedaries freedom of movement which they require, but it strikes the American driver as a rangy sort of an outfit, which it would be difficult to keep to a line. How that may be we do not know, as our training as a dromedary driver was confined to a half a day in a circus parade forty years ago; but it occurs to us that the Egyptian plowman does not care about a line, and probably he leaves as much as he turns, although the lands look fairly well. At what cost of effort it must, however, be possible to hold the point in the soil. The attitude of the man is in striking contrast to that of the modern plowman, and his work is probably in the same relation.

It will be interesting to observe how this old plow of the Pharaohs will endure the influences which are now to be brought to bear upon it. There has just been established near Cairo and almost under the shadow of the pyramids, an agricultural experiment station, and if the director does not among his first experiments test the efficiency of ancient and modern plows, we shall be very much surprised.

The other plowing scene shows the Syrian method of tackling up any sort of an animal that may be at hand, and shows the ox and the ass in a shape which would lead no American to break the tenth commandment. How the old Syrian in picnic costume and with such a team can do any responsible plowing it is hard to imagine. And yet thus it has been done for centuries, and thus it would ever be, probably, if the Caucasian race had not become so uncomfortably progressive and powerful.

THE reports of the mine inspectors in Great Britain show that the total number of persons employed below ground last year was 38,385, and above ground 6875, making a total of 45,260 persons, as compared with 44,872 persons in 1895. It will be seen that during the year only 388 more persons were employed, in and about mines, than in the preceding year, which, when considered with the largely increased output of mineral, indicates comparatively satisfactory results. The total of 11,952,417 tons mineral raised in 1896 compares favorably with 10,893,010 in 1895 and 11,254,225 in 1894, and is a record output. Compared with 1895, there is an increase of 1,059,407 tons of mineral raised during the year, made up as follows: 1,055,687 tons increase in coal, 4210 tons increase in fireclay, 688 tons decrease in ironstone, and 198 tons increase in other minerals.

AT the sixth annual meeting of the De Lamar Mining Company of Idaho, in London, it was reported that during the past year they had only been able to pay a dividend of 5 per cent, as compared with 17½ and 25 per cent in previous years, the main reason for this being the lower grade of ore on which they had had to work. They had also been steadily exhausting the silver stopes or rich shipping ore. There was £61,000 unexpended capital and reserve, and undivided amounts, as a substantial asset to fall back upon. Further development was now being carried out to ascertain whether the rich ore had become exhausted and should that prove true they had a large body of low-grade ore which, with improved appliances, could be worked.

THE bottom of the Pacific between Hawaii and California is said to be so level that a railway could be laid for 500 miles without altering the grade anywhere. This fact was discovered by the United States surveying vessel engaged in making soundings with the view of laying a cable.

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Automatic Cut-Off Engines, High-Speed Engines, Hoisting Engines,
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Why the Springer Concentrator is the Best:

It will do more and cleaner work than any rubber belt machine.
It weighs only one-half as much as some of the six-foot concentrators.
Is the most simple in its construction of any machine in the market, and only one-third as many pieces in it as in some of the others. Was invented by an old miner of forty years' experience handling every known concentrator on the market.
Should any piece need repairing, it can be removed without disturbing any other part of the machine.
Can be set up by any inexperienced miner.
Its distributor is perfection itself, distributing the pulp evenly over the entire surface of the belt.
Grade of shaking frame can be changed while the machine is running at full speed.
It is the strongest, lightestr unning and most inexpensive to keep in repair of any
Will save more of the fine slimes than any other machine.
Is cheaper than any other six-foot machine, costing only $350.00 f. o. b. cars or boat, San Francisco.
Will handle the pulp from five stamps better than any other Concentrator.
Has adjustable eccentrics, and any length of stroke can be had, thereby giving different speeds per minute.
The belt is very durable, being made of No. 3 Canvas, woven especially for the Springer concentrator.
This machine requires so little attention that one man will easily attend to a dozen of them.
It has a solid rubber flange, which no other canvas belt has.
Wear and tear upon this machine is not one-third as much as upon some of the other concentrators.

Coast Industrial Notes.

—A scarcity of shingles in the northwest has advanced the price to $1.15 per M.

—The California State Fair will be held at Sacramento from Sept. 6th to Sept. 18th.

—The British Columbia salmon canners and fishermen have compromised on ten cents per fish for the season.

—The Hawaiian annexation treaty has been reported favorably from the United States Senate committee.

—Nearly 25,000 people visited California since the 1st inst., induced by the ususually low rate of $25 from Chicago—2600 miles.

—Bids have been opened at Seattle, Wash., for supplying 500,000 tons of material for the construction of the Gray's harbor Government jetty.

—Compelling the Government to pay $425 per ton for armor plate is a good argument for the establishment of a plant on this coast for its manufacture.

—The total shipments of oranges from southern California for the season ending June 30th was 7340 carloads. This does not include the shipments on steamers.

—The work in detail for the Government at Marrowstone Point, Puget Sound, Wash., was given in this column last week. The contract was awarded to the Pacific Bridge Company last Tuesday for $163,450.

—By the close of July bids for the construction of the breakwater at San Pedro will have been advertised for by the Secretary of War, and it is expected that the actual work will be under way early in September.

—The Treasury Department at Washington has decided to use marble in the construction of the new San Francisco postoffice building. To this Congressman Loud objects, claiming that sandstone or granite would be more suitable and available.

—Ninety carloads of machinery have been sent from San Francisco to the asphalt mines on the Sisquoc, Santa Barbara county, Cal. Two pipe lines twenty-eight miles long, reaching from the mines to Gaviota, are to be constructed, together with structures for reduction works.

—At Tacoma, last Sunday, the 40-ton flywheel of the engine in the power house of the Tacoma Railway Company flew to pieces and wrecked the building. The shafting in the building was torn out and half a dozen dynamos badly damaged. The total loss will be $20,000 to $25,000, not including the loss of street railway revenues.

—The Trans-Mississippi Congress met at Salt Lake, Utah, this week. Hugh Craig of San Francisco was elected temporary chairman and addresses of welcome were delivered by the Governor of Utah, Mayor of Salt Lake, and Judge Goodwin. There were in attendance over 400 delegates, representing over twenty States and Territories.

—E. J. Baldwin is credited with having secured the one practical pass remaining in the Sierra Madres. Men are constructing a trail from the Santa Anita canyon to the territory adjacent to the San Gabriel canyon, thus making a pass-way to the Mojave desert; the grade, 1 foot in 16, is available for a railway line. The Southern Pacific Company has two —the Soledad and another over the Coast line. Cajon, far towards the east, is in the hands of the Santa Fe.

—The Santa Fe railroad proposes to experiment on a large scale with the storage of water in the arid regions of Arizona. President Ripley has let a contract for the construction of two big dams of masonry in the Arizona desert, to be at the mouths of canyons or gorges twelve or eighteen miles distant from the railroad. James Dun, chief engineer, estimates that each will hold 50,000,000 gallons of water—enough for the company's use along the Arizona division for eighteen months. The dams will be 40 feet high, constructed of sandstone quarried near by. The stone reservoirs will cost about $290,000.

—The Mexican Government has officially promulgated a concession for a railroad from Chihuahua, Mexico, to the Pacific coast. A. A. Spendlove and E. C. Creel are empowered to construct a railway to start from the city of Chihuahua, or from a point on the Mexican Central Railroad south of Chihuahua, and to extend in a westerly direction to a point on the Pacific coast in the State of Sonora. Construction will begin as soon as the Department of Communications has approved the plans, and within two years 200 kilometers must have been completed. Subsequent construction must proceed at the rate of 100 kilometers annually, and the entire road, with its telegraph line, must be completed within seven years from April 13, 1897. The subsidized length of the line is 600 kilometers (372.8 miles). A. A. Spendlove is the general manager of the Chihuahua Mining Company, Chihuahua, Mexico. E. C. Creel is a local banker and the manager of the Banco Minero, Chihuahua. The Mexican Government has also granted to Col. A. K. Owen a concession for a railroad from Presidio del Norte, on the Rio Grande, State of Chihuahua, west, via the city of Chihuahua, to a point on the Pacific coast in the State of Sinaloa. This last concession is without subsidy or Government aid. The mineral wealth of the State of Chihuahua, through which these railroads must pass, is considerable. Notwithstanding the impediments in the way or transportation and fuel, there are many mines in the Sierras that are to-day being worked with profit, and with the shortening of distance and the cheapening of transportation there are many small enterprises that will become large and profitable mines.

Personal.

CAPTAIN J. R. DE LAMAR has returned from Europe to Salt Lake.

W. L. MERRY of San Francisco has been appointed minister to Nicaragua.

M. M. FLYNN has been appointed superintendent of the Sacramento mine at Mercur, Utah.

HOMER DAVENPORT, the well-known caricature artist, is interested in oil wells in southern California.

W. J. BRYAN has made a tour of the coast this month, and says he will travel through Mexico in October.

HUGH CRAIG of San Francisco was elected temporary chairman of the Trans-Mississippi Congress at Salt Lake last Wednesday.

F. H. BOSTWICK, representing the Hendrie & Bolthoff Manufacturing Co. of Denver, Colo., is looking around California this month.

JONES BAKER, who was engineer for the London & Continental Mining Co. in South Africa, is in the Trail Creek, B. C., country for the same company.

FRANK L. BROWN of the Washburn-Moen Co., 8–10 Pine street, San Francisco, is the newly elected secretary of the Pacific Coast Hardware and Steel Association. The next annual meeting of the association will be held in San Francisco, June 17, '98.

Recently Declared Mining Dividends.

Swansea, Utah, $5000; payable July 3.

Silver King, Utah, $37,500; payable July 11.

Calumet & Hecla, Michigan, $1,000,000; payable July 7.

Anchoria-Leland, Cripple Creek, Colo., $6000; payable July 12.

Mercur, Utah, $25,000; payable July 21. Total to date, $750,000.

Montana Ore Purchasing Co., Montana, $40,000; payable July 15.

Portland Gold Mining Co., Cripple Creek, Colo., $30,000; payable July 15.

Champion Mining Co., Nevada City, Cal., 25 cents per share; payable July 20.

Golden Cycle, Cripple Creek, $7500; payable July 1. It is the intention of the company to keep up this monthly dividend for an indefinite period.

Recent California Mining Incorporations.

Stein Mt. M. Co.; J. I. Sabin, L. Glass, J. P. Couch, E. S. Pillsbury, J. C. Weir; capital stock $100,000, subscribed $1500.

Success G. M. Co., Pasadena, Cal.; G. H. Smith, C. M. Davis, J. F. Church, J. C. Fraser, M. Ayers; capital stock $1,000,000, subscribed $25.

Standard G. M. Co., Grass Valley, Cal.; J. Mulroy, R. Riley, T. Cavanaugh, C. Mallon, D. McFall; capital stock $10,000,000, subscribed $5000.

Commercial Paragraphs.

MANAGER GRAHAM of the Vulcan Iron Works, 505 Mission street, San Francisco, is putting in an ice plant for the manufacture of ice at the Mountain Copper Company's works, Keswick, Cal. The Vulcan Iron Works makes a success of this work, and this year has put in seventeen plants of that kind on this coast, besides fitting up twenty-seven steamships with ice making machinery. The Keswick construction is in charge of Jno. W. Dyer, supervising engineer.

Obituary.

N. C. CREEDE, the discoverer of the great silver-mining camp at Creede, Col., died in Los Angeles, Cal., on the 12th inst. Creede camped with Conner's scouts through Colorado, Utah and Nevada from '62 to '70, prospected from '71 to '90, and about seven years ago "struck it rich" in several localities in Colorado, the most famous being Creede, which for three years was the largest silver producer in the country. In '93 Creede's wealth was estimated in millions; he sold his Colorado interests in '94, and bought a palatial home in southern California, where he ended his days.

WANTED.

Able, rugged man, as Roaster, thoroughly familiar with oxidizing dead roast of gold concentrates in Bruckner furnace. None other need apply. Address quickly, stating experience and qualifications.

JACKSON & LAKEVIEW MINING CO.,
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WANTED.—A Second-Hand 5 OR 10 STAMP MILL.

Address, stating particulars, price, etc., A. B., this office.

Fort Wayne Electric Corporation,

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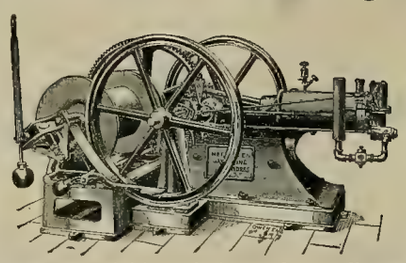
Hercules Hoisting Engines



Solve the difficulty of fuel, and make mining profitable where steam power is too expensive. Over 3000 Hercules Gas and Gasoline Engines are in use, giving entire satisfaction. Fully guaranteed. Requires no engineer. No smoke, no dirt. No danger.

We build engines from 2 to 200 h. p. for pumping, hoisting, running air compressors, sinking shafts and for all power purposes. Used in mines throughout the coast.

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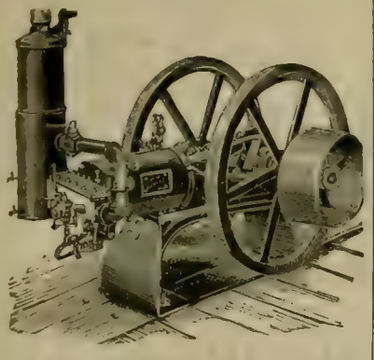

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"DANIEL BEST" Crude Oil Engine.

This Engine can be operated on either Crude Oil, Distillate, Gasoline, or Kerosene. **It is the cheapest power on earth** and is not tied to any one kind of Oil, but can use any kind that will make gas and is not handicapped by being compelled to use a certain Oil. Do not forget this when in need of an Engine.

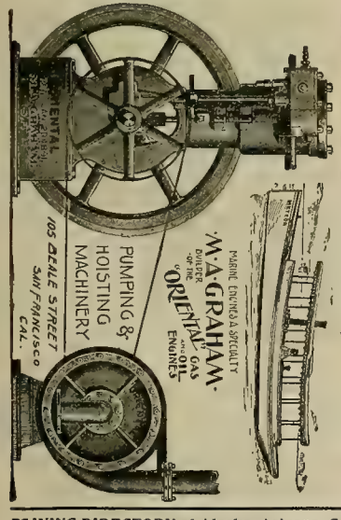
We guarantee our Engines to work perfectly on California Crude Oil, or Distillate, or any other kind of gaseous Oil; we however prefer CALIFORNIA CRUDE OIL, from Coalinga, Fresno county, for the reason that gas from Crude Oil will produce more power from the number of feet of gas used than from any other Oil, and it is also a natural lubricant as well, the valves being always lubricated sufficiently to prevent them from sticking, thus assuring greater durability of the working parts than it otherwise would be in using dry gas. And another advantage we claim is, that danger from explosions is reduced to a minimum, there being no accumulation of gas, but is used by the Engine as fast as it is generated and hence is absolutely safe. The following is a test that we made with one of our Five-Horse Power Crude Oil Engines, running ten hours on the different gas oils:

California Crude Oil, 40 grav.,	7½ galls.	at 5c.,		$.37½
Distillate	40	"	7½ "	8c., .60
Domestic Coal Oil	40	"	7¾ "	12½c. .93¾
Gasoline	74	"	8¾ "	15c., 1.31¼
City Gas	1000 feet.			2.00

We manufacture all sizes from two-horse power up, and will guarantee that our Engines will run cheaper and are more simple in construction, have fewer parts and hence are more durable than any other Gas Engines on the market. Seeing is believing; don't take our word for it, but come and investigate for yourselves. You can always see one in operation at our works. We will be pleased to see you and will at all times take pleasure in showing them up. Our Engines are specially adapted for running well and mining machinery—in fact, for any kind of power desired. We are the pioneers and first inventors of Crude Oil and Distillate Engines. **We always lead and never follow.** Send for Catalogue and Price List of the only genuine Crude Oil and Distillate Engine made.

The Best M'f'g Company,

SAN LEANDRO, CAL.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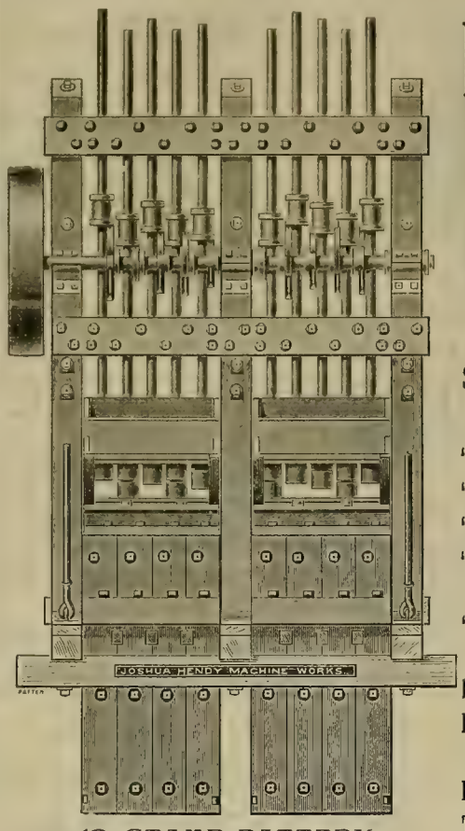

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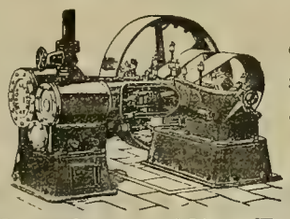

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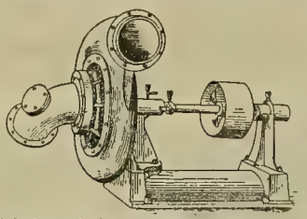

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Guaranteed to Save Every Particle of Flour and Flake Gold, and Floured Quicksilver.

WILL HANDLE 3 TONS OF GRAVEL PER HOUR.

Minimum power and water required. Requires but one handling of gravel. By motion of machine water is returned and used over and over again. Light, durable and easily transported. Simple in construction and inexpensive.

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The German Savings and Loan SOCIETY,

526 California Street.

For the half year ending June 30, 1897, a dividend has been declared at the rate of four and twenty-hundredths (4.20) per cent per annum on Term Deposits and three and fifty-hundredths (3.50) per cent per annum on Ordinary Deposits, free of taxes, payable on and after THURSDAY, July 1st, 1897. GEO. TOURNY, Secretary.

In the Superior Court of the City and County of San Francisco, State of California, Department No. 8. John V. Kimball, plaintiff, vs. Mabel L. Kimball, defendant. Action brought in the Superior Court, City and County of San Francisco, State of California, and the complaint filed in said City and County of San Francisco, in the office of the clerk of said Superior Court. The people of the State of California send greeting to Mabel L. Kimball, defendant. You are hereby required to appear in an action brought against you by the above-named plaintiff in the Superior Court, City and County of San Francisco, State of California, and to answer the complaint filed therein within ten days (exclusive of the day of service) after the service on you of this summons, if served within this county; or, if served elsewhere, within thirty days. The said action is brought to dissolve the bands of matrimony now existing between yourself and plaintiff, on the ground of habitual intemperance on your part for more than one year past. All of which will more fully appear in the complaint on file herein to which you are hereby referred. And you are hereby notified that if you fail to appear and answer the said complaint, as above required, the said plaintiff will apply to the said Court for the relief prayed for in the complaint. Given under my hand and seal of said Superior Court at the City and County of San Francisco, State of California, this 9th day of April, in the year of our Lord, one thousand eight hundred and ninety-seven. C. F. Curry, Clerk. By Joseph Riordan, Deputy Clerk. R. Thompson, Attorney for Plaintiff.

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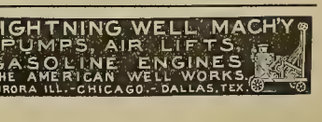

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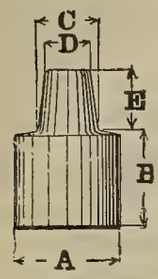

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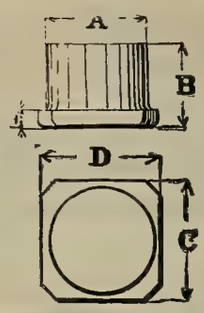

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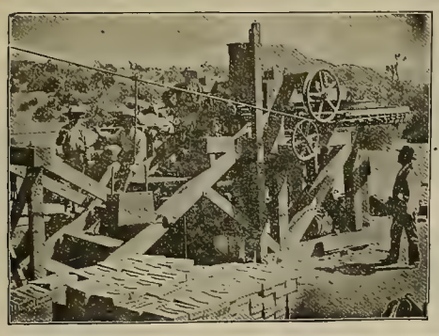

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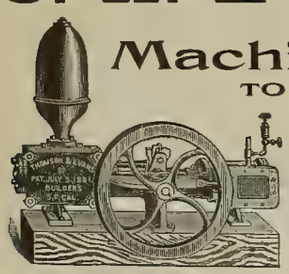

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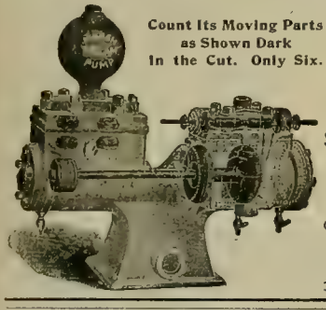

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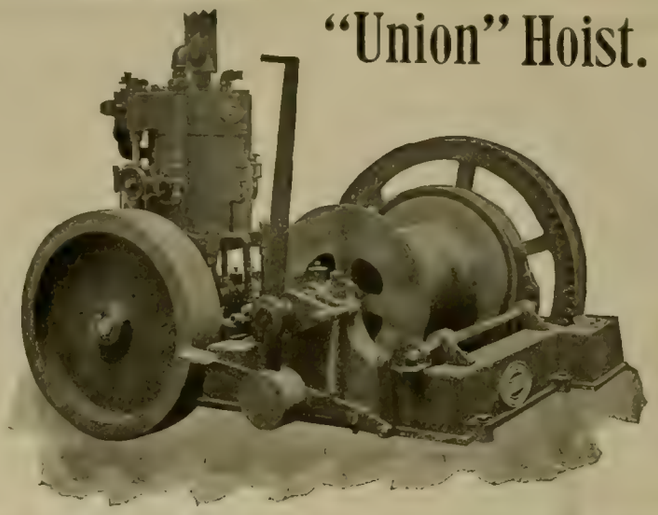

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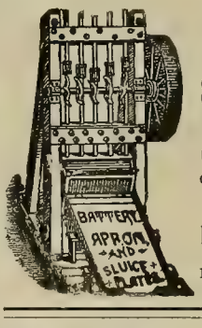

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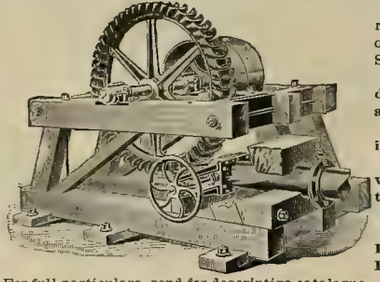

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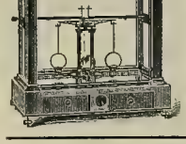

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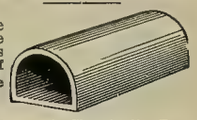

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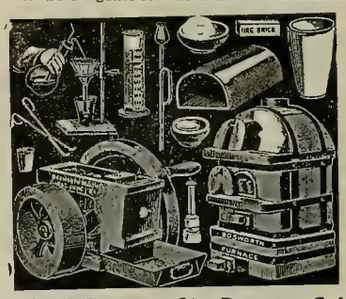

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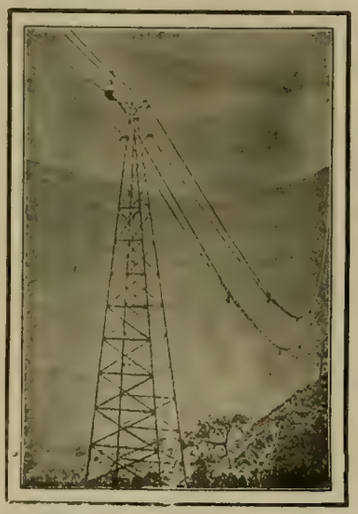

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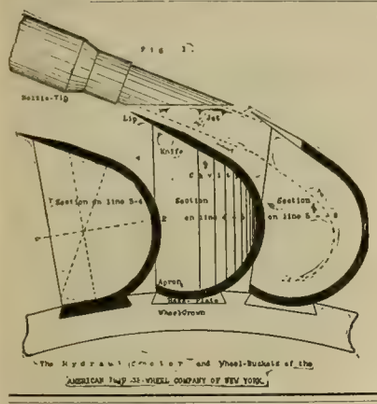

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585,881.—GATE—D. F. Baker, Vernonia, Or.
585,732.—ORE SEPARATOR—T. G. Barlow-Massicks, Massicks, A. T.
585,812.—AMALGAMATOR—T. G. Barlow-Massicks, Massicks, A. T.
586,083.—WAGON BRAKE—S. Berreyesa, Phœnix, A. T.
586,005.—CORKING UTENSIL—S. S. Black, Pasadena, Cal.
585,653.—CARPENTER'S LEVEL.—E. T. Clowe, Woodland, Cal.
585,741.—CLAPBOARD MACHINE—P. Conway, New Watcom, Wash.
585,911.—CONCRETE CONSTRUCTION—G. F. & H. N. Gray, S. F.
585,865.—PIPE-TURNING LATHE—C. S. Hamlin, Los Angeles, Cal.
586,087.—STOVE ATTACHMENT—Hess & Mulholland, S. F.
585,765.—CHINA KILN—G. Jeffrey, Portland, Or.
585,958.—PLUCKING TOOL—J. Joffriand, S. F.
585,676.—DANGER SIGNAL—J. K. Kendrick, Germantown, Cal.
585,922.—COOKING APPARATUS—L. Moser, S. F.
585,695.—PRUNE GRADER—G. M. Peterson, Salem, Or.
585,875.—DISTRIBUTING WEIR—J. B. Pope, San Bernardino, Cal.
586,063.—REIN HOLDER.—R. R. Richardson, Portland, Or.
585,989.—GOLD WASHING PAN—F. Sletcher, S. F.
585,800.—FRUIT CONVEYOR—Toulouse & Delorieux, S. F.
585,880.—TOASTER—E. Wall, Portland, Or.
585,897.—BROOM ATTACHMENT—F. Wittram, S. F.
585,997.—TIRE SETTER.—E. N. Zeller, Portland, Or.

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Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

PUNCTURE DETECTOR FOR PNEUMATIC TIRES.—Samuel C. Freels, of Hollister, Cal., and John T. McKean, of Santa Cruz, Cal. No. 585,200. Dated June 29, 1897. The object of this invention is to provide a simple device for detecting air-holes or punctures in air-containing receptacles, and it is especially designed to be used in conjunction with the pneumatic tires of bicycles. It consists essentially of a casing adapted to be detachably fitted to the surface of the tire having an intermediate bottom pervious to air and a loose material upon said bottom which will be agitated by the air passing into the casing and through the pervious material so that it is only necessary to move the device slowly over the inflated tire or other article, and when it arrives over a point where there may be an opening for the escape of air, the material therein will be agitated by the air passing into the casing. A sight cover may be used to prevent the loss of the light material.

COMPARTMENT COOKING APPARATUS.—Louis Moser, San Francisco, Cal., assignor of one-half interest to Max Sniderman, same place. No. 585,922. Dated July 6, 1897. This invention relates to an apparatus which is designed to be used for cooking a variety of substances in different compartments with a single heating mechanism. It consists essentially of a chamber superposed over a suitable burner, the chamber being divided into separate compartments, each of which is provided with a draw-off or discharge. An expansion chamber is formed below, having its top wall forming a bottom for the superposed chamber, and a tubular extension from this expansion chamber serves to carry the heat up through the chambers above, where it acts upon another set of chambers arranged in line above the tube. There are suitable passages for the escape of the heat, and the bottom of the upper chamber is made of screen material, so as to disseminate the heat before its escape.

GOLD WASHING PAN.—Frederick Sletcher, San Francisco, assignor of one-half interest to A. & H. Dannenbrink, Gilta, Cal. No. 585,989. Dated July 6, 1897. This invention relates to improvements in pans such as are ordinarily employed by miners for hand washing of gold-bearing earth. The object of this invention is to easily separate the heavier valuable portion from the debris which it is desired to discharge, and, by means of certain curved indentations in the bottom of the pan, to form riffles in which the gold will be retained by reason of its greater weight. The pan is made in the usual form, with sloping sides, and has an inwardly projecting rib between the top and bottom. The bottom has crescent-shaped indentations, lessening in depth near the ends, and a screen or sieve frame fits the interior of the pan, its upper edge being curved or hooked to fit over the corresponding edge of the pan, while a sieve bottom is fixed to it, leaving a space between itself and the bottom of the pan. This sieve checks all the larger rocks, which can be thrown out at once, and the remainder of the material passes down, and, by the peculiar agitation of the pan, is separated, the lighter material being washed down by the water and passing over the edge, while the heavier material will be concentrated into the riffles at the bottom.

CONCRETE ARCHES AND FIREPROOF CONSTRUCTION.—G. F. & H. M. Gray, San Francisco, Cal. No. 585,911. Dated July 6, 1897. This invention relates to that class of fireproof and arched construction in buildings in which the arch or flooring is made of concrete laid upon temporary false work and permanently supported by metallic beams. The object of the invention is to provide a structure which, by reason of the intimate and practically integral construction of the arch and the furring strips, will avoid the usual practice of first making the concrete arch up to the level of the supporting beams and then subsequently placing a separate layer or flat sheet of concrete upon this arch in which to hold the furring strips. The invention comprises supporting beams, a layer of fireproof material thereon, an intervening arch of concrete supported by the beams, furring strips supported above the beams on this fireproof material incorporated directly in and flush with the upper surface of the concrete arch and a metallic strengthener incorporated in the lower portion of the arch, with interstices through which the concrete passes to incorporate fully with it.

BROOM ATTACHMENT.—Frederick Wittram, San Francisco, Cal. No. 585,897. Dated July 6, 1897. This invention relates to a scraping attachment for brooms. The object is to provide a stiff brace and connection between the broom or brush and the scraper to prevent its being bent and twisted out of shape. The scraper is made of sheet metal bent at an obtuse angle, having one portion attached to the head of the brush or broom, having its ends bent substantially at right angles to its body, so that the bent portions stand on edge and extend down upon the ouside of the ends of the head, being secured thereto. These ends are slitted or bent and folded on the line of the slit or bend, so that they stand on edge substantially at right angles with the body of the scraper, the latter being bent longitudinally to an obtuse angle, so that when attached to the brush it forms a very rigid connection.

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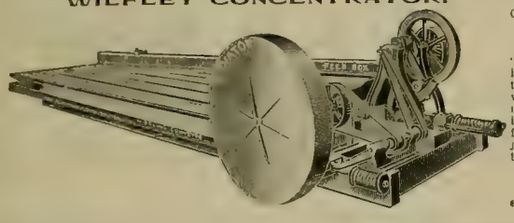

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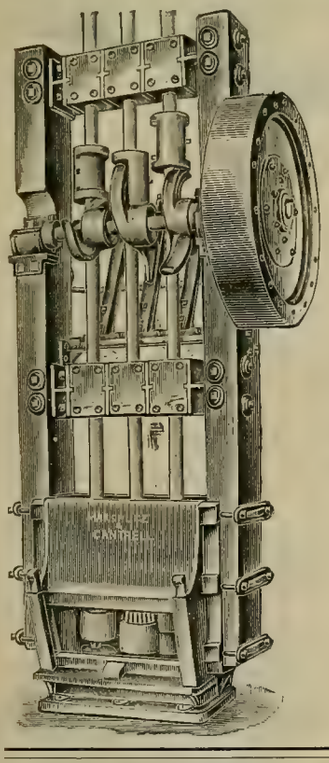

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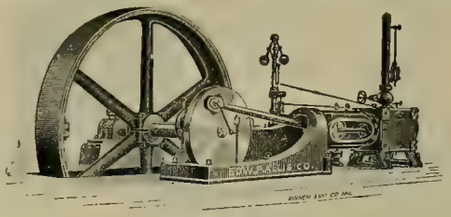

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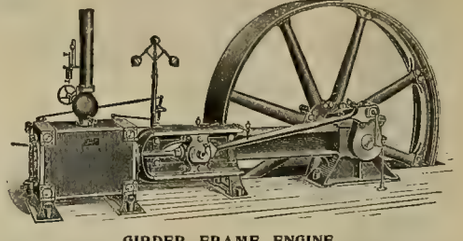

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By shipping your ores to us you can obtain the highest prices paid on competitive bids in the public market, together with a careful and accurate sample, as with our new mill and improved machinery we are able to give perfect satisfaction to all shippers. *Write for our Pocket Reference Book.* The highest cash price paid for gold bullion and old gold. Prompt returns.

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Adapted to all Heads from

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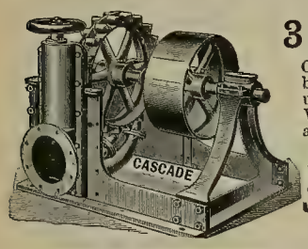

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THE CHEAPEST PLACE ON EARTH TO OUTFIT A MINE

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Ores tested and amalgamation and concentration mills built to **fit the ore** and guaranteed to save what we say. Coal Mine equipments, Screens, Jigs, Tramways, Arastors, Chillian Mills, Ore Sacks, etc. Cornish Rolls, 12x20, weight 6,000 lbs., price $350; Feeders, Bumping Tables; Blake Crushers, 7x10, weight 8,100 lbs, only $250. Our 100 page illustrated catalogue FREE.

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Rock Drilling, Air Compressing, Mining and Quarrying

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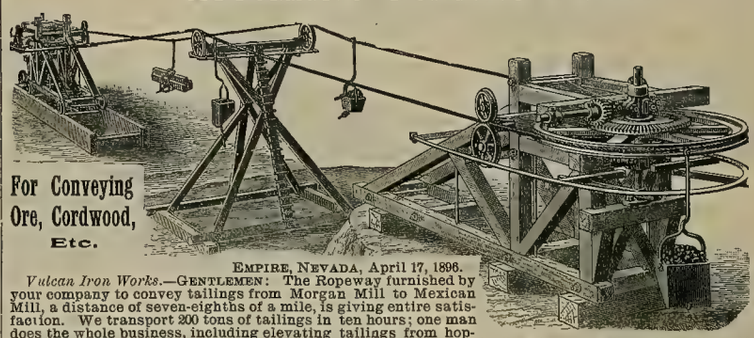
VULCAN ROPEWAY

—WITH—

AUTOMATIC ORE LOADER AND AUTOMATIC DUMPING DEVICE.



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EMPIRE, NEVADA, April 17, 1896.

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Yours very truly, J. P. WOODBURY, Supt.

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IF YOU HAVE A SMELTER--YOU WANT IT.
IF YOU HAVE A COPPER MINE--YOU NEED IT.
IF YOU HAVE A CYANIDE PLANT--YOU OUGHT TO HAVE IT.
IF YOU OWN CHLORINATION WORKS--YOU SHOULD BUY IT.
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IT IS ABSOLUTELY ACID PROOF---TRIED AND PROVEN.

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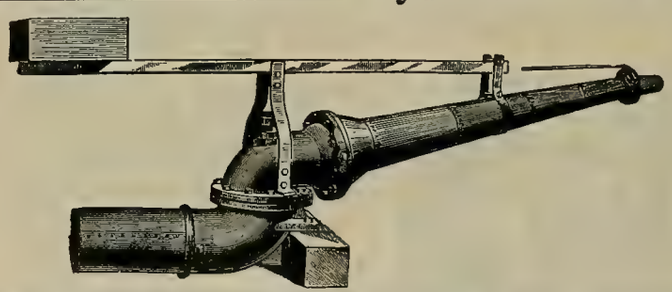
You Can Order It From Your Dealer.

Double-Jointed Ball-Bearing Hydraulic Giants.



The above presents an improved **Double-Jointed Ball-Bearing Hydraulic Giant** which we build. The improvement consists of the introduction of a **Ball Bearing** by which the pressure of the water is reduced to a minimum and the direction of the nozzle changed at will with ease.

Catalogues and prices of our specialties of HYDRAULIC MINING MACHINERY furnished upon application. JOSHUA HENDY MACHINE WORKS, 38 to 44 Fremont St., San Francisco, Cal.

ADAMANTINE SHOES AND DIES

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CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

STAMP SHOES.

STAMP DIES.

These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

Manufactured by CHROME STEEL WORKS, Brooklyn, N. Y.

H. D. MORRIS & CO., Agents, 141 and 143 First Street, San Francisco

Special attention given to the purchase of Mine and Mill Supplies.

Stamp Cam.

H. D. MORRIS & CO., DEALERS IN MINING MACHINERY AND SUPPLIES.

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MANHATTAN RUBBER BELTING, PACKING AND HOSE,
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LIGHT STEEL RAIL.

THE FINLAYSON PATENT WIRE ROPE TRAMWAY.

THIS TRAMWAY IS THE BEST THAT HAS EVER BEEN PLACED ON THE MARKET. IT HAS NO RIVAL. IT IS STRICTLY AUTOMATIC AND ITS CAPACITY RUNS UP TO 1000 LBS. PER BUCKET. ANY ONE CONTEMPLATING THE ERECTION OF A TRAMWAY SHOULD INVESTIGATE ITS MERITS BEFORE PURCHASING ELSEWHERE. . . . . .

THE COLORADO IRON WORKS COMPANY, Denver, Colo.

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WE ARE MANUFACTURERS OF AND CONTRACTING ENGINEERS FOR **Gold, Silver, Lead, Copper and Pyritic SMELTING FURNACES.**

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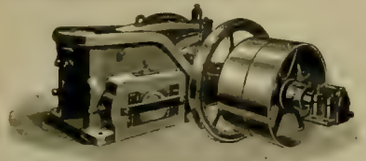
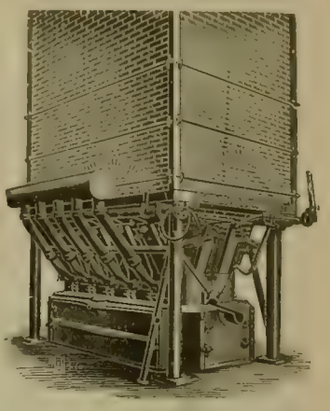
Investigate Our Late Improvements in ORE CRUSHING MACHINERY.
We Guarantee Capacity Per Day to Any Degree of Fineness.



Improved Black Hawk Ore Breaker.

OUR PATENT HOT BLAST APPARATUS for all Smelting Furnaces is a Success. A great economizer of fuel, and enlarges capacity of furnace.



Standard Silver-Lead Water Jacket Smelting Furnace.

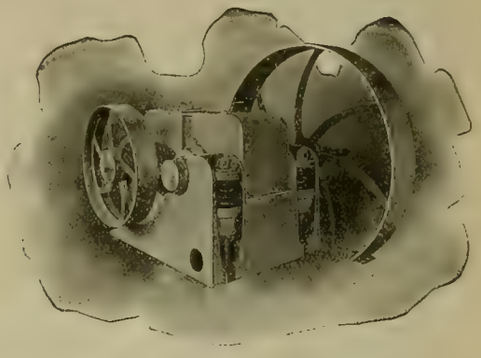
Equipped with Arch-Bar System of Mantles, insuring rigid and strong walls. No Cracks.

Denver Crushing Rolls!

Constructed Upon New Principle!

SIMPLE! COMPACT! STRONG!

Few Parts. Easily Accessible.
High Speed. Maximum Capacity.



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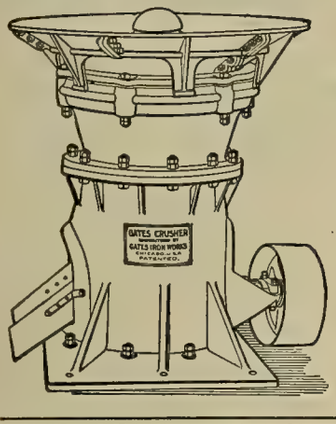
MODERN SMELTING, MINING AND MILLING MACHINERY.

Denver Engineering Works Co, Denver, Colorado, U. S. A.

GATES ROCK AND ORE BREAKER



still leads the world. It has greatly cheapened the cost of macadam and ballast, and made low grade ores profitable 180 large sizes shipped to South Africa.

General Mining Machinery of improved designs. Nothing equal to **High Grade Cornish Rolls,**

Stamps, Concentrators, Connersville Blowers, High Speed Engines,

Cyanide and Clorinating Equipments.

The Gates Improved Vanner Concentrators.

Every appliance for the mining and milling of ores.

Agent for Gates Breakers in California,
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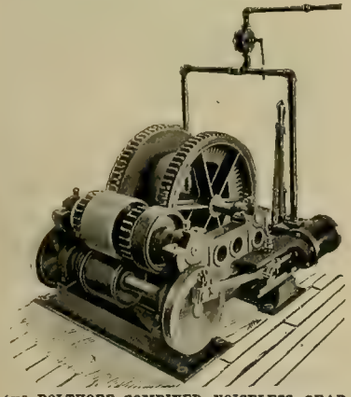

6x8 BOLTHOFF COMBINED NOISELESS GEAR AND FRICTION HOIST.—Pat. Oct. 6, 1896.

"Things are in shape to push."
—*Gen. Sheridan to Gen. Grant.*

"Push things."
—*Gen. Grant to Gen. Sheridan.*

WE HAVE IN SHAPE TO PUSH OUR NEW

Botlhoff Combined Noiseless Gear and Friction Hoist.

It is pre-eminently the

STRONGEST, MOST DURABLE, COMPACT and ECONOMICAL

Small Hoisting Engine Ever Built.

"IT'S A GOOD THING. PUSH IT ALONG!"

WRITE FOR DESCRIPTION AND PRICES. MENTION THIS PAPER.

HENDRIE & BOLTHOFF M'F'G CO.,

Denver, Colorado, U. S. A.

Market Reports.

The Markets.

SAN FRANCISCO, July 15, 1897.

It is doubted no longer that the tide of better times has set in, and while there will be quiet spells, yet there will be a steady growth of confidence and expanding business. The years of depression are giving way to years of greater prosperity. For the former we are largely indebted to the introduction of labor-saving machinery in every industry and avenue of life, which steadily threw out of employment wage-earners who, in turn, sought other avenues for obtaining means to meet the necessities of life. To the setting of the tide to better times we are indebted to the wage-earners successfully drifting into new avocations, which seem to be enlarging as the requirements of changed conditions make themselves felt. In a thorough canvas of this city among bankers, merchants and manufacturers there seems to be a unit of opinion that we have seen the worse for several years to come, and that 1898 will be a more prosperous year than for over a decade. In this State, and as for that on the entire Pacific coast, the outlook is of a most cheerful character. The gold mines never before turned out so much bullion as they are at present, while the number of miners at work was never before equalled. Aside from this, farmers are doing well. Good to high prices ruling for nearly every article grown or raised, with the crops above an average, together with lower transportation, will put the farmers, orchardists and others on a good substantial financial footing.

The banks report a plethora of funds, with the rate of interest ranging from 4 to 6 per cent on gilt-edge to good call paper. The banks report a very light inquiry, but look for an improving demand to set in soon. The call they expect will extend to nearly every industry and line of trade. The output of silver on this coast, according to the Selby Smelting and Lead Company, does not show any increase over that at the corresponding time in 1896, but gold shows quite a gain, with every section showing an increase. This out-turn helps very materially in increasing the available supply of funds for loaning. The East reports a more active market, which is freely met without advancing the rates of discount. The *Wall Street Journal* says: The low rates for money are unremunerative, and it is not very easy to loan money for 60 and 90 days in quantity. Last winter the low rates for time money greatly facilitated the accumulation of exchange, and good rates now would bring an immense flood of bills on the market. Unfortunately there seems little prospect of material advance in money for some little time at all events.

New York Silver Prices.

NEW YORK, July 15.—Following are the closing prices for the week:

	London.	N. Y.
Friday	27 11-16	60¼
Saturday	27 11-16	60¼
Monday	27⅝	60⅛
Tuesday	27 9-16	60⅛
Wednesday	27 9-16	60⅛
Thursday	27 9-16	60⅛

	Copper.	Lead.	Iron.	Tin.
Fri.	11 00 @11 25	3 65	10 00@12 00	13 90
Sat.	11 00 @11 25	3 60	10 00@12 00	13 95
Mon.	@	3 60	10 00@12 00	13 95
Tue.	11 10 @11 12½	3 55	10 00@12 00	13 95
Wed.	11 10 @11 12½	3 52½	10 00@12 00	13 95
Thur.	11 10 @11 12½	3 52½	10 00@12 00	13 95

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	—
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	—
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	12½c Prem
New York Telegraphic Transfer	15c Prem
London Bankers' 60 days	4.87
London Merchants	4.85
London Sight Bankers	4.88
Refined Silver, per oz., 1000 fine	60⅛
Mexican Dollars	48@48⅝

SILVER.—The market shaded off slightly, but towards the close it was held fairly steady at the reduction. There is a fair export inquiry here for China and East Indies. At the East there is a fair movement to Europe. London continues to report a good movement, all things considered, to East Indies and Russia, but only fair to other countries. It is expected that China, East Indies and the Straits will take more next year. Bradstreet's says the expected issue of an Indian Government rupee loan and a decline of discount rates in India, the Bank of Bengal having reduced its rate to 6 per cent, are apparently responsible for a hardening in silver prices. The expectation is that, under the circumstances, India will be a moderate purchaser. The improvement, however, was slight, the quotation for bars in London rising from 27 9-16d to 27 11-16d, while the commercial price here advanced from 60c to 60⅛c per ounce.

MEXICAN DOLLARS.—There is a continued fairly free demand for China. The supply is large, both for spot and to arrive.

QUICKSILVER.—Our market is steady. New York reports strong selling competition, which causes some cutting. The receipts at this port last month aggregate 1352 flasks, against 2307 flasks for the same month last year.

Our market is quoted at $40 for domestic consumption.

COPPER.—The market has held to fairly steady figures the past week, both at home and abroad; the consumption is reported to be increasing.

The local market is quoted as follows:

Ingot casting, jobbing	18@—
Ingot " wholesale	12½@—
Sheet copper	—@16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½

TIN.—The market is holding fairly steady for both pig and plate.

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

LEAD.—The market is weaker at the East, having recovered somewhat from its awakening over the decision we published last week.

Our market is quoted in jobbing lots as follows:

Pig	— @ 4 50
Bar	— @ 4 60
Sheet	5 75 @ 6 00
Pipe	5 00 @ 5 25

SHOT.—The market is firm.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 35
Drop, B and larger sizes, " "	1 60
Buck, Balls and Chilled, do, " "	1 60

POWDER.—The market is steady.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9c to 11c, according to strength and quantity.

IRON.—There is a continued free consumption in our market, which keeps the market fairly steady, although some cutting is reported at times to place a fair sized consignment.

AMERICAN.	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50
ENGLISH.		
Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

COAL.—Australian for shipment is offering at from $5 to $5.25. The market for spot and to arrive is practically unchanged.

We quote as follows:

SPOT FROM YARD—PER TON.	
Wellington	$8 00@— —
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Guman	5 50@ 6 00
Seattle	5 50@ 6 00
Coos Bay	—@ 4 75
Cannel	8 00@— —
Egg, hard	12 00@13 00
Wallsend	6 50@— —
TO ARRIVE—CARGO LOTS.	
Australian	5 50
Liverpool Steam	6 25
Scotch Splint	—
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	9 50	@	— —
" spot, in bulk	10 00	@	— —
" in sacks	11 00	@	12 00
Cumberland	— —	@	— —

ANTIMONY.—The market is steady.

Our market is quoted at 7¼@8¼c in a jobbing way. New York mail advices quote 7½c for Cookson's, 6⅞@7⅛c for Hallett's and 6⅞@7c for Japanese.

NAILS.—The market is strong.

Wire, carloads, basis per keg	$2 35
" jobbing, " "	$2 35
Cut, carloads, " "	2 25
" jobbing, " "	2 25

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4¼

PLATINUM.—The market is quiet.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is barely steady.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 50 cents per pound for ingots.

Chemicals.

Importers and jobbers say that there is nothing new in any line, and that there will not be until following the passage of the tariff bill by both houses of Congress. Owing to the disagreement on several schedules, dealers do not seem disposed to operate except on a certainty.

SPELTER.—The market is quiet

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is steady.

Our market is quoted in a jobbing way at $1.50 a pound.

BONEASH.—There is a good movement at firm figures.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is firmer.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firmer at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is quiet at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—There is a fair demand at 2½c a pound from stores.

NITRATE OF SODA.—Market is steady.

Our market is quoted from store at 4c for 95%.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

SULPHURIC ACID.—The demand is fair.

We quote in a jobbing way at 1½c per lb for 66°.

NITRIC ACID.—Our market is reported firmer from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is steady.

We quote in a jobbing way at 4½c per pound.

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Alpha Con M & M Co, Nev.	19	10c	July 8.	Aug 12. Sept 2.	C E Elliott, 309 Montgomery
Best & Belcher M Co, Nev.	62	25c	July 1.	Aug 5. Aug 26.	M Juffe, 309 Montgomery
Brunswick Con G M Co, Cal.	12	3c	June 22.	July 22. Aug 14.	J Stadtfeld, 309 Montgomery
Bullion Con G M Co, Cal.	11	22c	June 22.	Aug 2. Aug 23.	C A Grow, Mills Bldg
Eureka Con D M Co, Cal.	9	3c	June 30.	Aug 7. Aug 28.	D M Keat, 330 Pine
Gold Hill M Co, Cal.	12	25c	June 16.	July 26. Aug 12.	C A Grow, Mills Building
Jamison M Co, Cal.	9	5c	Nov 27.	June 23. Aug 18.	Sam W Cheyney, 120 Sutter
Nth G & C G & S M Co, Nev.	18	10c	June 26.	July 28. Aug 14.	E W Sichel, 337 Pine
Osceola Con M Co, Cal.	6	1c	June 30.	Aug 2. Aug 21.	Holland Smith, 307 Montgomery
Pine Hill G & S M Co, Cal.	10	5c	May 10.	July 1. July 22.	Chas A Hare, 1003 Railroad Ave
Rose Creek M Co, Cal	1	15c	June 28.	July 28. Aug 30.	J M Wilmans, Crocker Bldg
Thorpe M Co, Cal.	7	2½c.	June 9.	July 17. Aug 9.	A F Frey, Phelan Building
Utah Con M Co, Nev	25	5c	July 6.	Aug 9. Aug 30.	A W Havens, 309 Montgomery

Mining Share Market.

SAN FRANCISCO, July 16, 1897.

Trading on the two exchanges has been light outside cross-orders. The general public will not come in to any extent unless ore is shown up in sufficient quantities to assure dividends. There have been so many false reports about ore put out on the street and through the press that moneyed outsiders pay but little attention to what they hear or read about the mines. So long as some of the mills and mines are run as they have been for years past, just so long will there be a lack of confidence. If the powers that be are desirous of inspiring confidence and show to the world that the mines are worked and ore milled in the interest of all shareholders, it would seem as if they would have the two run separately and distinct, and not, as is generally supposed, in collusion by which outsiders get assessments and insiders get the bullion. The steady levying of assessments is not calculated to help matters, but it may be shares and not money that is wanted.

The work on the Comstock lode ought to attract attention within the next two or three months unless it is turned to one side or stopped. The work at one or two points on the Brunswick lode ought to attract more attention soon. In the Bodie district preparations have been under way for some time for more extensive work this year than for several years past.

The news from the Comstock mines is rather unimportant to outsiders, but to those informed on the mines it is quite interesting, for much of it is still in the right direction; yet, as has been done quite often in the past, it may be changed or stopped just in time not to strike ore. Interest by outsiders changes from week to week, being guided by the share market manipulator through street pointers or cappers and also by write-ups. Last week it was Sierra Nevada and Yellow Jacket, and now they are directing attention to Potosi on the Brunswick lode. This work was mentioned in this paper some time ago, and therefore is nothing new. From Utah we are without anything of special interest to report. Clay seams and lines of quartz are still cut by the north drift. In Sierra Nevada west crossdrift No. 3 on the 900-foot level has been advanced at last advices over 20 feet, without finding anything of importance. No ore strike is expected to be reported unless for the purpose of striking shorts down here. The work reported on the Layton tunnel is in the wrong direction for finding much ore. In Union work is confined still to the 900-foot level.

They continue to find 75-cent ore in Mexican on the 1000-foot level in the southwest drift. At last advices there was a seepage of water. In Ophir they were at last advices in $1 ore on the central tunnel level. This will help them to collect an assessment before long. On the 1000-foot level there is nothing new to report. No. 3 west crossdrift is not quite far enough in to be stopped. In Con. Virginia active exploiting work is being done on the 1000-foot, 1550-foot and 1650-foot levels, with varying success. There was raised the past week twenty-two tons of ore assaying slightly over $39 to the ton. There is no change in the Best & Belcher and Gould & Curry joint work. In Savage the usual routine work is reported. No work is reported in either Hale & Norcross or Chollar. In Potosi they are running a south drift, raising to the surface, repairing shaft and doing dead work. They hoisted seventy-four tons of low-grade ore. It assayed about $8 in gold and nine ounces in silver. The Nevada mill crushed a little over 110 tons of ore. In Alpha they have been doing some dead work on the 500-foot level. There is nothing new reported from the joint west crossdrift of Con. Imperial, Confidence and Challenge. It is given out that the west country will be thoroughly exploited jointly by Yellow Jacket, Kentuck and Crown Point on the sage brush level and by Yellow Jacket on the 1000-foot and 1100-foot levels. If the work is done in the interest of shareholders there can be no doubt of the result, but very few have confidence that it will. From Crown Point, Belcher, Seg. Belcher and Overman nothing new has come to hand. The three latter continue to raise some ore each week.

On the Brunswick lode the news is rather interesting for it indicates that the Potosi mine will be developed, for, it is stated, the ore improves running south in the Chollar ground. The joint work of Con. Virginia, Best & Belcher and Gould & Curry is practically the same as reported in our last week's review. In No. 2 shaft they have about finished cutting out a station to develop the 600-foot level. It is expected that good results will follow work on this level if run into Con. Virginia. In Chollar they are working towards Potosi on the 400-foot level. They have commenced exploiting on the 600-foot level. There was extracted last week 102 tons of ore of fair grade, assaying over $14 gold and about 15 ounces silver. From Occidental there is nothing new to report.

The following illustrates the changes of the week:

Mines.	July 8.	July 15.
Alpha	$ 15	
Alta Consolidated		
Andes		
Belcher		$ 22
Best & Belcher	45	41
Bodie		
Bullion		
Challenge		
Chollar	76	80
Confidence		
Consolidated California and Virginia	1 35	1 30
Consolidated New York		
Crown Point	18	18
Exchequer		
Gould & Curry		34
Hale & Norcross	87	
Justice		
Mexican	38	32
Ophir		64
Overman		
Potosi		48
Savage		
Sierra Nevada	98	83
Union	44	41
Utah	08	06
Yellow Jacket	47	50

Regarding Colorado's mining share market, Frank H. Pettingell writes from Colorado Springs, Colo.: "The market is again in a very unsatisfactory condition, and why? Because the hand of manipulation is too keenly felt. The experience of those who have bought recently purely for investment, based on reported improved condition of the properties, have invariably sustained losses. Of Mollie Gibson we have nothing to remark at present, but prefer to await further develop-

WILL NEGOTIATE with owners or their duly authorized agents only.

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THE DEMAND FOR STUMP PULLERS.

Another order for a California Stump Puller has just been received from Honolulu. This makes the second within a year from Hawaii. Three more to Mexico, one to Central America and one to Siberia, indicates the growing favor in which these machines are held.

Send to A. BARNES, Gen'l M'g'r. 82-84 Zoe St., S. F., Cal.

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ment before making any attempt to explain to those who bought at the highest figures, at a time when they or their brokers knew not why. That 'there is no fool like an old fool,' is effectively illustrated when we recognize the identity of those who are sullenly nursing fancy-priced Mollie Gibson. We prayerfully hope that each phenomenal strike recently circulated regarding this resourceful property will be more than substantiated by facts that cannot be questioned. It is with deep gratification that we observe whenever this stock advances, as of late, a similar effect overflows to the entire list. Activity can do the market no harm, whether of a downward character or not. It promotes interest; it inspires confidence as to the permanency of trading. If some stocks are too high, they cannot decline too soon to effect a permanent adjustment of values. Manipulation should be frowned down and actual mining encouraged, at the detriment of the imaginary. If Mollie Gibson goes up and remains, other stocks possessed of true merit will surely follow in its wake. The eyes of investment are carefully watching the situation, and, if proper discretion is used by influencing operators, good times cannot be avoided. No line of investment presents as many attractions as gold mining, and no State rivals Colorado, and no stocks compare with those listed on the Colorado Springs Mining Stock Association. Development, prospecting and production are progressing at Cripple Creek without interruption and with results almost beyond the hopes of the most sanguine. We recommend no particular stock, and only ask that actual conditions be inquired into. A 'boom' is not wanted by the conservative, and no intelligent operator predicts one. The ignorant penny stock speculator who buys for a 'flyer' is tottering on his last legs, and, having imbibed beyond his capacity in 'flyers' and little else, will find that his cloud of mining stocks has no silver lining. Mining is not benefited by this class of visionary and pretended investors; printer's ink, postage and time are too expensive to even attempt to successfully treat those painful cases, and they invariably become such after a series of transactions, for sooner or later they fall by the wayside of poor judgment, and then rend the atmosphere with howls of the swindling tactics of all connected with mining. If by any possible circumstance they encounter profit, no secrect is so perfectly guarded. Why not, instead of courting these rainbows, utilize our efforts to attract the careful, experienced and energetic representative of known capital who desires mines, purchases only on expert examinations, thereby benefitting the entire industry, the State and his principals. There are few evidences of anything discouraging but the few little drawbacks that accompany all business, and, because they relate to mining, it is no sign they should be magnified."

Under date of Salt Lake City, July 9th, James A. Pollock writes regarding the Utah mining stock market:

"This week showed no inclination towards a resumption of activity. There is a steady business going on, but the demand for stocks is not sufficient to put any snap into the market, which seems to be settling down to the annual dullness at this season. Stocks are a purchase now, and with any further tendency to sag they are bargains for the buyer. I earnestly advise clients to watch the silver stocks and to keep in touch with the silver situation. There will be more opportunities to make money in low-priced silver stocks within the next one or two years than have ever before been presented.

"Ajax was fairly active, but prices were somewhat shaded again. The company has about decided to sink several hundred feet deeper in order to open up the ore bodies which have produced so generously above, and which have gone down to the 1600-foot level in the Mammoth. Only very limited inquiry occurred for Anchor, while Alliance was entirely neglected. Bullion-Beck was in a little better demand and fair business occurred at advanced figures. The grade of ore being produced has improved somewhat and the outlook seems more favorable. It is not likely that dividends will be resumed this month. Buckeye has levied a one-cent assessment. Prices were again lower.

"Practically no offerings were made of Centennial-Eureka. There seems to be no sellers at would-be buyers figures. Some business was done in Chloride Point at last week's figures, but there is but little local demand. Dalton is reported to be looking very well, but business in the stock was not heavy. Orders have at last been given to fire up at the Marsac mill of the Daly company. A large supply of ore is at hand at the plant and the mines are in good condition. The stock should see better figures. Daly-West changed but little and business in the stock was at a standstill. Only light business was done in Dexter, although prices were a little firmer. Dalton & Lark was stronger.

"Eagle was hardly as active as during the previous week, but there was no shading of prices. Four Aces was featureless. The company is doing a great deal of development work. Geyser-Marion was very active, as usual, and while prices changed little they remained quite firm. On the present selling price the stock is paying 26 per cent annually. The properties are officially reported to be in splendid shape and both mills are at work. Galena is sending in some very high grade ore. The stock did some business at last week's figures. Horn silver is doing well. Little Pittsburg has changed but little for some time past, but is not doing heavy business just now.

"The Mercur's July dividend books may not close for a few days on account of President Dern's absence from the State, but the usual amount is assured. On very limited offerings the stock continues strong. At the properties the showing is excellent. Mammoth is just resuming mill operations. The stock gives promise of great strength. Northern Light was quite active at last week's bidding figures. Ontario's continued regular dividend payments has attracted much favorable attention to the stock and prices were firmer. Omaha did some business at unchanged figures.

"Sunbeam has held its annual meeting and should resume operations next week. The stock was stronger again. Swansea has paid its July dividend of five cents, and South Swansea has declared the regular amount to be paid on the 21st. Both stocks were somewhat stronger. Silver King's usual dividend of twenty-five cents is due to-morrow. Sacramento did some business at a slight advance. Sunshine was not active and last week's figures governed. Tetro is pushing development work with great energy. Utah was on the market with some splendid ore."

San Francisco Stock Board Sales.

SAN FRANCISCO, July 15, 1897.
9:30 A. M. SESSION.

200 Best & Belcher	39	100 Potosi	43
300 Chollar	76	250 Sierra Nevada	83
100 Crown Point	18	300 Union	41
100 Mexican	32	300 Utah	06
100 Ophir	82	200 Yellow Jacket	49

SECOND SESSION—2:30 P. M.

400 Ophir	64	1000 Potosi	48
400 Mexican	32	200 Yellow Jacket	50
600 Gould & Curry	34	350 Sierra Nevada	80
50 Best & Belcher	41	100 Union	41
100 Con Cal & Va	1 30	300 Occidental	11
800 Chollar	80		

Rainfall and Temperature.

The following data for the week ending 5 A. M., July 14, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

CALIFORNIA STATIONS.	Total Rainfall for the Week	Total Seasonal Rainfall to Date	Total Seasonal Rainfall Last Year to Same Date	Average Seasonal Rainfall to Date	Minimum Temperature for the Week	Maximum Temperature for the Week
Eureka	00	.03	00	.06	50	62
Red Bluff	00	00	00	.01	60	106
Sacramento	00	00	00	00	55	105
San Francisco	00	00	.04	T	47	82
Fresno	00	00	00	T	54	110
San Luis Obispo	00	00	.04	.....	46	90
Los Angeles	00	00	00	T	52	86
San Diego	00	.01	00	T	60	74
Yuma	T	T	00	.07	78	112

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from the May Flower Gravel Mining Co., in the May Flower Mine, near Forest Hill, Placer Co., to deposit tailings in Black Hawk Creek; from Dr. J. P. Weich, in the Pactolian Mine, near Genesee, Plumas Co., to deposit tailings in Grizzly Creek; from the Gold Bug Mining Co., in its mine near Georgetown, El Dorado Co., to deposit tailings in Canon Creek; and from E. D. Bowman et als., in the Eclipse and Boston Claims, near Onion Valley, Plumas Co., to deposit tailings in Poorman's Creek, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on August 2, 1897, at 1:30 P. M.

STOCK IN THE
Copper King of Arizona
Can be had by applying to
C. W. BLACKBURN, Fiscal Agent,
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Assessment Notices.

ROSE CREEK MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Star, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 24th day of June, 1897, an assessment (No. 1) of 15 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 163, Crocker building, junction Post, Montgomery and Market streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 14th day of August, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 7th day of September 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. M. WILMANS, Secretary.

Office—Room 163, Crocker building, San Francisco, California.

BEST & BELCHER MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Virginia District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 1st day of July, 1897, an assessment (No. 62) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 35, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 5th day of August, 1897, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on THURSDAY, the 26th day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

M. JAFFE, Secretary.

Office—Room 35, Nevada block, 309 Montgomery street, San Francisco, California.

OSCEOLA CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Amador County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 30th day of June, 1897, an assessment (No. 6) of 1 cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 307 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 2nd day of August, 1897, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on SATURDAY, the 21st day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

HOLLAND SMITH, Secretary.

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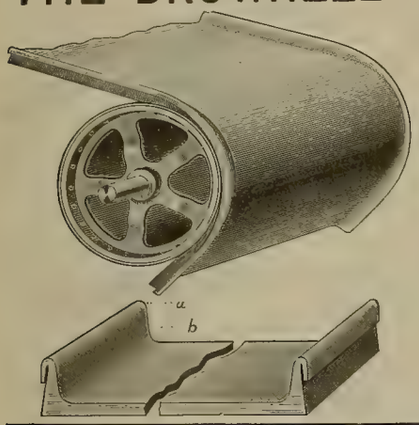

It has taken years of ceaseless testing and experimenting to produce the superior belt which we now offer, with elastic flanges and pliable body reinforced with specially woven duck. Every belt is manufactured by experienced workmen, and carefully tested on machines especially built for that purpose; consequently we are to day manufacturing the best belts that mechanical ingenuity, combined with honesty of construction, can possibly produce.

ORIGINAL EMPIRE MILL & MINING COMPANY,
GRASS VALLEY, NEVADA CO., CAL., Feb. 20, 1897.

JAS. S. BROWNELL, ESQ., San Francisco, Cal.—DEAR SIR: The Brownell Patent Lip flange belt for ore concentrators, which I bought of you nearly two years ago, has been in constant use and is in good order and gives us perfect satisfaction. We have several other kinds of belts in the mill, and your belt and flange I consider the best of all. Yours respectfully, ROBT. WALKER, Superintendent.

ROANOKE MINING COMPANY,
MOKELUMNE HILL, March 4, 1897.

MR. JAS. S. BROWNELL, 132 Market St., San Francisco, Cal.—DEAR SIR: We have in our 20-stamp mill at this place five Frue vanners; three of these are equipped with the Patent Lip flange belt and two with the plain flange belt. We certainly consider the former a great improvement on the latter. They will certainly wear much longer, as cracking now seems out of the question. Any one purchasing the Frue vanning machine should see that it is equipped with the Patent Lip flange belt. Very truly yours, ROANOKE MINING COMPANY.
Per G. M. WILDE, Acting Superintendent.

For any information regarding Frue Vanner or Belts, call on or address

JAS. S. BROWNELL, Western Agent FRUE VANNING MACHINE CO.

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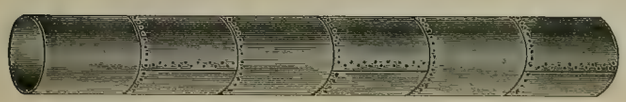

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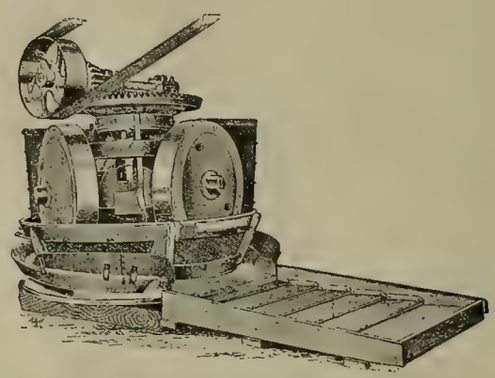

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ROPP STRAIGHT LINE FURNACE

FOR ROASTING, CHLORINATING AND SULPHURIZING ORES.

Extracts from Letters Received from Mr. Phil. Argall, Manager the Metallic Extraction Co., Cyanide, Colorado:

January 2, 1897.

"The roasting is invariably good. We can [illegible] tons per day to 0.13% sulphur, when everything runs smooth. Our month record which, of course, includes all delays, is 1700 tons, from 1.94% sulphur to 0.16%."

February 19, 1897.

"Our furnace is now running very nicely indeed, averaging 90 tons per day to 0.10% sulphur, and doing excellent work; in fact, it has improved right along and we are highly pleased with it.
"For 24 hours ending 7 A. M. to-day 102 tons were roasted."

The ROPP FURNACE is now in successful operation at the following reduction works: The Hanauer Smelting Works, Salt Lake City, Utah (one furnace); The Metallic Extraction Co., Cyanide, Colo. (one furnace); The Colorado-Philadelphia Reduction Co., Colorado City, Colo. (three furnaces); The Selby Smelting & Lead Co., Selby, Cal; (one furnace); The Mount Morgan Gold Mining Co., Rockhampton, Queensland (one furnace); and Broken Hill Proprietary Co., Broken Hill, New South Wales (two furnaces).

Catalogue on Application.

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MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1933.—VOLUME LXXV. Number 4. SAN FRANCISCO, SATURDAY, JULY 24, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Recent Improvements in Gas Engines.

Herewith is illustrated one of the latest products of the Union Gas Engine Co.—a 4 H. P. marine engine, fitted to run on kerosene. Similar engines fitted to run on gasoline and naphtha have been built under the patents of this company for the past ten years. No entirely successful kerosene engine for marine service has heretofore been built in America where the kerosene vapor is taken into the cylinder of the engine and there exploded.

The charge in the cylinder is ignited by an electric spark, which does away with all fire or flame outside the cylinder after the engine is started.

Before starting a torch is used for five minutes to heat the vaporizer, after which it is extinguished. The care required is the same as in the ordinary gasoline engine. This invention is deemed of value in making this type of engine available in countries and places where gasoline, naphtha, or benzine are not obtainable.

The lower cut shows the latest improved five-horse power "Union" stationary engine, fitted to run on either common stove gasoline, naphtha, benzine, or city gas. This engine is designed for running centrifugal pumps, dynamos, ventilating fans, and high-speed machinery. Its normal speed is about 420 revolutions per minute. When intended to drive a dynamo, for electric lighting, two fly-wheels are supplied, as per cut. The builders say it will develop five-horse power on the pulley, on a consumption of 20 cubic feet of gas per actual horse power per hour.

These engines are built in various sizes by the Union Gas Engine Co. of this city. This pioneer company has a reputation for good workmanship and progressiveness second to none.

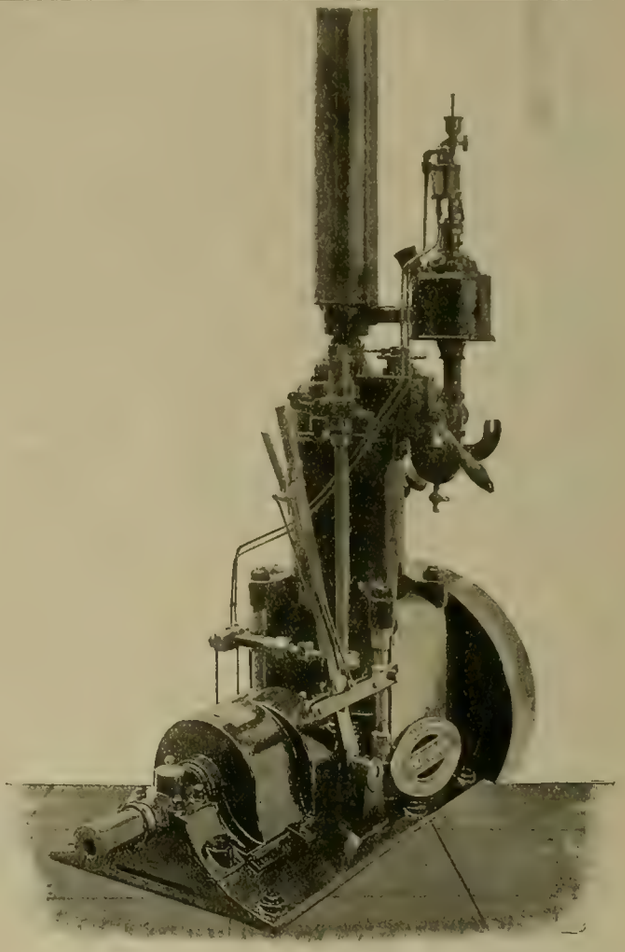
THE expenditure on the mines of the Rand, South Africa, in 1896, amounted, according to the State Mining Engineer, to £10,681,000, while the gold produced figured up £8,603,821. Of the money spent, £7,131,000 was put down to the 79 producing mines and £3,547,000 to 106 non-producing mines. For an expenditure of £7,-134,000 the producing mines made a profit of about £1,500,000. Much of the money spent was in the way of developing new mines—permanent improvements which were not expected to make any return. Yet a very large proportion of the producing mines made no profit, and under present conditions cannot be made to pay. It has been shown that with reductions in the cost of working that can be brought about by getting rid of the dynamite monopoly, and reductions in the exorbitant railway charges, and in other directions many mines now not capable of yielding profits could be made to pay. In most of the mining districts of the world at the present time the amount of money being expended in development work and the erection of mills and machinery is out of proportion to the yield of gold. But for every dollar being put in many will be taken out in the future.

The Treadwell Mine.

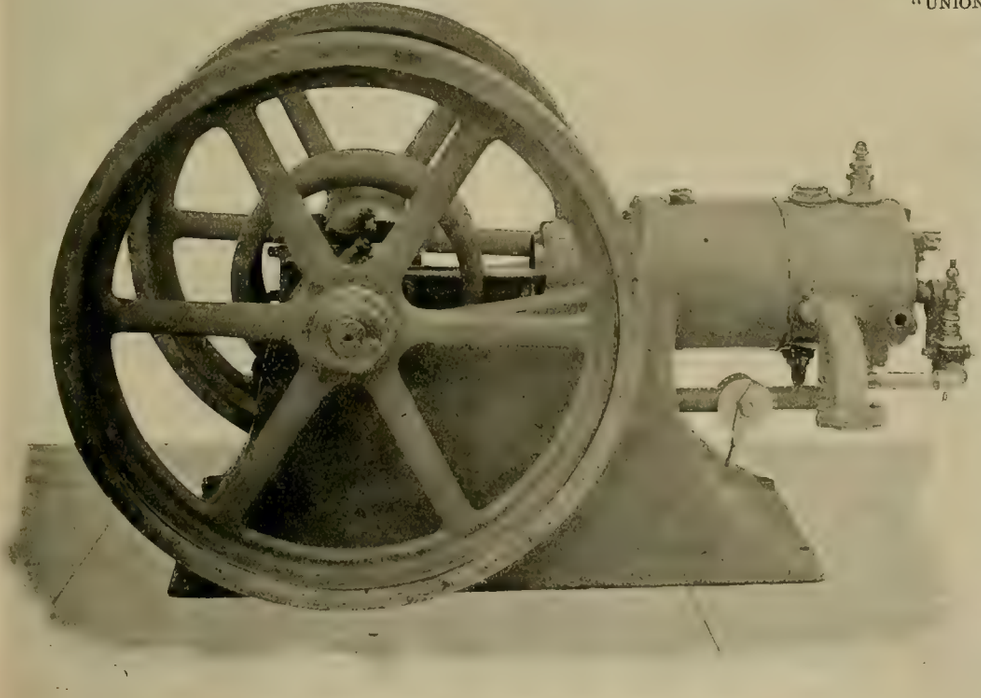
Capt. Thomas Mein, San Francisco agent of the Exploration Company of London, has sent on a report on the Alaska-Treadwell mine, in which he says that while the pay ore has not become richer in depth the deposit is much larger than there was reason to believe from the developments made up to the time he left the mine. In the east end there is a block of ground embracing two sections, which were considered waste, but which have been proved by new development on the 220-foot level to be the best ore in the mine, and there are 400,000 tons of good milling ore in the block. Superintendent Duncan has estimated that there are 2,960,014 tons in sight, but he is said not to have allowed for the ore above the adit level and only for ore exposed to the end of the drifts being run. For these reasons Captain Mein says there are 5,000,000 tons above the 220-foot level, and it is safe to estimate it will last 100 feet below that level, which would make 7,000,000 tons. To obtain additional power it is proposed to build a dam on Lemon creek, and to erect another electric plant. Captain Mein recommends the putting up of another 240-stamp mill at a cost of $500,000, and says that with 480 stamps the cost of mining and milling the Alaska-Treadwell ore would not exceed $1 a ton.

The Alaska-Treadwell mine has long been noted for having the largest stamp mill in full operation in the world, and for working ores at a cheaper rate per ton than any other large mine. The great advantage in this respect is the fact that the rock is quarried, practically.

This and other mines are also giving promise of holding out in depth.



"UNION" MARINE ENGINE, USING KEROSENE.



"UNION" STATIONARY GAS ENGINE—LATE PATTERN.

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San Francisco, July 24, 1897.

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The California Gold Yield.

Mr. Preston, the director of the Mint of the United States, has cut down the estimate of the statistician of the gold yield of California for 1896 from $17,181,562 to $15,235,000, and makes an explanation that will not be satisfactory to those familiar with some of the facts in the case. In his letter to Congressman De Vries, which will be found in another column, he says that Mr. Yale's estimate is based solely upon information furnished by superintendents and owners of mines, postmasters and express agents. Mr. Yale as an official of the Mint certainly had access to data as to receipts of bullion at the Mint and at the smelting and refining works. Besides that he had access to all information of the State Mining Bureau and brought to his work long experience. It might be pertinent enough to ask Mr. Preston why it was that he accepted Mr. Yale's figures for 1895 without making any changes. They were made up from data obtained from the same sources as those made use of in 1897. Certainly the officials of the United States Mint in Washington have had to do with the statistics relating to the product of the precious metals long enough to have found some permanent system for gathering data.

If they are to continue to take figures gathered in one way one year and those gathered in another way the next, the public will lose confidence in their work. This will not be an unmixed blessing if they do not do good work.

At a time when so much money is being invested in California mines any figures, such as those sent out by Mr. Preston alleging that there has been no increase in the yield, will make many would-be investors pause. They know that large sums were invested in California mines in development work and in the erection of mills, and that more stamps were dropping in 1896 than in 1895. If the yield is announced to be decreasing they will think that California is a declining mining district, when in fact no district in the world is in a more healthy condition. That the first figures—$17,181,562—were conservative is the belief of all who are at all familiar with the industry.

THE Mariposa correspondent of the MINING AND SCIENTIFIC PRESS writes this week that during the past three months the bullion shipments from the mines of that county have exceeded in amount those of the entire year 1896. In Tuolumne, Amador, Calaveras, Placer, El Dorado, Nevada, Siskiyou and Trinity, the leading producers, the number of stamps falling has been materially increased. In no part of the State has there been any indication of falling off in the yield by the closing down of mines. It is to be hoped that any statistics gathered this year on this subject will be better treated than were those of 1896.

The Yukon Fever.

The importance of the late discoveries in Alaska on the Yukon river—or rather in the British Northwest Territory—is apt to be exaggerated on account of the air of romance, the strange conditions and the amount of space given to them by the daily papers the world over. That very rich and very extensive gravel deposits have been discovered and will yield largely, there can be no question. In time quartz mines will be discovered, developed and worked; but that the country will radically affect the supply of gold in the world and its price, as some seem to suppose, is entirely out of the question. There is in the world to-day, in coin or in other shape, some eight billions of dollars in value. In case the Alaska gold fields should output in one year eighty millions of dollars, it would add only one per cent to the world's supply of gold. It is not at all probable that Alaska will turn out any such sum, or even a quarter as much, for years to come, unless very much more extensive gravel deposits are discovered.

The United States Geological Survey has issued a general statement as to the possibilities of the whole Yukon country. While they show that a very large district is yet to be prospected, they point out the fact that the source of the gold is a comparatively limited area and that near this, or within its limits, must be found all the rich quartz and placer deposits.

The discovery of pay gravel along the different creeks varies very much as to quality. On several of the creeks the rich deposits have already been worked, and those who worked them have gone to the newer discoveries. There were in the Territory, so it is estimated, two or three months ago, some 3000 miners. If each miner takes up, as is his privilege, 500 feet in length along a creek, they would be able to lay claim to no less than 300 miles of these placers. It is now said by the papers that some 20,000 people will go in this fall or in the spring. A little calculation will show that the Yukon placers must be much more extensive than is generally supposed to furnish even a moiety of these with claims.

In time, and it will probably be short, wages will be much lower, supplies cheaper, and much of the gravel that it will not pay to work under the present conditions will become valuable. This of course will make the Yukon country of more permanent and lasting value to the world at large than the present work that is being done.

Probably the greatest value of the excitement that has been caused by the reports that have come from the north is that it is apt to do much to dispel the business depression, loosen up money and improve trade. Curious as it may seem, reports from trade circles in San Francisco indicate that already, within a week after the first reports arrived at San Francisco, prices generally in the market have gone up and there is a better tone in every direction. In this direction, more than any other, did the discoveries of gold in California do the world good in increasing business, and being the cause, directly or indirectly, of new enterprises. In a material way the excitement caused by the discoveries of gold in California did nearly as much for the world's progress as did the output of gold.

It must be remembered that the news of the placer finds on the Yukon, if made where there was telegraph or postal communication, would have filtered out gradually and caused much less stir. The truth of this can be seen in the case of South Africa. There were discovered the greatest gold fields in the world, in some senses—for they are lasting, and are producing nearly as much as was produced in California in its palmiest days, and the output is now increasing fast. Cable communication gave full and definite information, that prevented people from going who had no business, yet, at the same time, drew in those who were wanted. There was no rush of inexperienced men.

Suppose no word came to the rest of the world from Mariposa county, California, from the first of this year until the first of next. Reports show that the yield for the past three months is larger than for all of 1896. What would be the result? Mariposa would attract the attention of mine investors the world over, and would send in more bullion per miner employed than does the Yukon.

The wisest men in the world are always apt to overestimate such discoveries as those made in the Yukon country. Michel Chevalier, the political economist of France, in 1857, in his work, translated by Richard Cobden, "On the Probable Fall in the Value of Gold and the Commercial and Social Consequences Which May Ensue and the Measures Which it Invites," wrote that, in consequence of the discoveries made in California and Australia: "In our day we seemed destined, like our fathers of three centuries ago, and from the same causes, to witness the spectacle—or, in other words, the shock and crisis—of a universal rise in prices; with this difference, however, that up to the present time the new discoveries affect only the production of one of the precious metals, gold, of which vast deposits of immense richness, hitherto unknown, have been successively discovered. * * * Under the influence of this greatly increased and cheapened production of gold it is reasonable to expect, at least in those countries where gold circulates in large quantities and where it is, or tends to be, the sole medium of exchange, a general disturbance of prices, deeply-felt derangement of interests, and a modification more or less radical in the different relations of society."

Chevalier suggested remedies and the political economists of the world put their heads together and devised means of meeting the changed condition of affairs. But all this was unnecessary; the human race needed no conditions, and the large output of gold was absorbed immediately in new industries and increased enterprises.

Advertising Out Co-owners Delinquent in Assessment Work.

A correspondent asks about the procedure in cases of advertising out co-owners of mining claims who refuse to do the required assessment work. On this subject section 2324 of the United States Revised Statutes says:

On each claim located after the tenth day of May, eighteen hundred and seventy-two, and until a patent has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year. On all claims located prior to the tenth day of May, eighteen hundred and seventy-two, ten dollars worth of labor shall be performed or improvements made by the tenth day of June, eighteen hundred and seventy-four, and each year thereafter, for each one hundred feet in length along the vein, until a patent has been issued therefor; but where such claims are held in common, such expenditure may be made upon any one claim; and upon a failure to comply with these conditions, the claim or mine upon which such failure occurred shall be opened to relocation in the same manner as if no location of the same had ever been made: *Provided*, That the original locators, their heirs, assigns, or legal representatives, have not resumed work upon the claim after failure and before such location. Upon the failure of any one of several co-owners to contribute his proportion of the expenditures required hereby, the co-owners who have performed the labor or made the improvements may, at the expiration of the year, give such delinquent co-owner personal notice in writing or notice by publication in the newspaper published nearest the claim, for at least once a week for ninety days, and if at the expiration of ninety days after such notice in writing or by publication such delinquent should fail or refuse to contribute his proportion of the expenditure required by this section, his interest in the claim shall become the property of his co-owners, who have made the expenditures.

The Federal law provides, as will be seen, for advertising out a delinquent co-owner, but the State law has not, until recently, provided that the record of such proceedings was evidence of any fact therein contained, nor does it now provide that evidence may be had to show that the proceedings had been annulled by due payment of the delinquent's proportionate share. To remedy this, a bill was prepared by the MINING AND SCIENTIFIC PRESS and presented to the last Legislature, but it was not passed.

Concentrates.

A CONTRACT for the erection of a smelter at Cerillos, N. M., for Captain Balue has been let.

THE Ontario Gold Mining Company has purchased the Ajax group of mines in the Slocan for $25,000.

A POCKET discovered in the Tanzy mine, near Sonora, Cal., a few days ago, is reported to have yielded $80,000.

FROM the Juneau mine, in Silver Bow basin, Alaska, $16,000 in gold was taken out in the first twenty days of the season.

EXPORTS of copper in June amounted to 13,129 tons and from January 1st, 62,223 tons, against 58,109 tons of the same time last year.

THOMAS KEARNS, representing the Silver King, has secured an option on the Union mine at Park City, Utah, for eighteen months at $50,000.

AT the Golden Gate mill at Mercur, Utah, which is to have a capacity of 800 tons daily, the Kendall dioxide cyanide process will be used.

THE lessees of the Unity, or Gold Flat mine, in Nevada county, Cal., are about to increase the capacity of the mill from five to ten stamps.

EVERY mill within hauling distance of Randsburg, California, is kept busy crushing ore, and more is being mined than ever before since the camp was started.

THE Nowell G. M. Co. writes that good rock miners can find employment in and around Juneau, Alaska. The Klondyke excitement is making miners scarce there.

AFTER an imprisonment of thirteen days without food in a caved mine at Goldfields, Phœnix, Arizona, James Sterms was rescued alive last Saturday and will recover.

A COMPANY has taken up, under the placer mining law, the islands in Great Salt Lake for their guano deposits. The first shipment will be made to California for sugar beet fields.

PHIL ARMOUR and other capitalists of Chicago have purchased a large tract of placer ground on the Snake river, Idaho, and it is said will operate it by means of a dry process.

SOME of the best gold properties of Cripple Creek are said to be in French hands. Foreign stockholders are even reported to have displaced a recent president of the Victor mine of that camp.

THE number of silver dollars coined at the United States mints during the last fiscal year was 21,203,701, on which the seigniorage or profits to the government amounted to $6,336,104.

THE Kootenay, B. C., Mining Protection Association is taking steps to urge the comptroller of customs to exercise his discretionary power and place more mining machinery on the free list.

THE silver yield of Mexico last year was estimated at $54,500,000, and it is claimed that there is a larger output being made this year, which promises to increase the total to $60,000,000.

A CUT in wages at Park City, Utah, in the Ontario and Daly mines, has been announced to go into effect August 1st, which is under discussion by the men as to whether they will submit or not.

RECENT discoveries of gold-bearing quartz at Hall City, in Trinity county, Cal., near the Harrison gulch mines, have caused considerable excitement and many people have gone in to prospect and locate.

A COPPER ledge is reported to have been discovered on the shore 400 miles west of Sitka, which is said to be 80 feet wide and 500 feet in length. It has been located for L. C. Dillman of Spokane and associates.

A RUSH of mud in the De Beers diamond mine, at Kimberley, Africa, last Saturday, entombed several Europeans and fifty natives. Twenty of the men were rescued, but it is feared the others perished.

UP to July 10 for 1897 the value of ore and matte exported from the Kootenay mines in British Columbia was $3,916,-286.80. Of this 27,378 tons was in ore valued at $1,933,245.70 and $1,983,040.10 in produce of smelters.

THE Southern Pacific Company have resumed work of boring for coal in the Gila valley, above Solomonville. Work of this kind has been going on for nearly two years, and, although no paying bodies have been found, good results are expected.

THE power plant of the Blue Lakes Water Company on the Mokelumne river is completed and light turned on in the towns of Mokelumne Hill and San Andreas. But its greatest importance probably will be in furnishing power for developing mines.

HUMBOLDT'S prediction comes true. Fifty years ago he said that some day great stores of gold would be discovered in the extreme northwestern part of America. Alaska is now one of the sections that thinks its gold yield for 1897 will exceed that of California.

INFORMATION comes from Juneau, Alaska, that rich strikes have been made on Minute creek, near Forty-mile, on the Yukon, and on American creek, forty miles down the river. Many miners are going to those places and relieving the strain in the Klondyke.

NEVADA AND COLORADO are no longer "silver States," the gold yield in '96 exceeding that of silver in each commonwealth. Montana is now the "silver State," though either Nevada or Colorado stands ready to dispute the title should conditions warrant the extraction of the white metal.

THE Tamarack copper mine of Michigan in June produced 1400 tons mineral, with 73 per cent copper, an increase owing to improved mill facilities. The product of the Atlantic mine was 291 tons 595 pounds, the Wolverine mine 107 tons 1700 pounds, the Franklin mine 147 tons 1710 pounds and the Central mine 25 tons.

A WASHINGTON dispatch says the director of the Mint has given assurance that if Seattle, Wash., will give a building and ground, an assay office will be established out of funds appropriated for the same purpose for Deadwood, S. D. If this cannot be done, legislation in the regular congressional session will be necessary.

THE copper situation in a sense is not favorable or likely to result in high prices soon for the metal, unless a decided change takes place in the home consumption, which is small, although there are reasons for believing that by and by there will be an increase in the amount of copper used here. In the meantime the output increases.

EDMUND HARVEY, of properties of the Consolidated Gold Mines of California in Butte county, Cal., reports that development of the mine is being pushed as rapidly as possible at the 700, 800 and 1000-foot levels, Banner mine, and 390-foot level, Amosky. The mill is running steadily. The hoist is erected complete and operations are in full swing.

A MORTGAGE was filed last week at Bakersfield, Cal., covering the twenty-eight miles of railway which the Randsburg Railway Company intends building. The purpose of the mortgage is to secure the payment of $300,000 in twenty-year bonds that the directors of the railway have ordered issued. The Rochester Safe and Deposit Company has taken the entire issue.

A JOINT proposal of bimetallism was presented last week on behalf of the United States and France, at a conference in London between representatives of France, the United States and Great Britain. The proposals were taken under consideration by the British Cabinet, and it is reported that an international conference will be summoned to meet in the United States, with Great Britain represented.

INCLUDED in the rush to Alaska are enough men of ability and experience to make a good leavening in any community. Like the trip to California in early days, it calls for endurance and pluck, and while many may go unprepared few men without pluck and perseverance will get in. A large majority may be trusted to care for themselves any where; none but the daring will go and none but the strong will survive.

GOLD, in the shape of a fine dust that will be blown about in the wind is found in a mine at Sawmill flat, Tuolumne county. It is found in cells in the quartz like honey in a comb and is reported to be 20.35 fine. In other parts of the mine the gold is coarser. In the gravel deposits of northwestern Colorado—lacustrine deposits—the gold averages about 1100 pieces to one cent. It, too, is much purer than ordinary gravel gold.

SHIPMENTS of iron ore are now greater than they have ever been in the history of the Lake Superior district. *Bradstreets* says more than 47,000 tons are being sent out daily from Duluth. The average monthly shipments for the remainder of the season, it is estimated, will be over 1,000,000 tons. It is expected that Minnesota, for the first time, will this year take first place as a shipper of iron ore, passing Michigan, which has held the place for many years.

THE California Debris Commission has received new applications to mine by the hydraulic process from the Mayflower Gravel Mining Company, in the Mayflower mine, near Forest Hill, Placer county, Cal.; from Dr. J. P. Welch, in the Pactolian mine, near Genesee, Plumas county, Cal.; from the Gold Bug Mining Company, in its mine near Georgetown, El Dorado county, Cal., and from E. D. Bowman et al., in the Eclipse and Boston claims, near Onion valley, Plumas county, Cal.

THE mail facilities in the Yukon region are being constantly improved. Under a contract made by the Department, which went into effect July 1st of this year, there is a monthly mail from Juneau by way of Dyea and the Chilcoot pass as far as Circle City. The service by way of St. Michael's for the remainder of this season is from San Francisco, July 28th and September 5th, and from Seattle, Augugt 30th. The Canadian Government also has a monthly service from Juneau by the overland route.

IN '49 to the Yuba; in '97 to the Yukon. The Alaska rush will bring political prominence to that country, insure a boundary line, create correct maps, relieve other places of congestion, cause great suffering and disappointment, and enrich a few. Scientific mining will find a way to work the quartz ledges when the surface gold is gone, and a new field for mining ingenuity is open. The arrival of so much gold creates wonder, but were one county in California to dump its yield for a year in one shipment it would exceed in value the million that the Klondyke sent down this week.

THE receipts of quicksilver at San Francisco for June were 1349 flasks. For the first six months of 1897 the receipts were 7309 flasks, against 16,705 in the corresponding period of 1896 and 15,357 in 1895. San Francisco exports of quicksilver by sea for June were 405 flasks—265 to Mexico, 120 to Central America, 20 to British Columbia. The exports for the first half of the year were 2647 flasks, of which 1874 went to Mexico, 720 to Central America, 33 to British Columbia and 20 to New Zealand. The exports for the first six months of 1896 were 8539 flasks, including 2500 flasks to New York and 3000 to Hongkong.

AT A meeting of the anti-Debris Association held last Tuesday in Sacramento the special legislative committee reported the result of their conference with a like committee of the California Miners' Association in San Francisco. The committee was instructed to continue the conference, and, touching the same point, a resolution was adopted to the effect that the sense of the meeting was that the association should make urgent efforts to secure adequate appropriations for the improvement of the navigable rivers of the Sacramento valley, and requesting the support of all the people in the State to that end.

AT a meeting of the council of the Kootenay Mining Protective Association held in Kaslo last week the following resolution was adopted: "That this association views with consternation the fact that the executive at Ottawa are in possession of the power to place, at any time, an export duty on ores, and this association desires to place itself on record as being of opinion that should such vested powers be exercised the effect will be disastrous to the infant 'quartz mining industry' of British Columbia, and practically ruin it with an amount of taxation it is at the present time unable to carry and prosper."

THE value of the Yukon gravel is not so very remarkable compared with much that was found in California in early days. In the Dardanelles mine in Placer county a single pan yielded $1800. Many others taken out of crevices produced nearly as much in other of the drift mines in the Forest Hill divide. But in the shallow placers of earlier days it was no uncommon thing to find from $100 to $500 in a pan. A present resident of Nevada City, Cal.—A. Isoard—got $912 from one panful on September 13th, 1850. He and his partners that fall took $164,000 from a piece of ground thirty feet square in their claim. There are others.

THE Daly West mine in Utah was, when a prospect, owned one-half by John J. Daly and the other half by Hearst, Haggin and Tevis and R. C. Chambers. Mr. Daly wanted to open it up, but the other interest would not agree. Then Mr. Daly incorporated his half—probably the only instance in the world where the undivided half of a mine is made a corporation in and of itself. This half so incorporated, they proceeded to open up and develop the mine under Mr. Daly's management, and he has made it a magnificent property. Now a suit is about to be instituted involving control. If the owners of the other half have purchased even a single share of Mr. Daly's stock in the market he will lose control.

NOT since '49 has such a gold discovery been announced as that this week from the icy North. The fact that it is not all talk, but that returning miners have brought such store of gold starts thousands up there. For over a year glittering stories have been told of that region, and the arrival of nearly $2,000,000 in gold confirms previous statements. It is in every sense a new field and its development will be interesting. It is a problem slow of solution, whether, after the surface gold is gone, the quartz resources of that section will ever be given attention. This paper advises its readers to think twice before starting for that country, and on no account to go this season, which is now too far advanced for any present hope of success.

MANAGER THOMAS EWING says of the Diamond Hill mine in Montana: "The ore body is from 140 to 150 feet wide in sulphides. We have opened the vein by crosscuts in a number of places and the narrowest point found was 120 feet. We have run a tunnel 1500 feet diagonally to the vein and 1200 feet are in ore, and I have no hesitation in saying that it is one of the largest bodies of ore developed by preliminary workings in the country. We place the average value of the ore at from $4 to $6 per ton, though we have obtained much higher values. We took out last year 25,000 tons of ore from the south end, 7000 tons of which ran from $12 to $13 per ton, yielding $84,000, the remaining 18,000 tons running about $5 per ton. Like all sulphides, the values run in spots. I have taken out and panned ore from the vein that will run $25,000 to the ton, and in some places it will run as low as $2, but the average is as I have stated. The developments show 2,500,000 tons of ore in sight, of which about 1,000,000 is an oxidized free-milling ore."

THE value of the pearls found during 1896 on the coast of the gulf of Lower California amounted to $350,000. Besides, there were also exported 5000 tons of mussel shells, the value of which was estimated at $1,250,000. The pearl fishing, with appurtenances, forms the entire occupation of the natives, and La Paz, the capital for this trade in the peninsula, exists exclusively upon this industry. Until a few years ago only native divers had been employed, and the greatest depth to which they could dive was 35 feet. Upon the introduction of the modern diving apparatus a depth of 180 feet was accomplished, and, while formerly the best divers could not remain longer than two minutes under water, a modern diver thinks nothing of staying for two hours at a depth of 100 feet, although at a still greater depth the stay is necessarily shortened on account of the volume of water above. The divers do not limit themselves to the pearl oysters, but whenever they come across a rare piece of coral or a new kind of mussel, they pocket these likewise.

THE Drum Lummon mine at Marysville, Montana, was a year ago reported worked out. To-day the force employed by the Montana Mining Company, the owners, is as large as it ever was and in a few days when the 60-stamp mill will be crushing ore again, the number of men in the company's employ will be larger than ever before in its history. There are now about 350 men on the pay roll of the company. Until last year the Drum Lummon mine was a steady producer almost from the time the English company bought the property from Thomas Cruse. Less than a year ago, both mills were closed down, as it was found they were keeping ahead of production. Since the development work has shown up large ore bodies and within a short time 120 stamps will be dropping again. In the meantime a cyanide plant has been put up to work over an immense quantity of old tailings. All this means much for other mines all over the West, for the history of the Drum Lummon is the history of other mines in Nevada, Colorado, California, Idaho and Arizona.

A SUIT involving $30,000,000 is in progress in the United States Court in Denver, Col. The plaintiffs are L. S. Ballou and A. McLain of New York. The defendants are C. B. Reed, J. F. Campion and others interested in the Ibex Mining Company of Leadville. Ballou and McLain were interested in claims adjoining the Little Johnny, embraced in the Archer Consolidation, of which Clinton B. Reed was made trustee. In 1890, a lease of the property for three years was granted to John F. Campion, who formed the Ibex Mining Company. The Little Johnny was purchased outright. In June, 1893, an extension for three years was asked, which was granted on condition that all of the other beneficiaries claiming to be former co-owners of claims included in the Archer Consolidation, gave their consent. This extension ran out June 29, 1896. The plaintiffs claim that the extension was illegal and that the property has been worked since June 29, 1893, without title, and they therefore ask that an accounting be ordered, and name the sum of $30,000,000 as the amount due them. The defendants' demurrer to the bill of complaint was overruled in the U. S. Circuit Court last Thursday.

THE American Institute of Mining Engineers met at Houghton, Michigan, July 12. Members were taken over the copper and iron properties and the meeting was concluded by a visit to the Black Hills, S. D. Papers were read as follows: F. C. Smith, Rapid City, S. D., "Potsdam Gold Ores of the Black Hills;" J. W. Pinder, Gold Creek, Nev., "Losses of Gold in Hydraulic Placer Mining;" B. MacDonald, Butte, Mont., "Hydraulic Classification of Battery Pulp and its Effect on Vanner Concentration;" E. S. Sperry, Bridgeport, Conn., "Influence of Lead on Rolled and Drawn Brass;" G. L. Heath, South Lake Linden, Mich., "Electrolytic Assay as Applied to Refined Copper;" M. E. Wadsworth, "Occurrence of Lake Superior Copper;" A. K. Reese, Baltimore, "Six Months' Working of Dover Furnace at Canal Dover, O.;" D. H. Bacon, Soudan, Minn., "Development of the Lake Superior Iron Industry;" C. E. Bailey, Virginia, Minn., "Mining Methods on the Mesabi Range;" E. J. Longyear, Hibbing, Minn., "Explorations on the Mesabi Range;" J. E. Jopling, Marquette, Mich., "Developments of Iron Ore on the Marquette Range;" J. Birkenbine, "Production of Mesabi Ores;" H. Ries, New York, "Clays and Clay Working Industry of California," "The Fuller's Earth of South Dakota;" R. Ingalls, New York, "Notes on the Tin Deposits of Mexico;" F. H. Newell, Washington, D. C., "The Investigation of Water Supply;" Prof. E. Kidwell, Houghton, Mich., "The Efficiency of Built-up Wooden Beams;" P. Wilkins, "The Cement Industry at Quanah, Tex.;" W. Kelly, Vulcan, Mich., "A Mine Dam."

John Dern on Mercur, Utah.

The following is a condensation of a paper read at the International Mining Convention at Denver, Colo., on the 9th inst., by John Dern of Mercur, Utah, on gold mining in that district:

The Mercur district is in the Oquirrh range of mountains, in Utah and Tooele counties, State of Utah. The town of Mercur is in Lewiston canyon, toward the northerly end of the district, in Tooele county. The altitude is about 6600 feet. The district has a population of 2500.

Twenty-five years ago, on the site of Mercur, there was a bustling, active town, nearly as large as Mercur is to-day. It was named Lewiston, and was a silver mining camp. As the result of finding some rich silver ore, a mining district was organized, called Camp Floyd mining district, after the nearest town. The ore was so pockety that it could not be made to pay. Lewiston disappeared and silence reigned.

This silence was occasionally invaded by the casual prospector, but nothing was developed. In 1880 Arie Pinedo, a German prospector discovered cinnabar and made a location, which he named the Mercur claim, Mercur being the German word for mercury or quicksilver. Some interest was manifested in the find, and others came into the neighborhood to find quicksilver mines. M. T. Gisborn located the Geyser, which is a gold mine to-day. Pinedo went to the expense of having his Mercur claim patented, but he found that the quicksilver was not sufficiently abundant to pay. He deserted the claim and left the country, and Camp Floyd district had for the second time been pronounced a failure.

What is now being worked as the gold ore in Mercur was not unknown in the earlier days. During the Lewiston excitement prospectors often brought samples of this rock into the camp. Though a fire assay showed that gold was present, it was invariably pronounced worthless, because no colors could be found in panning. Samples which were brought to Salt Lake City were also promptly condemned by local experts, and the finder was laughed at, or convinced that the stuff was no good. No one had ever heard of gold ore that could not be panned, and, as the closest scrutiny failed to reveal any gold to the eye, the assays were declared fraudulent.

Joseph Smith, now of the Geyser-Marion Mining Company, was prospecting in the district late in the eighties, and he became convinced that there was gold in the ore which he found there. He made a number of amalgamation tests and felt satisfied that the values could be saved. He began to take steps to organize a company, but could find no one in Utah mining circles who was credulous enough to listen to him. Finally he submitted the proposition to G. S. Peyton and H. W. Brown. These men had not the capital with which to develop the ground and build a mill, but upon examination they became thoroughly imbued with the conviction that the property was a valuable one, and June 4, 1890, the Mercur Gold Mining and Milling Company was incorporated.

After milling about 1500 tons and various changes had been made in the mill, it was fully demonstrated that the values could not be saved by that method.

They sent a small sample of the ore for a laboratory test to the Gold and Silver Extraction Company of America, Limited, at Denver. The report showed that the treatment had been satisfactory. A carload of the ore was then loaded and sent to Denver. The experiments on this lot were as encouraging as the first tests had been, and the company decided to install the new process. The old pans and settlers were torn out, to be replaced by five round iron tanks, having a capacity of seven tons each. The other necessary alterations were made, and soon the cyanide plant was ready for operation. Upon starting up, the exasperating discovery was made that, on account of the talcy nature of the ore, the solution would not percolate through it. All sorts of schemes were tried to make the leaching a success, but with no avail. The prospect was again gloomy, for this process seemed to have failed like the other. The company's funds had long ago been exhausted, and debts to the amount of many thousands of dollars had been guaranteed by the stockholders. After it was demonstrated that the leaching was not possible, the mill was closed down and experiments were renewed in the assay office. Several weeks were consumed in this work. All imaginable expedients seemed to have been resorted to, but still the obstacle had not been overcome. Finally, one day when the baffled workers were wondering what they could try next, Mr. Nesbit, who then had charge of the works, noticing the pile of coarse ores which had been thrown aside in quartering down samples, said: "I am going to try some of this stuff and see what the result will be." The patentees of the process had insisted that fine crushing was essential, and all experiments had so far been made in compliance with those instructions. This casual, almost accidental, test by Mr. Nesbit solved the problem of the treatment of the Mercur ore. He found that the percolation was perfect and the extraction very satisfactory.

Coarse crushing was now applied in the mill, and the tide of fortune at last began to turn. Additions to the mill were made, and the Mercur mine speedily took its place in the ranks of the producers. The debts were discharged, and in September, 1893, dividend No. 1, of $25,000, being 12½ cents per share on the capital stock of the company, was declared and paid. This month the thirtieth of these dividends is to be paid, which will bring the total up to a round three-quarters of a million.

As the Mercur continued to give evidences of prosperity, it began to dawn upon people that there was other ground in the district that might prove valuable. Mr. Smith and Mr. Scannell, two of the incorporators of the Mercur, had already organized the Marion Gold Mining Company, and were putting up a mill on that property. Soon an influx of prospectors began, and these were promptly followed by business men. Thus a new town was born on the site of the old town of Lewiston.

The ores of Mercur occur in different veins or ledges. The largest and richest of these is known as the regular Mercur vein, it being the one on which all of the original work in the Mercur mine was done. This ore sheet dips in a northeasterly direction, at an angle of 18° to 25°; it varies in thickness from 6 to 40 feet, easily averaging 15 or 18 feet. Cinnabar frequently occurs, and the presence of this metal is always indicative of good gold values. This ore carries no trace of silver. Its gold content runs from $3 or $4 to $40 per ton.

Fifty feet above this vein is the Ruby vein, so named because it was first exploited by means of the Ruby tunnel, in the Mercur mine. When this ore body was encountered it was believed to be the same vein as that which was had in the upper workings, but subsequent developments proved it to be a distinct layer. The ore is practically the same as in the Mercur vein, and, like the latter, carries no silver, but often contains cinnabar.

A hundred feet below the Mercur vein is what has always been called the silver vein. This is a hard cherty rock, very different from the gold veins. In the lower part of this vein silver is found, sometimes of high grade. The upper portion of the vein, or perhaps it is a deposit which overlies it, is softer and looks more like the gold veins, though it is quite dissimilar in some respects. This, however, seems to be another gold-bearing ledge. In the Geyser-Marion a good deal of it has been mined and run through the mill. The Geyser has opened it up sufficiently to be convinced that it is a valuable deposit. The lowest workings in the Golden Gate appear to be in this ledge, and it is reported that these developments in that mine are very gratifying to the management. In the Mercur this silver ledge has not been explored to speak of.

By means of a No. 5 Gates rock breaker, and two sets of Wall's corrugated rolls, they crush their ore to pass through a three-quarter mesh screen. The ore being uncommonly soft, of course the greater percentage of it becomes finer, and it is only the hard pieces that remain at this coarse size. They being interspersed through the ore, facilitate the leaching, as has been explained in recounting the early experiences.

The crushed ore is dumped into round iron tanks, each of fifteen tons capacity. Here the solution, which we keep at a strength of about one-fourth of 1 per cent cyanide of potassium, is turned on. Our method is to let the fluid percolate six hours, and then drain it off, repeating the operation until we have leached from 48 to 60 hours. Our extraction ranges from 80 to 87 per cent in our regular work. We precipitate our zinc shavings. A clean-up is made about every two weeks. We dry the slimes in a retort, then pulverize them and ship them to the refinery. We have at various times attempted to refine our product, but some of its ingredients render it more or less refractory to the ordinary methods, and our attempts have not been successful.

The Mercur mill is treating 300 tons per day at a cost of not to exceed 80 cents per ton. The Geyser-Marion Company, whose ores are still more silicious, are milled at the extremely low cost of 70 cents per ton. At all events, it is unquestionably a fact that the regular Mercur ore—that which is called the oxidized ore—can be very cheaply treated by cyanide process. In the first place, the coarse crushing, which is essential, rather than answerable, obviates the necessity for expensive crushing machinery, and reduces to a minimum the labor in this department. Then the small percentage of cyanide needed to extract the gold gives Mercur an advantage over most other camps. Nearly all of the mines are perfectly dry, so there is no pumping to be done. A railroad runs into the camp, and supplies can be obtained at reasonable prices. The Gold Belt Water Company's pipe line supplies the town of Mercur and the mills in that vicinity with water, which is brought from Ophir creek, three miles north.

The boomers, who asserted that the whole country for miles around Mercur was underlaid by an immense blanket of ore, and that it could be struck anywhere and would be rich wherever found, claimed that which has never yet come to pass in any country at any time. Mercur is a legitimate mining camp and the saying that "Gold is where you find it" is as true there as anywhere else. Not every man who owns a claim has a bonanza. If he had, gold would soon be demonetized, and lead or some other more valuable metal substituted for it as a medium of exchange.

The history of this camp demonstrated that what is impossible this year may be possible next year, and the rock which is now utterly useless and intractable may, by a very simple discovery or process, become extremely valuable. Just as the despised rock of the Camp Floyd district has, by the application of cyanide, been transformed into a source of great wealth, so it is possible that in other fields there are ores which are now accounted valueless, but which, with the advances that are now being made in metallurgy and the treatment of ores, may some time become productive.

Work of the United States Geological Survey.

The plans of operation of the United States Geological Survey for the fiscal year 1897-1898 have been approved by the Secretary of the Interior and the work of the field season of 1897 has been started, the parties having all taken the field. The sums appropriated for the Survey this year make the aggregate amount for the fiscal year 1897-1898 $967,840, a decided increase, though the additional sum does not go to the geological branch.

For convenience in administration the work of the Survey is divided into four branches, each of which is again separated into a number of divisions. The branches are geology, topography, publication and administration, geology and topography being the main branches.

In geology the field work extends all over the United States, from New England to the Pacific.

Seven parties have been sent to the interior Mississippi region, and five to the Rocky mountain region which lies between the British and Mexican boundaries on the north and south, the margin of the great plains on the east and, approximately, the line of the 119th meridian on the west, and embraces the Rocky mountains and their foothills. Mr. Arnold Hague is in charge of one of these parties, which will do the work necessary to enable him to complete his monograph on the Yellowstone National Park. This was interrupted by his work on the Forestry Commission of the National Academy of Sciences last year. Prof. Hague will survey the Absaroka range, one of the most rugged and inaccessible of the Rocky mountains. Dr. W. H. Weed will continue the study of ore problems, etc., in Montana.

Mr. S. F. Emmons will be in Europe the greater part of the season, but under his direction surveys of the Tintic mining district of Utah will go on.

The Pacific region is covered by five parties, but the appropriation of $5000 made for work in Alaska was not passed in time to be available during the present year.

The paleontologic work is to be continued on the same lines as during the last year.

It is also proposed to continue the collection and publication of data touching the mineral resources of the United States. Dr. D. T. Day has direction of this work, and $20,000 has been specifically appropriated for it.

One hundred and seventy-five thousand dollars has been allotted for the topographic surveys proper and $150,000 for forestry surveys, and the plan of work will not be changed in character and organization from that of last year, except that additional work is imposed by the survey of the forest reserves.

THE production of aluminum in the United States during the year 1896 was 1,300,000 pounds, as against 900,000 pounds in 1895, showing a gain of 400,000 pounds, or 44 per cent. As has been the case for several years past, the entire domestic output came from a single producer, the Pittsburg Reduction Company, whose plant at Niagara Falls has been enlarged and has been working at nearly full capacity. It is interesting to note in this connection that the United States has up to the present time produced more than one-third of all the aluminum manufactured in the world. The principal European producer is the Aluminum Industrie Gesellschaft, with works at Neuhausen, Switzerland, and controlling the Societie Electro-Metallurgique de France, with works at Froges, in France.

THE longest distance ever encompassed by the human vision, so far as records go, is 183 miles, between Uncompahgre Peak, in Colorado, and Mount Ellen, in Utah. This feat was accomplished by surveyors of the United States Coast and Geodetic Survey in making a new measurement of the earth. Observers on this coast have been able to signal from Mount Shasta to Mount Helena, a distance of 190 miles, but have never been able to get a response. Between the two other peaks communication has been continuous for an hour or more on several occasions. Uncompahgre Peak is 14,300 feet in height, while Mount Ellen is 13,400 feet. The longest distance that the human eye ever reached until this record was made was between Algiers and Spain, 168 miles.

A New Mexican District.

Written for the MINING AND SCIENTIFIC PRESS by J. D. BONE.

In the northern part of the Members or Black Range of mountains in Sierra county, New Mexico, and about fifty miles west from Engle, a station on the A., T. & S. Fe railroad, lies a section of country of interest to the geologist and mining man. This mineralized belt extends from Grafton on the north to Cook's peak on the south, a distance of over 100 miles, but only that portion of it embraced within the Apache and Black Range mining districts will be considered in this article.

Traversing through the Black Range and Apache districts, in a north and southeast of north and west of north direction, through the high spurs of the mountains and cropping boldly through the porphyry and limestone cap is seen a remarkable belt of mineral outcropping. Like stone fences they can be traced for many miles across the country and in many places for long distances they arise fully 20 feet above the surrounding country. At one point the vein forms a vertical strata on the side of the cliff to a height of 100 feet, showing many thousands of tons of fair average ore all ready to be quarried and reduced.

The geology of both districts is made up of red stratified quartzite, but principally of gray and greenish-gray porphyry capped and flanked in many places by a hard, fine-grained, crystalline limestone. This limestone is also seen breaking through the country in the manner of ribs or dikes, distorted and thrown from its natural horizontal bed by the erratic outcroppings of porphyry, and subsequently highly crystallized by the metamorphic heat and is remarked throughout these districts in a very disturbed state, but in many places still retains its natural stratification.

Breaking through the porphyry and across the stratification of its limestone cap, and in contact with both, this remarkable belt makes its appearance, presenting to the geologist a most interesting and remarkable series of true fissures, filled with a quartz matrix. Their persistant structure and bold outcropping through and across the stratified limestone cap, leaves little doubt of their deep-seated nature. The veins vary from a few feet in width to over 40 feet of solid quartz, carrying pay streaks from a few inches to over 6 feet of gray copper ore, argentiferous, with native silver, chloride of silver, and gold, more or less disseminated throughout the mass.

There are exceptions to this, however, notably among which are two claims in the Apache district, known as the United States Treasury and White Eagle, both worked to a depth of 140 feet, showing on the 100-foot level a body of ore more than 24 feet wide—hanging wall not yet disclosed—and giving an average value in gold of one-half ounce or $10 per ton for the full width, while there are ore streaks 10 inches wide that will give values into the thousands. The gold is largely free, as is the case with a number of claims about Grafton in the Black Range district, namely the Great Republic, Emporia, Ivanhoe, Rock Gold, Elephant, Polar Star, and others, whose principal value is gold, as has been fully demonstrated by shipments to the different centers of reduction. In traveling about in these districts a feature is presented that is rarely found in any other mining region of the United States, and a condition which at once impresses the beholder is this, that no claim within an area of thirty miles long by over three miles wide, upon which any work is done, fails to show ore of greater or less value, and many of them of great value, as is attested by smelter and mill certificates of the product.

Prof. F. A. Reynolds says, in writing of this country, that "it is especially interesting in the character of its porphyries, every known kind of which enters into the formation of the mineralized section; that it is marked by many volcanic cones capped by phonolite, and the country from which these cones emerge is one vast field of porphyry, andesite and rhyolite predominating, interspersed with many kinds of crystalline rock coming under the name of quartz porphyry."

I find this especially the case in the Black Range or northern district, where dikes of the harder kinds of porphyries cut through deposits of softer porphyries, and along the lines of contact the ore chutes and channels occur.

The general strike of the veins, as stated, is north and south, but in places, notably one, the trend is disturbed and the veins seem to converge toward and radiate from an isolated peak of igneous formation, know as "Hagen's peak," and at one time the center of great eruptive disturbances. This cone seems to be the center of this vast mineralized deposition in the Apache district. The convergence of so many strong and highly mineralized veins make it a great central point of attraction, a sort of "mineralized hub" to the whole system radiating from it, and where they meet and cross each other in this peak great mineralization will be expected to follow, from the theory that great mineralization occurs at the junction of one or more mineral-bearing veins.

Work in these districts has been almost entirely confined to the immense quartz veins that mark the contact of the igneous with the rudimentary formation, but what limited prospecting has been done on these porphyries has given very satisfactory results, proving that great and sure value will yet be found in this formation.

Nature has especially fitted these two districts for the prosecution of mining enterprises. In the midst of a well wooded and watered country whose mineral zone is cut across the formation at right angles by broad canyons, these bold outcroppings offer exceptional economical tunnel entrances for a more thorough exploration of their mineral character. Many properties which from the amount of high and low-grade ores now exposed on the dumps and in the underground workings puts them beyond mere prospects, and mines now being developed and awaiting the advent of capital, is sufficient to make these mineral depositions of importance.

At the present time there is in operation a small five-stamp mill which works almost entirely on custom ore brought in by the various miners of the two districts, and as the results have proved so satisfactory a number of leases have been taken upon claims which heretofore were only worked for their silver values, but which now can be profitably operated for the gold.

The Horseflesh Business in Oregon.

It seems that the horse butchers of Oregon are developing considerable speed in their business and are now indulging in the highest kind of anticipations. It is reported from Portland that the Portland Horse Packing Company, whose plant is located at Linnton, employing eighteen men, is now doing a thriving business. The company some months ago received an order for 5000 barrels of cured horse meat from dealers in Paris, France, and the contract is now being filled. The plant, which has been idle since last fall, was started up again about four weeks ago and since that time 800 horses have been slaughtered. Fifty were killed yesterday. Each barrel is labeled "horse meat," and is thoroughly inspected by an inspector sent here from Paris. The Paris purchasers, before making this contract, had the plant thoroughly examined and satisfied themselves that the products would be up to the required standard. Parisians were the first people to adopt horse meat as an article of food, and the demand for it in the French capital is constantly increasing. The horses for the Linnton plant are procured from Eastern Oregon and are what are known as cayuses, worth in the market about $2 50 a head on the average. There is an abundant supply to draw from and the sooner they are cleaned out the better.

The horse packing company expects to build up a large business with Paris dealers and hopes also to find a market in Japan and China. Every part of the horse is utilized in some way. The choice meat is cured and all other parts, including hair, hide, bones, and even blood, are used for commercial purposes.

How It is Done.—We find in an exchange a description of the present work in Oregon, credited to a Stockton man who recently visited Linnton. His account is not appetizing, but it has a businesslike swing about it, nevertheless: "Played-out horses are bought up at $2 50 a head and slaughtered as fast as a man can hit them with an ax. The slaughter house is constructed after the style usual where beeves are killed, the horses being driven into a pen, from which they pass through a narrow way to the axman. As soon as the horse falls under the blow, the carcass is dragged away by a dummy engine. The tail is cut off to bleed the body, instead of bleeding from the jugular vein, as in the case of beeves. The hide is slit open, hooks attached to a rope connected with another dummy engine are inserted and the animal is skinned in a jiffy. The carcass is then cleaned and cut up, all the bones being removed, and the meat is thrown into a pickling solution. When properly cured, it is barreled and sent East, ostensibly for the European market; and it is sold as corned beef. Eight thousand head of horses have been slaughtered and marketed since the business began, which was a year and a half ago. Most of the horses slaughtered are superannuated ones, but colts only a few days old are also killed. The proprietors of the business say that as soon as the supply runs short in Oregon they intend to draw on California."

THE use of petroleum refuse for steam generation on Russian railways is rapidly extending, and over 100 per cent gain has been recorded in the last few years. Recent investigations show many advantages possessed by petroleum residue for locomotive firing. The method of burning the refuse is to pulverize it by jets of superheated steam, concentric, flat and annular pulverizers all being used. From 3 to 5 per cent of the steam generated is used in the pulverizers, but, as the evaporative power of the petroleum is found to be fully 50 per cent greater than that of coal, the net gain is considerable. The liquid fuel is convenient to handle and is prompt in response to sudden demands for steam.

Rules to Govern Forest Reserves.

Much attention has been paid recently by the General Land Office to the preparation of rules and regulations applicable to the government of all the various forest reserves of the United States, of which there are several in California, and Commissioner Hermann has now formulated these for the approval of the Secretary of the Interior, as follows:

Attention is called to the matter of forest fires, which annually do so much damage through carelessness, and the law is especially referred to which imposes a penalty for willfully setting fire to timber or carelessly suffering fire to burn unattended near any timber, and which punishes such offense by fine or imprisonment. The law provides that before breaking camp fires shall be totally extinguished.

Prospecting, locating and developing the mineral resources of forest reserves are permitted. Lands for schoolhouses and churches are provided, and the use of waters for domestic, mining, milling and irrigating purposes is also allowed.

The construction of wagon roads is authorized, and the right of way across the reserves for irrigation canals, ditches, flumes and reservoirs is permitted. The pasturing of live stock on the reserves is permitted except as to sheep, which, in view of their injuries to the forest cover, are prohibited in regions where the rainfall is limited, and the present exception in this regard is extended only to the reserves in the States of Oregon and Washington, because of the continuous moisture and abundant rainfall of the Cascades of the Pacific coast roads. Even there permission must be had, which will be revoked if pasturing extends to Bull Run reserve, Crater lake or places where injury may be done.

Where persons have unperfected bona fide claims within the reserves they may relinquish the same and select vacant public lands elsewhere without charge, in cases where previous fees had been paid.

The mineral lands of the forest reserves are subject to location and entry under the mining laws in the usual manner. Owners of mining locations are authorized to fell and remove from their mining claims any timber growing thereon for actual mining purposes upon their particular claim. The free use of timber is allowed to bona fide settlers, miners, residents and prospectors for minerals, for fire wood, fencing, buildings, etc. This privilege is restricted to persons resident within the forest reserves who have not a sufficient supply of timber on their own claims.

The sale of timber from the reserves will be permitted in limited quantities for the purpose of preserving the living and growing timber and permitting the younger growth of timber on the reserves to develop. Dead, matured or large growths of trees found upon the reserves shall be designated and appraised so far as the same may not be necessary for the forest preservation and water cover, and may be sold for not less than the appraised value in such quantity as shall be prescribed to each purchaser and to be used in the State or Territory in which the reservation may be. Sixty days' notice, published in the county where the timber is situated, is to be given before sale. Payments are to be made to the Receiver of the local Land Office of the district wherein the timber is sold. Before the sale the timber shall be examined and appraised under the direction of the Department. In order to avoid a monopoly, the Department may, in sales in excess of $500, make allotments of quantity to the several bidders, and the right is reserved to reject any or all bids. Within thirty days after an award of timber to a bidder payment must be made in full and within one year it must be removed. Where it may be found necessary to erect temporary sawmills, a permit will be necessary. All timber so cut must be used in the State or Territory in which the reservation is situated.

Supplemental instructions are given to all special agents of the Interior Department to especially take cognizance of unlawful cutting of timber and depredations upon the public domain, including the forest reserves, and hereafter a vigilant watch will be directed toward the matter of forest fires.

In the case of lands more applicable for mining and agriculture than for forestry purposes, upon a proper showing made, the same may be eliminated entirely from the forest reserve and restored to the public domain.

As to the forest reserves which have lately been suspended by the recent act of Congress, the geological survey is now busily engaged in examining them and in extending the exterior lines properly embracing the reserves. In this manner large portions erroneously heretofore embraced in reserves will be restored to public entry, and other portions, which were omitted from the reserves, will be embraced within them.

The estimated area of the existing forest reserves is 18,993,280 acres. The estimated area of the suspended forest reserves is 19,951,360 acres. The aggregate area of the existing and suspended reserves is 38,944,640 acres. This is greater than the area of any State east of the Mississippi river and of several west of it.

The Alaskan Placers.

Last week there came down from the Yukon placers two steamers bringing a few returning miners and about a million and a half in gold. As a consequence, many thousands throughout the country are endeavoring to go into the new El Dorado, and a greater excitement has been created than by any other gold discovery since that of 1849. The Excelsior arrived in San Francisco on the 15th, bringing in bullion carried by about a dozen returning miners and by the Alaska Commercial Company—some $730,000. The following list gives an approximate idea of the money brought down: Alaska Commercial Company, $250,000; T. S. Lippy, $65,000; F. G. H. Bowker, $90,000; J. McMann, $15,000; J. O. Hestwood, $10,000; J. Ladue, $10,000; J. Fox, $4,000; A. Krook, $20,000; J. Marks, $10,000; B. Anderson, $10,000; A. Orn, $20,000; C. Galbraith, $20,000; H. Cook, $20,000; L. Rhodes, $45,000; J. Ernmerger, $10,000; F. Lendesser, $10,000; T. Flack, $20,000; N. McArthur, $20,000; A. F. Stewart, $22,000; J. Hollinsead, $22,000; M. S. Norcross, $12,000; C. A. Stamatia, $5,000.

The steamer Portland arrived at Seattle, Wash., on Saturday, the 17th inst., bringing over $1,000,000.

The new discoveries made on the Klondyke river last August, and reported at Forty Mile and Circle City about the first of this year, are the source of the largest part of this gold. The accompanying sketch will show the Klondyke river to be within the British possessions. The gold fields are indicated by a square. As will be seen, the Yukon is fed by many smaller streams both in Alaska and far up into the British Northwest Territory. In all of these gravel deposits are found carrying gold. Forty Mile, Seventy Mile and American creeks were attracting most of the attention of the miners along the Yukon until about the first of the year, when reports of rich discoveries on the Klondyke were brought down and most of the miners found their way up the river to the new diggings. There were about 1200 wintering in the country, and since then at least 2500 more have gone in.

Reports as to how rich the Klondyke placers were did not arrive here in time to increase the number who went in this spring. Now all is changed. There is no uncertainty. That the gravels of the Klondyke are as rich as any ever found in the world there can be little doubt. However, it would be ridiculous to suppose that one-tenth of the men who are now going in will find claims in the rich field. It is probably safe to say that of the 3000 miners now on the Yukon not ten per cent will make any considerable fortunes, and but a small proportion of the rest will make more than wages.

There is likelihood that new districts will be found and room found for many of those who will rush in and possibly all of them, but at best it is a gamble. Such was the history of California in early days and of Australia, but few made piles.

There is danger that there will be a stampede that will cause considerable suffering during the winter and spring, but people who are careful and go properly prepared need fear no danger. One of the experienced men who have returned says that no one should venture into the region without some cash and a sufficient supply of provisions to last eight months. One should buy these things in Juneau, and he should start out with something like the following: Four hundred pounds of flour, 100 pounds of beans, 100 pounds of bacon, 100 pounds of sugar, 10 pounds of tea, 30 pounds of coffee, 150 pounds of mixed fruit, salt, pepper and cooking utensils. The whole outfit can be purchased, well, within $90. The cost of conveying this stock of provisions to the headwaters of Lake Lindermann will average about $15 per hundred, but even that makes it considerably cheaper than the same goods could be purchased in the mining camp. On the trip from Juneau the Indians are employed in the heavy work. They are paid from 8 to 25 cents a pound, but the average is 15. The credit system has been entirely done away with in Dawson. No one can make a purchase of any kind without the necessary cash in the shape of dust. Of course, it must not be understood that they would let a man starve, but, on the other hand, no one must expect to be supported by the generosity of the people.

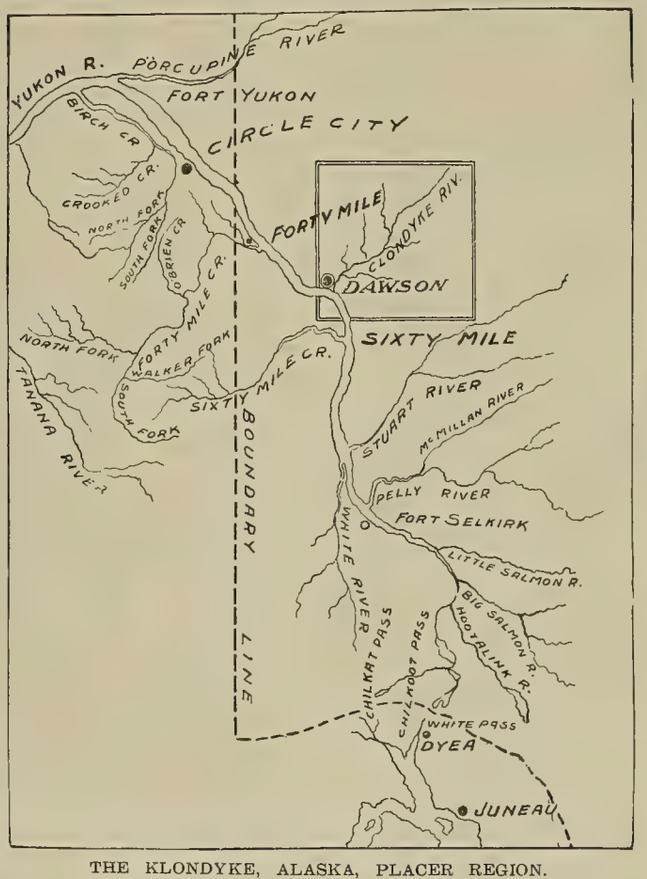
The steamship companies will send in probably only three steamers this year and will, of course, accommodate but a small proportion of those who wish to go.

There are two routes by which to reach Dawson City, the town of the Klondyke fields. One is by steamer and the other overland from Juneau. By the former it costs $150 from San Francisco, a forty days' trip. This is the easier way, but the longer one. The distance is roughly estimated at 4600 miles.

It is doubtful if one-twentieth of those who would like to go to Alaska this year can be accommodated. The Alaska Commercial Company will only send one steamer through to the gold fields, and the Pacific Transportation Company will endeavor to push two steamers up the Yukon to Dawson City before the ice comes.

The Juneau route is the cheapest, but it involves considerable hardship and will be open only until about September 15th. Steamers go to Juneau and from there the passengers are taken to Dyea, which is shown in the accompanying map, by river boat. From there the traveler must go afoot to Lake Linderman, a distance of thirty miles, and for a moderate sum an Alaska Indian will carry the prospector's pack.

At the lakeside in the spring the traveler must buy or build a small boat. In the winter he must hire a sleigh. There is a boat builder at the edge of the lake who constructs light craft. The boats are seldom used except to carry baggage, as it is safer to tow them along the lakeside. From one lake to another passage is comparatively easy by the connecting streams. White Horse lake and river are reached first. The only difficult part of the journey is in what is called "the canyon." Sometimes the boat has to be towed along at a considerable distance below the traveler, who walks on the bank high above. The walking is none of the best because of the rocky nature of the ground.



THE KLONDYKE, ALASKA, PLACER REGION.

From the seaport town to Circle City by way of the Klondyke region the following are the distances:

	Miles.
To Haines (Chilcat mountains)	80
To Dyea	100
To head of canoe navigation	106
To summit of Chilkoot pass	114¾
To head of Lake Linderman	123¾
To head of Lake Bennet	128½
To foot of Takish lake	178¼
To head of canyon	223
To head of White Horse rapids	225¼
To Tahkeena river	240
To head of Lake La Barge	256
To Hootalink river	316
To Big Salmon river	349
To Little Salmon river	385½
To Five Fingers rapids	444
To Rink rapids	450
To Pelly river	503¾
To White river	599¼
To Stewart river	609
To Sixty-mile post	629
To Klondyke	678
To Fort Reliance	682½
To Forty-mile post	728
To Fort Cudahy	728¾
To Circle City	898

As to the mines themselves, those so far discovered are shallow placers of recent formation lying along the creeks. Owing to the coldness of the climate, the ground is frozen the year round and must be thawed out by fire in order to work. The system in vogue is in principle the same as that in the great Siberian placer fields, which are very much the same as those of Alaska.

The Siberian diggings are of two classes—summer and winter. Most of the creeks have a slight fall and wide bottoms, the gravel being covered by 1 to 10 feet of muck, or soil (not glacial drift). The bedrock is often 20 feet deep, and since the ground never thaws more than 2 or 3 feet from the surface, drains and ditches are expensive, so each winter more "burning" is done, which consists in thawing the gravel by fire, removing it and repeating. The muck thaws but little, and makes a good roof for drifting. The dumps are sluiced with the first water in the spring. Summer diggings are expensive to open for work, but the net returns are often more than if "burning" had been the method. In most cases lumber must be whipsawed, the average cost being $150 per thousand feet. Other things being in proportion, considerable expense is incurred before the ground is ready to shovel into the sluice boxes.

A glance at the map of Alaska and the Northwest Territory, in which these mines are located, will show that there is an immense extent of country that has never been explored. Now that the prospector has gone to blaze the way, every stream and mountain will soon be properly located on the maps, and if there are any resources of wealth besides mineral in any part of it the miners will be the cause of making them valuable.

The mines so far discovered are the gravel deposits in an area of country small compared with all that in which other deposits may be found. But little attention has been paid to quartz, particularly as the hills and valleys are covered by a heavy growth of moss. So far nothing but small stringers have been found in the bedrock. Nuggets are often found which are more than half quartz.

As far as any thorough prospecting is concerned, the basin of the Yukon has hardly been entered. The main river winds through a distance of 3000 miles and its tributaries vary in length from 60 to 300 miles. That there are possibilities of discoveries of much more wealth cannot be doubted, but to the prospector it is a most inhospitable region, not only on account of the dangers and hardships, but because the ground is covered with arctic moss or snow and frozen, making the discovery of quartz or other deposits extremely difficult.

Plans for the University of California.

Regent J. B. Reinstein of the University of California has returned from Europe, where he went three months ago, accompanied by H. E. Maybeck, instructor in architectural draining, to inspect university buildings and consult with prominent architects as to the plans for the new buildings to be erected at Berkeley. The architects generally regard the opportunity presented as one of the greatest ever offered in the history of architecture, for, in addition to the beauty of the site, the large area of the grounds, and their situation on a gently rising hill overlooking the Golden Gate, Mrs. Hearst has not restricted the amount of money necessary to obtain these plans.

Mr. Reinstein states that there will be an international concurrence of architects, together with artists, sculptors and landscape gardeners, to bring about the best results. Prof. Gaudet of Paris, who has probably had the most extensive experience of any person living in this direction, is preparing the "programme," as it is technically called. This will give in detail the requirements of the University, together with the necessary data, maps and photographs, and will be finished within a month, when copies will probably be sent to the various architects of the world.

Under the arrangements as contemplated at present the architects will be requested to send in sketches of their plans at a given date, and these will be passed upon by a jury consisting of one recognized authority each from France, Germany, England and the United States and a representative of the University, the understanding being that each architect submitting plans will receive some recompense. At least ten of the best sketches will be selected by the jury and the authors will be requested to elaborate their plans. The architects so selected will be permitted to name four additional members of the jury, and these nine jurors will select the ultimate plan. It is probable that there will be about thirty magnificent buildings in all, each of which will be built of marble or other stone. The completion of the work is not expected for many years.

The Transmississippi Congress.

There were about 400 delegates in attendance at the Transmississippi Congress in Salt Lake last week. Delegates were present from every State and Territory west of the Mississippi river. Hugh Craig of San Francisco was chosen temporary chairman, and at the second and third days' session Wm. J. Bryan presided. H. R. Whittemore of St. Louis, Mo., was appointed chairman of the Executive Committee.

On Wednesday, Lorin A. Thurston and W. A. Kinney addressed the Congress on the question of annexing the Hawaiian islands. Addresses of welcome were delivered by Governor Wells of Utah and Mayor Glendenning of Salt Lake. Resolutions were introduced as follows:

By Ford of California urging the creation of a Department of Mines and Mining.

By Walsh of Wyoming favoring the annexation of Hawaii.

By Patterson of Colorado declaring that the pending mining strike in the Eastern States proved the necessity for the creation of a national board of arbitration.

By Black of California urging Congress to provide for the speedy construction of the Nicaragua canal.

By Thompson of Nebraska favoring a daily fast mail train between the Atlantic and Pacific coasts, which would not be subject to delay at Chicago or elsewhere.

Other resolutions were introduced in the interest of forestry reservation and the beet-sugar industry.

The resolutions committee was composed of the following delegates: T. M. Patterson, Colorado; T. L. Ford, California; J. H. Richards, Idaho; E. F. Test, Iowa; J. H. McKnight, Kansas; B. Smith, Louisiana; J. M. Reed, Montana; E. V. Smalley, Minnesota; J. M. McMichael, Missouri; G. W. E. Dorsey, Nebraska; S. Bradford Prince, New Mexico; L. H. Taylor, Nevada; A. J. Levy, Oklahoma; A. J. Keller, South Dakota; G. B. Stone, Texas; T. D. Lee, Utah; J. P. DeMattos, Washington; J. A. Holliday, Wyoming.

The Nicaragua canal question was discussed by Prof. S. W. Waterhouse of the Washington University, St. Louis, and Hugh Craig of San Francisco.

On reassembling on Thursday, Wm. J. Bryan was present and took the chair, when he said in part:

"I am in hearty accord with the purposes of this Congress. We have here a vast empire whose interests are in many respects dissimilar to those of the rest of the country, and much benefit can be made to accrue from the deliberations of this body. We do not want to secure advantages at the expense of the rest of the country, but only to secure what rightfully belongs to us. In traveling through this region I am impressed with the great mineral wealth it contains."

Mr. Smalley of Nebraska offered a resolution, which recited that the public lands were being injured by overgrazing, and asked the congress to cause them to be resurveyed, classified and placed on sale under regulations which should be more liberal than the present land law.

Mr. Gibbons of Nebraska offered a resolution reciting the reasons why a deep-water harbor should be constructed at San Pedro, southern California.

Mr. Prince of New Mexico introduced a series of resolutions providing for home rule in Territories; the extending to Territories of the benefits of the Carey land law, and providing for the creation of a Government Department of Mines.

Mr. Dorsey of Nebraska introduced a series of resolutions favoring the beet-sugar industry and the granting to the several States of the public lands within them under such restrictions as would prevent monopoly.

A resolution favoring the taking possession by the Government of the Pacific roads was introduced by a delegate from Nebraska.

Tirey L. Ford of California addressed the convention in favor of an executive Department of Mines. Judge Royal of Colorado followed and the resolution was adopted.

Resolutions reported by the committee were adopted in favor of Hawaiian annexation, building the Nicaragua canal, recognition of Cuban independence, arbitration under action of Congress to settle the present coal strike and urging action by Congress for the encouragement of the beet-sugar industry.

The report of the majority of the committee declaring in favor of the free and unlimited coinage of both gold and silver at the ratio of 16 to 1 was debated at length and finally adopted by a vote of 204.6 to 46.4.

On Saturday, Mr. Craig tendered his resignation as president in view of the adoption of the free-silver resolution on the ground that he could not consistently act while opposed to the sentiment of the congress. His resignation was declined unanimously.

The Committee on Resolutions reported favorably the San Pedro harbor resolution and it was adopted by a practically unanimous vote.

Vice-presidents from the States were named as follows: Arkansas, B. D. Williams; Arizona, J. J. Hawkins; Colorado, W. H. McClure; California, Wm. Johns; Idaho, E. S. Hart; Iowa, A. R. Garrell; Kansas, W. P. Dillard; Louisiana, Breedlove Smith; Montana, Wm. Thompson; Minnesota, D. T. Adams; Missouri, John Doniphan; Nebraska, W. I. Kiersted; New Mexico, A. S. Goetz; Nevada, W. P. Maxon; Oklahoma, A. J. Seay; South Dakota, C. E. Jewett; Texas, G. P. Zimpleman; Utah, T. W. Shurtleff; Washington, Geo. Hazard; Wyoming, J. R. Arnold.

Resolutions were adopted favoring the Free Homes bill, the improvement of Pacific coast harbors and a deep-water harbor at Galveston and indorsing the Pure Food bill.

A resolution introduced by Mr. Bryan favoring the foreclosure of the Pacific railroad liens was adopted.

Wichita, Kansas, was chosen as the place for holding the congress next year.

Mr. Preston's Explanation.

R. E. Preston, Director of the Mint, has given out as his final figures for the gold yield of California for 1896, $15,235,900. These figures were made up in Washington. On the ground here the United States Mint has employed a statistician of acknowledged ability, who has for a quarter of a century been familiar with this work. Besides the machinery of the Branch Mint of San Francisco, he has the assistance in gathering data of the State Mining Bureau, and also every source of information available to Mr. Preston. His report, which was recognized by all those familiar with the subject as conservative, returned the gold output of California for 1896 at $17,181,562.

Now Mr. Preston, in a letter to Congressman De Vries, makes the following explanation:

"The difference, namely, $1,945,662, between my estimate of the gold product of California for 1896 and that of Mr. Yale is due to the fact that he bases his estimates solely upon information furnished by superintendents and owners of mines, postmasters, express agents et al., while the estimate of the Bureau of the Mint is based upon the deposits of crude gold at the mints and assay offices, identified upon information given at the time of deposit as produced in California, and from the reports received from private smelting and refining works in the United States, giving the amount of their product derived from the ores mined in California in 1896.

"During the calendar year 1896 the deposits of crude gold at the mints and assay offices of the United States credited to the State of California were 145,304 fine ounces, while the returns from private refineries showed the quantity of gold derived by them from California ores as 576,359.

"In addition to the deposits of crude gold at the mints and assay offices and the amount returned by private refineries as the product of California there were 50,497 fine ounces entered as of domestic production, of which no definite information could be obtained as to the respective States to which it should be credited. It was therefore necessary to distribute this amount among the producing States and Territories, and 15,374 fine ounces of the same were allotted to California, making the total gold product of that State for 1896 737,037 fine ounces, of the value of $15,235,900, the same being the amount of my estimate. Experience has shown that the reports of superintendents of mines and mine owners are not a safe basis upon which to estimate the gold and silver product, as there is a disposition to magnify the product by estimating the same at the assay value of the ore extracted, although much of it may be of so low grade as not to warrant the expense of working, such ore remaining on the dump, and therefore nothing being added to the stock of gold and silver by the extraction of ore of this character."

In regard to this Mr. Yale says: "I do not wish to be construed as criticising either Mr. Preston or his estimate. We figure from entirely different standpoints and both are correct in the main. The Department at Washington counts only the gold that reaches the mints and assay offices. My estimates on the other hand are based on the figures of mine owners and people who keep closely in touch with mining men. It must be remembered that thousands of dollars are taken out of the ground every year in this State by Chinese and then shipped immediately to their own country. I have a record of this, but the Director of the Mint has not. This of itself would make up a large part of the difference between the estimates of this office and Mr. Preston.

"Again, it is the practice of the Department to decrease the gold estimates and raise the silver output. This practice is due to the fact that many of the miners fail to account for any silver production, but estimate the year's work on a gold basis. When, therefore, this gold is taken to the refinery the silver is extracted and added to that account. On the whole, therefore, I think my estimate of the gold produced in California in 1896 is substantially correct. I might say that it is the custom of the Department to decrease the gold output in every State. There was lopped from Colorado last year $3,000,000, and nearly half that amount from Montana. It is so of every State in the Union."

A New Source of Asphaltum.

The following discovery of deposits of asphaltum in the island of Barbadoes of the West Indies, from the London *Engineer*, will be of interest to those interested in asphaltum deposits in this country:

The discovery was made some months back of large quantities of a certain mineral—locally called "manjak"—which bids fair to outrival in point of utility all the similar substances that occur in various parts of the world. Manjak is of a black color, possessing high luster, and having a bright chonchoidal fracture, in appearance closely resembling newly-broken pitch. In Barbadoes it is found very near, and sometimes upon, the surface of the ground in seams varying from 1 foot to 2 feet in thickness, running usually at an angle of about 40° and in close proximity to rocks. It is supposed to have been formed by the drying up and consolidation of petroleum, which occurs in abundance in the same localities and is often seen oozing out of the ground or floating down the streams. In composition it is not unlike Trinidad pitch, the Utah gilsonite and the Canadian albertite, but is of superior quality to any of these. It is supposed to equal the Egyptian asphaltum in quality, but there is a doubt as to the correctness of this view. The analysis of the best quality manjak is: Moisture, 2.00; volatile organic matter, 70.85; non-volatile organic matter, 26.97; mineral matter, 0.18; total, 100.00. As ordinarily met with, however, it does not quite come up to this analysis. It contains rather more—about 5 per cent—moisture and mineral matter. Referring to the analysis of Trinidad pitch, we find that it contains between 21 per cent and 30 per cent moisture and about 38 per cent ash, so that the superior richness of manjak in natural bitumen, as compared with Trinidad pitch, is evident. Among the various uses to which manjak has been successfully applied may be mentioned: (1) As insulation for electric wires; (2) as varnishes of the best quality; (3) as bituminous concrete in asphalt roads and pavements; (4) as patent fuel, mixed with peat or other organic matter; (5) in small percentages, as an intensifier of the illuminating power of coal gas. Such satisfactory results have been obtained by its use for insulation that it is expected by some experts that it will soon supplant rubber in all waterproof work.

Increasing Mineral Yield of British Columbia.

Returns compiled by the Collector of the Port of Nelson, in British Columbia, for the present fiscal year ending June 30th show that the revenue has increased from $188,000 to $350,078, while the mineral exports have made a relative increase, amounting to $4,841,459. These figures do not cover the entire mineral exports of the district, as much of the ore went out via Revelstoke. Were all the mineral exports of southern Kootenay included, the aggregate would exceed $5,000,000. A comparison of the several quarters of the fiscal year just closed with the corresponding quarters of the previous year shows that for the last quarter of the fiscal year ending June 30, 1896, the value of the mineral exports was $467,667; for the corresponding quarter of the year just closed their value was $1,309,184.

The following table shows the relative values of the different metals for each quarter:

	Value.
Quarter ending September 30, 1896—	
Gold	$268,215
Silver (259,422 ounces)	355,824
Copper (1,118,407 pounds)	67,773
Lead (3,049,334 pounds)	38,723
Total value for quarter	$730,535
Quarter ending December 31, 1896—	Value.
Gold	$428,736
Silver (500,302 ounces)	324,211
Copper (1,354,919 pounds)	104,521
Lead (2,310,879 pounds)	28,332
Total value for quarter	$885,800
Quarter ending March 31, 1897—	Value.
Gold	$ 905,561
Silver (1,101,274 ounces)	718,396
Copper (2,054,754 pounds)	189,045
Lead (7,048,314 pounds)	103,038
Total value for quarter	$1,916,040
Quarter ending June 30, 1897—	Value.
Gold	$ 704,368
Silver (676,221 ounces)	369,212
Copper (1,518,817 pounds)	157,176
Lead (4,576,455 pounds)	78,328
Total value for quarter	$1,309,184
Summary of exports—	Value.
Gold exported during year	$2,306,880
Silver exported during year	1,767,643
Copper exported during year	518,515
Lead exported during year	248,421
Grand total for year	$4,841,459

THE Empire State express on the New York Central road, last week, broke all records by making the run from Syracuse to Buffalo, 148.8 miles, in 143 minutes, including a two-minute stop at Rochester and two slowdowns near Syracuse, aggregating four minutes. The actual running time was therefore 137 minutes.

A METHOD of precipitating zinc in aqueous solution in the shape of dense plates of commercial thickness by means of electricity has been found at the zinc works at Duisberg, in Germany.

Electrical Progress.

The Power Plant of the Pioneer Electric Power Company of Ogden, Utah.

In the canyon of the Ogden river, near Ogden, Utah, the latest and most important hydraulic power plant of that State, and one of the largest works of the kind yet undertaken in this country, has been carried out during the past year by the Pioneer Electric Power Company of Utah. Ogden is in the basin of the Great Salt Lake, 4300 feet above sea level, thirty-five miles north of Salt Lake City. It extends eastward to the base of the Wahsatch mountains, which are 5000 feet higher, reaching a total altitude of 9000 feet above the sea. This chain of mountains is intersected by numerous canyons, forming the outlet for drainage areas of considerable extent. The outlet of the canyon of the Ogden river is two miles east of Ogden. About six miles above its mouth the narrow gorge through which the river flows widens out into a valley, eight miles by four, surrounded by an almost continuous mountain chain. The valley is traversed by three streams, which unite at the upper end of the canyon to form the Ogden river, the drainage area of which is about 360 square miles. Its flow varies greatly. In May and June, when the snow on the mountains melts, a maximum flow of 4800 cubic feet per second has been measured, while a minimum of 80 cubic feet in August and September is also on record. The minimum in average years is probably 125 cubic feet per second. The slope of the stream in the upper valley is comparatively gradual, while in the six miles of the canyon there is a total fall of nearly 500 feet. This portion of the river has long appeared an attractive field for the development of power, but apart from a small sawmill near its mouth there have been few attempts made at utilizing the fall of the stream.

TRENCH IN OGDEN CANYON.

The plans of the Pioneer Electric Power Company contemplate the utilization of the waters of the entire Ogden river watershed above the mouth of the canyon for the development of power as well as for irrigation. The central features of the plant are: A large storage reservoir and a masonry dam at the upper end of the canyon; a pipe conduit 6 feet in diameter; a power house with water wheels and electric generators, electric transmission lines and sub-stations for distributing the power to different points, and an extended system of irrigation canals.

The storage reservoir will cover an area of about 2000 acres and will have a capacity of nearly 15,000,000,000 gallons. It will be formed by building across the canyon, a short distance below its upper end, a dam of concrete masonry, built up of isolated piers and arches founded on bedrock. The length of the dam on its crest will be about 400 feet. It will have a total height of 100 feet, 60 feet of which will be above the level of the present river bed. The upstream face is protected by a steel plate covering to prevent abrasion and percolation.

A 9-foot tunnel, excavated through the solid rock around the south abutment of the dam, forms the outlet for the water of the reservoir. At its upper end it connects to a masonry inlet tower, which is in turn connected by a rivetted steel iron pipe, 3 feet 6 inches in diameter, with the main gate house 100 feet below the tunnel. This contains two 72-inch valves, one containing the supply of the main conduit, the other discharging the surplus water. The main conduit is a pipe line 6 feet in internal diameter. Its total length is 31,600 feet, of which 27,000 feet is wooden stave pipe and 4600 feet at the lower end rivetted steel pipe. It is laid in a trench 8½ feet wide, and covered with earth to a depth of 3 feet on top. The pipe is laid along the side of the canyon and follows the mountains to a point about half a mile beyond the mouth of the canyon. It is built to conform to a hydraulic grade line of 2 feet per 1000—a slope believed to correspond to the friction in the pipe. At the upper end of the pipe the inlet is funnel-shaped, and the wooden pipe is continuous, except at three points, where two rivetted steel elbows and a short length of tunnel are substituted. There are eight tunnels in the rock, the longest being 667 feet. There are also eight steel bridges, with a total length of 560 feet, besides a timber trestle. The maximum hydrostatic head in the wooden pipe is 117 feet, giving a pressure of fifty pounds per square inch.

MAKING THE WOODEN PIPE.

From the end of the wooden pipe the steel conduit runs to the power house. The slope of this is steep; the pressure is from 50 to 200 pounds per square inch. It is 60 feet in diameter until it reaches a point 100 feet from the power house, where it divides into two branches, 54 inches in diameter, which lead to two receivers, one on each side of the power house. There are thirteen elbows in this pipe and its entire weight is over 2,500,000 pounds. The total efficient head from the flow line of the reservoir, which is full to the center of the receiver, is 446 feet.

The riveting of the pipe in the trench was effected by power riveters, operated by compressed air at a pressure of from 50 to 75 pounds. Five hundred rivets per day of ten hours were driven by each machine. At the steep grades of the steel pipe line it is anchored by means of concrete anchorages built around it, 8 feet by 10 feet in section and 10 feet long.

The wooden pipe is built up of Douglas fir staves, tongued and grooved, 32 inches in circumference, 16, 18 and 20-foot lengths, 2 inches thick. All the staves were planed and dressed in a special mill erected near the mouth of the canyon. The pipe was laid upon sills in the trench, and was banded with round steel rods ⅝ inch and ¾ inch in diameter, the latter being used where the pressure exceeds that due to a head of 100 feet. In order to bring the staves to the inaccessible parts of the canyon a cableway 1000 feet long, erected on framed towers, was built.

THE PIPE LINE ALONG THE SIDE OF THE CANYON.

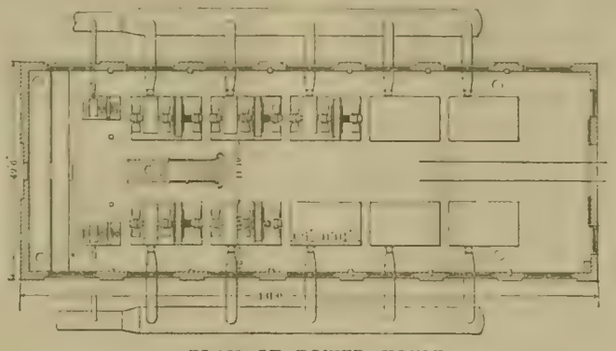
Between the inlet tower at the dam and the power house there are five large gate valves, besides the smaller blow-off and relief valves. Three are 6 feet in diameter, the other two 42 inches. The first two of the larger ones weigh about 23,000 pounds each, and are in the gate house; the third is placed near elbow No. 2 of the steel pipe line, about 100 feet below its junction with the wooden pipe. Its purpose is to permit the closing of the wooden pipe to keep it full of water even when the steel pipe is empty. The head at this point is about 200 feet. The valve has only a single valve stem and is operated by a hydraulic lift supplied with water pressure from the main pipe above the valve. The total weight of this valve is 52,000 pounds, the heaviest single piece in it weighing about 20,000 pounds. Besides

EXTERIOR OF POWER HOUSE, SHOWING ONE VENTURI METER AND RECEIVER.

these large valves there are two smaller, each 24 inches in diameter. These are placed between the lower end of the 6-foot pipe and the power house, in the 54-inch branches leading to the receivers. These branches are reduced to 42 inches by the use of Venturi motors, thus permitting the use of the smaller valves, which are operated by hand. The pipe is fully provided with air, mud and relief valves. The connection between the main pipe and the branches is made by a breeches casting secured to the steel pipes by cast steel angle flanges and belts. To withstand the great longitudinal pressure, a heavy concrete block is built around the casting. Of the nine bridges the longest is that over the Ogden river. This is a riveted bowstring girder 75 feet long. The other bridges carry the pipe line over lateral ravines or were built in place of masonry retaining walls, where a steel structure was cheaper. The power house is built of pressed brick, with concrete and rubble footings and cut stone trimmings. Its outside dimensions are 135 feet in length by 50 feet in width. The roof trusses are of steel, and are supported on steel posts imbedded in the brick walls. A traveling crane of fifteen tons capacity, operated by hand power, traverses the building, the track girders being carried by the steel posts. This building contains all the hydraulic and electric machinery used. A smaller, separate building serves as a machine and blacksmith shop. The water is delivered from the pipe conduit into two receivers, buried in the ground, one at either side of the power house. They are 6 feet in diameter, and, in their general appearance and the material used, closely resemble the regular steel pipe conduit, the thickness of the metal, however, being increased to $\frac{7}{8}$ inch in order to allow for the water hammer. The receivers are provided with five safety valves each, which discharge when the pressure exceeds 200 pounds per square inch, and an outlet gate at the bottom. From each of these receivers five 30-inch and one 10-inch intake pipes extend to the walls of the power house to connect with the water wheel nozzle pipes. Between these intakes and the nozzle pipes are placed the following valves in the order named: One 18-inch geared gate valve, one 18-inch hydraulic gate valve, and one 18-inch butterfly valve.

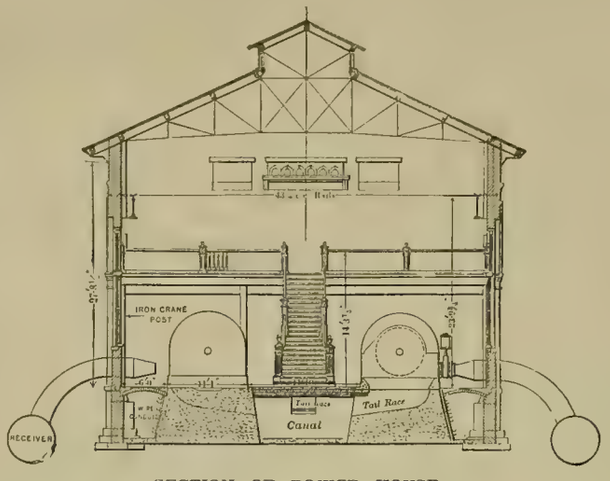
The 18-inch geared gate valve is only to be used in case of repairs to the particular machines that govern it. The 18-inch hydraulic gate valve is piped up to a small D valve, which is placed back of the switchboard and under the floor. By means of a lever on the switchboard, connected to this D valve, the gate can be opened or closed at the operator's will. This valve is the one which is to be used for starting or stopping a wheel. The 18-inch butterfly valve is operated by means of a worm gear from the governor, and is used in checking the speed of the wheel by reducing the head or pressure near the nozzle, and thus avoiding a sudden fall of head in the main pipe line, which would be detrimental to the proper working of the plant.

The nozzle for the water wheels has six rectangular openings, or ports, $1\text{-}\frac{11}{16}$ x$3\frac{1}{2}$ inches in area, of which the operator is able to close one or more, as he may desire. The levers that operate the hydraulic gate and nozzle are placed near the top of the switchboard. The set of levers for each water wheel is placed in the panel governing the generator, which is driven by the wheel in question, so that the operations required in starting or stopping these machines are reduced to a minimum. The wheels are of the impulse type, directly connected to the generators. The complete plant will consist of ten units, five being already installed. The power house and receivers being built for the ten, the balance can be readily installed at any time. The Knight water wheels are 59 inches in diameter and have forty-five bronze buckets cast in one solid piece; fourteen of these will, when the nozzle ports are all open, receive the water at the same instant. The centers of the wheels are made of cast steel, the buckets being pressed on these steel centers and secured with bolts. These wheels are keyed to the generator shaft. Each wheel has a capacity of 1200 H. P. at 300 revolutions per minute, and each is provided with two flywheels, about 70 inches in diameter, each weighing about two tons. The armature, armature shaft, two flywheels and one water wheel, which comprise the moving parts, weigh fifteen tons. This allows a uniform speed to be maintained, notwithstanding changes of head in the main pipe, or changes in the generator load. The water wheel, flywheels, nozzle and the two hydraulic cylinders controlling the nozzle ports are encased in a steel housing, bolted to the machine bed-frame. Between the two lines of machines and down through the center of the building, underneath the concrete floor, is the spillway, into which the wheels discharge the water and through which the water is carried back to the river from which it is taken. The generators used in this plant are of the General Electric Co. three-phase type, with 24 poles, and, at 300 revolutions per minute, have an output of 750 K. W. at 2300 volts and a frequency of 60 cycles per second. The factory tests show that the variation in volts will be less than 5% with a constant speed, should the full non-inductive load be thrown off or on.



PLAN OF POWER HOUSE.

Between the machine foundations and the building foundation wall, on each side of the building, is a subway which runs the entire length of the building and across the rear, and in this subway are carried all the necessary piping for water wheel controllers and all the wires between the generators and the switchboards. The cable connecting each generator to its respective panel on the generator switchboard is a three-wire concentric 250,000 C. M. lead-covered cables and the exciting wires are a two-wire concentric No. 4, B. & S. lead-covered cable. The exciters used on this plant are G. E. six-pole, 500 volt machines, and will give 100 K.W. at 550 revolutions per minute. Each of these machines is ample for the entire exciting current that will be needed for the ten 750 K. W. alternators, and they are each direct-connected to a 135 H. P. Knight water wheel, similar to the 1200 H. P. water wheels previously described. These exciter water wheels are cross-connected to each receiver, so that either exciter can be operated from either receiver. The generator switchboard consists of seven marble panels; five for the alternators, one for the exciter and one for the instrument panel.



SECTION OF POWER HOUSE.

There are two sets of three-phase bus-bars on the back extending the entire length of the seven panels, as well as two bus-bars, also running their entire length, from which the current is taken. From the generator switchboard the current is carried to the distributing board over copper bars, of which there are two sets of three, connecting the two sets of bus-bars on the generator board with the two sets of bus-bars on the primary panels of the distributing boards. The distributing board is in a gallery in the rear of the building and over the generator switchboard. Back of this distributing switchboard are nine 250 K. W. air blast step-up transformers, the lightning arresters and the two blowers for cooling the transformers. The distributing board is divided into two sections—the primary section and the secondary section. Each section has six panels. In the primary section four of the panels are for the low-tension side of the step-up transformers, the remaining two being for the local distributing lines in the vicinity of the power plant. In the secondary section four of the panels are for the high-pressure side of the step-up transformers and two for the long-distance transmission lines. Back of the distributing switchboard and on a raised platform are placed the step-up transformers. These transformers raise the potential of the current from 2300 to 16,100 volts, at which pressure it goes on to the long-distance transmission lines.

The transformers are connected up in sets of three, the delta connection being used on both sides. At each end of the building in the gallery are placed the two blowers, direct connected to a $2\frac{1}{2}$ H. P., 500-volt direct current motor. These blowers are used in cooling the step-up transformers and force the air up through the bottom of the transformers, around the coils and out at the top. The transmission line is calculated to deliver about 3000 H. P. at the substation in Salt Lake City, distant about thirty-eight miles, and consists of two circuits, making six wires of No. 1 B. & S. gauge.

The poles used on this line are of Oregon cedar—clear, straight poles 30, 40, 50 and 70 feet long, with 9-inch and 10-inch tops. There are two cross arms on each pole for the wires; two wires are on the top arm, 4 feet apart, and four wires on the bottom arm,

INTERIOR OF POWER HOUSE.

each 2 feet apart, a circuit being on each side of the pole. These wires are so arranged that should a plane be placed perpendicularly across the circuit it would show an equilateral triangle, with a wire at each angle, the length of the sides being 2 feet. These wires are transposed about every half mile. By this arrangement of the pole line wire the inductive effect is reduced to a minimum. About 6 feet below the second cross arm on the pole is a two-pin cross arm, on which the telephone wires are strung, being transposed about every four poles, there being an average of about fifty poles per mile. The current is fed into the transmission line at the power plant at 16,100 volts and delivered to the step-down transformers at 13,800 volts. This will give an energy loss of about 10 per cent in the line, and a potential loss of about 14 per cent. The sub-station step-down transformers deliver this current to the local distributing lines again at 2300 volts. There are at present nine 250 K. W. step-down transformers at the sub-station connected by the step-up transformers, and the switchboard in the sub-station is similar in every respect to the distributing board in the power plant gallery. The cooling apparatus here is also identical with that used in the power plant, except that the motors used are sixty cycle induction motors. While the transmission lines are at present capable of delivering 3000 H. P. at the sub-station, with a 10 per cent energy loss, if it should become necessary the step-up transformers can deliver more than this by changing three wires on their high-pressure side, and delivering the current into the transmission lines at 27,000 volts. Thus the line capacity would be more than doubled. The present installation of the power plant is capable of delivering 3750 K. W. to its lines, but ample provision has been made to increase this amount to 7500 by installing five more 750 K. W. machines, as new industries or manufactures spring up as the result of the advantages offered to them in Ogden and Salt Lake City. There is one important feature in the arrangement of the machinery which should be noticed, viz., the complete duplication of all parts. All portions of the plant below the breeches pipe casting, at the lower end of the 6-foot conduit, are absolutely symmetrical about the center line of the power house, each side being entirely independent of the other. This applies not only to the pipes and receivers, but to all the parts of the switchboards, etc., as well as to the generators and water wheels. Either of the exciters, also, is capable of providing sufficient current for all the large generators, and can be run with water from either receiver. The advantage of this arrangement is that an accident to either receiver, or to one or more wheels or generators, would not result in the shutting down of the entire plant, but, at the worst, of only one side. For a short period all the power required could probably be supplied from one side of the power house.

The current will be used to drive factories, running electric railways from Ogden to Salt Lake City, to the lake, to light the towns and cities in the north of the State. The surplus water in the storage reservoir will be used to irrigate large tracts of land in the vicinity.

The conception and successful completion of the works belonging to the Pioneer Electric Power Company are largely due to the efforts of C. K. Bannister, M. Am. Soc. C. E., who, as chief engineer and secretary of the company, has devoted several years to the careful study of the engineering and financial problems involved.

A LONDON daily, commenting on the warships at the great naval review at Spithead has the following comment on the United States warship Brooklyn: "The Brooklyn is capable of suggesting to us many things connected with the adoption of electricity to the work of a ship. In this matter we are at least five or six years behind several other countries, whereas America certainly leads the van. Some of the Brooklyn's electrical devices are perhaps a little too delicate, too complicated, or too unnecessary; but her gear for hoisting projectiles and ammunition to the guns and her machinery for working the turrets are so admirable that we recall with a blush of shame that only one of our British men-of-war is fitted with electrical shot hoists."

A Trolley Up the Jungfrau.

Up on the Jungfrau, an Alpine peak that only the most skillful mountain climbers could ascend, a railroad largely underground has been surveyed and will be completed this summer. The projector of the Jungfrau railroad is Herr Guyer-Zeller of Zurich. His proposition, when placed before the Swiss Government, provoked unbounded astonishment. But Guyer-Zeller explained that he meant to run his cars through a tunnel bored through the solid rocky heart of the mountain from the village of Scheidegg to the summit, and that the wild storms and perpetual snows of the upper levels could never interfere with its workings. Extensive surveys were made, and in the fall of 1894 the Government consented to the concession. Work was begun the following spring. The first station will be Eigergletscher, part way up the slope of Eiger and 2280 meters above sea level. Up to this point no special engineering difficulties will be met.

A strong curve will carry it to the left in a steep ascent up the cliff of Eiger, sometimes emerging to show the traveler a view of immense extent and majesty, and again plunging into the rock. Thus it winds up the snowless side until the station of Eiger is reached. This is about half way up the smallest peak of Jungfrau and 3221 meters above sea level. From this point the road runs in nearly a straight line toward the supreme summit, when opposite the second great peak Monch, the third station, is reached. This is 3623 meters above sea level. This station will be a general stopping place for climbers, and the Monch, with its 4105 meters of altitude, can be readily reached. From this point there is a gradual descent to the Guggigletscher Galerie, where, at a height of 3383 meters, the cars will pass along the top of one of the steepest walls of the mountain, a precipice of 1400 meters sheer descent. From there a tunnel carries the road on a sharp incline straight to the summit of Jungfrau, 4100 meters above sea level. The terminus of the road, the actual summit, is not yet reached. The real apex is a ledge of rock that shoots up 66 meters higher, but with a crown so narrow that the railroad cannot reach it. So the passenger will dismount and enter a tower, through whose interior an elevator quickly lifts him to the supreme point. The elevator will be worked by a dynamo, whose power comes from a hydraulic motor utilizing the waters of Lake Luchinen in the Lauterbrunnen. Within the tube is a winding staircase, so that travelers not caring to use the elevator may reach the summit afoot. All the tunnels and stations are to be lighted by electricity and connected with the world below by telephone and telegraph.

CABLEGRAMS announce that the French customs officers had been making successful experiments with Roentgen rays for the examination of trunks and the discovery of contraband articles. Cigars in a closed box are easily counted, it is said; the springs of an armchair plainly seen, as well as the contents of a carefully sealed package. Owing to the weight of the new instrument it cannot yet be used at small stations, or by the octroi offiers at the gates of Paris, but experiments have been made at the Gare du Nord.

THE kinetoscope took 143,000 different pictures during the Corbett-Fitzsimmons fight. The length of the film upon which the pictures were taken is two and a half miles.

Scientific Progress.

Liquid Air in Electrical Works.

It has recently been found that liquid air is one of the most perfect insulators, and that most insulating materials cooled to the temperature of liquid air are greatly improved in insulating qualities. It is known, also, that cooling renders it more difficult to cause a spark to occur between oppositely electrified conductors, the striking distance for a given pressure being diminished.

The stability or permanence of liquid air in bulk, even when it is fully open to the ordinary atmosphere or kept at atmospheric pressure, is of course simply dependent upon the heat insulation provided, and if this could be made perfect the air would never evaporate. But it may be possible that a much higher voltage than is now used (10,000 to 20,000 volts) may be successfully used with conductors cooled and insulated by liquid air. If the potential could be raised 50,000 volts, either the loss on the conductors for a given power transmitted would fall off as the inverse square of the voltage, or the conductors could be made smaller in the same proportion, or the distance of transmission increased with the same section of conductors as the square of the potential. These are matters worthy of experimental determination.

Could the conductors be kept cool by liquid air and thereby their conductivity and insulation greatly increased, the work of transfer in a reformer could be much greater for a given size than it now is, or the loss could be even less than it now is, although but 3 per cent is sacrificed in ordinary practice.

Transformers in liquid air might be made entirely of copper without iron, and their light load efficiency become nearly equal to full load efficiency.

A transformer without iron would avoid the loss in the air, and would permit such a saving in material that changes in design or disposition of the copper could be made to suit the condition of absence of the iron.

We need not touch upon the possibilities of liquid air as a means of energy storage, for they are self-evident enough, since liquid air is virtually compressed air which remains compressed, as it were, even when exposed to atmospheric pressure; that is, addition of heat gives to it pressure and the ability to do work in suitable engines in the usual compressed air motors. Our object has been to briefly point out what may be termed possibilities in electric engineering, assuming that data favorable to the ideas presented be the outcome of experimentation.—Elihu Thompson in Modern Machinery.

Interdependency of Inventions.

The advent of important and valuable inventions is often dependent, not upon the brilliant inspiration of some individual inventor, but upon the general and gradual advance of the state of the art to which they belong, making their occurrence not only possible, but almost inevitable. The bicycle is an excellent example of this kind of growth in mechanical construction, since, while it is one of the most important things both mechanically and commercially which has ever been produced, it owes its development to the parallel improvement in metal and rubber working without which it could never have existed at all, in the modern sense, or to any extent. The clumsy wooden velocipede would always have remained a useless toy had not the introduction of drawn steel tubing made the construction of a light and yet strong frame possible, while the original leather tire of Dunlop could never have led to the practical application of the pneumatic principle without the substitution of the rubber construction which only the advances in rubber manufacture made possible. This is but one instance of what is apparent in many other lines of work, and there is little doubt that if the patent records of the past fifty years were thoroughly studied by competent specialists many inventions, which at the time of their conception were failures simply because of the impossibility of executing the ideas, would now be found both practicable and valuable.—Cassier's Magazine.

Telegraphing Through Hills.

Tesla's utterances about wireless telegraphy recall the fact that an Italian some time ago claimed its invention and application in numerous experiments. His name is Guglielmo (William) Marconi. He even succeeded in transmitting signals through a hill. These first experiments remained the secret of the family circle till he went to London last year with his mother, who is an Englishwoman. There he soon attracted the attention of the director of the telegraphic service in England, who gave a lecture, which Marconi illustrated with his experiments. Private and public experiments soon followed. Some were given in the ministry of war and others in the general postoffice, in the presence of high authorities. The experiments were made with the primitive apparatus made in Italy, and yet, even then, telegrams were sent to very great distances in all directions and also through a little hill. Since then Marconi has been enabled to improve his original apparatus and hopes soon to send telegrams through hills and rivers by his new method of telegraphing.

A NEW USE of aluminum has been discovered in the manufacture of reproducers for talking machines. The reproducer is the apparatus which holds the vibrating diaphragm of glass. Heretofore the recorders and reproducers of talking machines have been made, as a rule, of hard rubber. For hard rubber aluminum has been substituted with what is regarded as much success. It is claimed that the blasting, blaring, or "chattering" as it is called in the trade, which is often noticeable in the performance of the talking machine, is almost completely absent when an aluminum reproducer is used.

COMMISSIONER OF PATENTS BUTTERWORTH says the business of the patent office for the current calendar year will be an increase of 7 per cent over last year, and that the receipts will be over $100,000 more. In view of this encouraging showing and of the inadequacy of the force of the office, he has asked Congress to insert in the urgent deficiency bill an appropriation of 40 per cent of the increase of additional appointments. Over $4,500,000 is now in the Treasury to the credit of the patent office, and this fact and the crippled service have been pointed out to Congress.

WHEN the flashlight of a submarine camera was burned recently in the Mediterranean, crowds of fish, with their wide-staring eyes, were instantly pictured on the sensitive plate. Photographs of submarine forests are startlingly novel. Seaweed makes an altogether different appearance when seen in its natural element from that which it presents when seen floating on the surface or driven up on the beach.

THE lightest balloon that has ever been built for continual use weighs a little over sixty pounds complete. Of this nine pounds is the weight of the netting, and seven that of the basket. This balloon is built to hold 4000 feet of hydrogen gas on the estimate that 1000 feet of gas will lift sixty pounds, although theoretically it will lift seventy pounds.

THERE is no reliable case on record where resuscitation has taken place after the complete freezing of the body in man. This has been frequently accomplished in the cold-blooded animals, such as fish and reptiles, if thawing be gradually brought about.

Mechanical Progress.

To Restore Smoothbore Cannon.

Colonel William H. Bell of the regular army has invented a projectile which promises to restore to usefulness $3,000,000 worth of old smoothbore cannon of rebellion times, which are lying loose around the United States. The old round shot which used to be fired from the smoothbores was never effective, as there was great loss of power by the escape of gases around the edges of the ball, and after it left the cannon the wind banked up against its sides and swerved it from its mark. Conical projectiles were given a rapid twist in their flight by being fired from the rifled gun, but the operation was expensive. Such are the great weapons of to-day, which have the fault that the balls are apt to tumble. Colonel Bell's invention, it is claimed, secures the necessary rotary twist in the air without the necessity of being fired from a rifled gun, and his projectile has not the fault of tumbling. In shape it is an ordinary conical shot. In its bore is a hollow capable of holding a considerable quantity of slow-burning powder. A plug screws into this hollow, holding the powder securely within. Around the edges of this plug are a series of grooves leading into the powder chamber, and bored at an angle opposite the direction in which the projectile is expected to twist, and thus bores its way through the air, which it does on the same principle that makes the Fourth of July pinwheel revolve when it is lighted.

A charge of quick-burning powder is dropped into the smoothbore cannon, and the projectile is pushed in upon it. The fuse is attached and the cannon fired. The quick-burning powder expels the projectile and lights the slow-burning powder through the grooves. This begins to act at once, accelerating the speed and initiating the twist even before leaving the cannon. The speed is said to actually increase while the projectile is in the air, and until the powder is burned out the rotary motion continues to accelerate the ball. Colonel Bell is stationed at the Presidio at San Francisco, and it is there that he made his first experiment a little over a year ago. Other tests are expected to take place shortly, and if results are found to be uniformly satisfactory the War Department will be asked to take official notice of the invention, and make tests with a view to adopting the projectile for use by the artillery of the regular army.

A Giant Umbrella.

The Department of Concessions of the Omaha Transmississippi Exposition of 1898 has received an application for space for the erection of a mechanical device. It resembles the framework of a gigantic umbrella. The part corresponding to the stick of the umbrella is an immense cylinder, 30 feet in diameter, constructed of steel plates, firmly riveted, making a "standpipe" which rears its head 250 feet above the level of the ground. At the extreme top of this cylinder are fastened twelve long arms resembling the ribs of an umbrella. These are steel trusses, reaching almost to the ground. At the lower end of each of these ribs is suspended a car for carrying passengers, each car having a capacity for twenty persons.

These monster ribs are raised by hydraulic power, acting by means of steel cables operating through the cylinder, aided by a mechanism greatly resembling that portion of an umbrella which comes into action when the umbrella is opened. By means of this mechanism the gigantic arms are raised until they are horizontal, the cars in the meantime being carried outwards and upwards until they reach a point 250 feet above the ground, the diameter of the huge circle formed by the suspended cars being also 250 feet. When the highest point has been reached another mechanism comes into play, and the suspended cars are swung slowly around in a circle, after which they are lowered to the ground. The sides of the cars are of glass, so that the passengers may secure an extensive view of the surrounding country.

Down Drafts.

In a paper read before the St. Louis association No. 2 of the National Association of Steam Engineers, Mr. A. B. Hazard makes strong claims for the advantages of down draft, in the application of which the green coal is placed upon the top of the fire and the air is forced downward through the grate. He claims that in this system there is (*a*) complete combustion of gas; (*b*) a complete combustion of the fuel; (*c*) no deposit of soot or tar; (*d*) a positive and rapid circulation of water in the water tube grates, which, with down draft, are in the hottest part of the fire; (*e*) no cooling of the hot furnace and boiler by throwing open the doors of the combustion chambers, as in the up draft systems; (*f*) much greater durability of grates; (*g*) increase of steaming capacity over that of boilers of the same size fired in the ordinary way; and (*h*) perfect smoke consumption. Of course, if these claims are sustained in practice, the logical result—increased efficiency—must inevitably follow. This is claimed to be from "10 to 50 per cent, depending on the kind of boiler and upon other conditions."

New Things in Paper.

Woven paper is a new article invented by W. A. Maurain, a Providence, R. I., manufacturer, which is designed as an improved kind of lining for carpets. A novel description of loom is employed in its production, and into this loom strips of paper a yard long are fed automatically through a tubular guide, which folds them lengthwise. These strips form a firm yet elastic weft a quarter of an inch thick and securely bound by warp threads.

A new kind of paper is being made of the fiber of sugar cane in the mill of Cunningham & Miller at Sugarland, Texas. The paper turned out is first-class hardware paper, and Col. Cunningham says that anything from butchers' stock to fine writing papers can be made at his mill. About fifty men are employed in the new enterprise, and the megasse, which heretofore has been a nuisance to the sugar planters and used for fuel, will be made to be a source of profit.

Speed of Modern Warships.

By far the larger proportion of the first-class cruisers, armored or protected, which in recent years have been projected or completed, are ships with speeds varying from 19 to 21 knots; and of those which equal or exceed 22 knots—projected, building or afloat—there is now a moderate fleet, among the leaders of which are the British Powerful and Terrible, armored cruisers, 14,250 tons, 25,000 H. P., 22 knots; the French Jeanne d'Arc, armored cruiser, 11,000 tons, 28,500 H. P., 23 knots; a protected armored cruiser for Italy of 10,500 tons, 13,000 H. P., 23 knots; the Buenos Ayres of Argentina, protected cruiser, 4500 tons, 14,000 H. P., 23.2 knots; the Chilean Blanco Encalada, protected cruiser, 4420 tons, 14,500 H. P., 22.78 knots; the Neuve de Julio, Argentina, protected cruiser, 14,500 H. P., 22.74 knots; and the Yoshino of Japan, an improved form of the latter vessel, with a speed of 23.08 knots. It would seem that expert opinion favors extreme speed for large cruisers.

FROM statistics compiled by the *Railway Age* it appears that during the first six months of 1897 only 622 miles of new track were laid upon fifty-five lines in twenty-three of the forty-nine States and Territories. This is 166 miles less than in the corresponding half of 1896, 10 miles less than in that of 1895, and about 100 miles more than in the first half of 1894. The number of States in which track has gone down is less than in any previous year for two decades, and the number of lines is also less than in any of those years except 1894. In twenty-six of the States and Territories no new railroad construction has been done thus far this year. A number of these, however, will no doubt appear in the record for the entire year. Construction is in progress on many lines upon which track laying has not yet begun, and if the financial situation continues to improve it is possible that 1897 may show more track laid than any of the three preceding years. It is estimated that the new construction of the year will aggregate from 1800 to 2000 miles.

IN a report made to the State Department by Mr. Monaghan, Consul at Chemnitz, Germany, a description is given of a new plan for a cheap and durable roof invented by M. Kohler of Limbach, Saxony. It consists simply of cement and gravel, or cement and sand, being thus as durable as slate, with the advantages of being very much cheaper, looks as well or better, and can be made much easier and put on quicker. The weight of a square yard of these tiles is calculated at sixty pounds, but they may be made heavier or lighter, as desired. Certain ridges are formed around the inside of the plate and permit of one so lying on and in the ridges of another as to preclude the possibility of wind or water working their way inside.

A CHICAGO company is working on a new horseless carriage. Mr. Overman considers that others who have studied the matter have made a mistake in following the models of vehicles built for horses. He began on the supposition that no horses had been used, and banished all idea of shafts or dashboards.

FOR SALE.

The Following Machinery, Nearly New. Now Located in State Agricultural Exposition Building at Sacramento:

One 16x42 R. H. Poppet-Valve O'Neil Automatic Cut-Off, 100-Horse Power Horizontal Engine, built by the Union Iron Works, with Band Pulley, 22 in. x 12 in. Pipe Connections and Valves complete, as it now stands.
One 22 in. Double Leather Driving Belt.
One 18 in. Union Exhaust Steam Feed Water Heater.
One Buffalo Duplex Boiler Feed Pump 6x4x6.
Two Tubular Steam Boilers, 54 in. diameter, 16 ft. long, in good order, with Furnaces, Grate Bars and Settings complete; one Injector for each Boiler, and all the necessary Checks, Valves and Gauges.
One Stack, 48 in. diameter by 80 ft. long.

For price and particulars, address
EDWIN F. SMITH, Secretary, Sacramento.

FOR SALE CHEAP.

First-Class Air Compressor (Steam Driven) and Drill, New.
Also, 3-Ton Capacity Pulverizer.
A. L. FISH, 59-61 FIRST STREET, S. F.

FOR SALE CHEAP.

Gold Wet Washing Machine,
MAIT'S MAKE.
Capacity, 8 Tons Per Day.
Good order. Can be carried anywhere by prospector.
Address T. L., this office.

WANTED.

Able, rugged man, as Roaster, thoroughly familiar with oxidizing dead roast of gold concentrates in Bruckner furnace. None other need apply. Address quickly, stating experience and qualifications.
JACKSON & LAKEVIEW MINING CO.,
LUNDY, CAL.

WANTED. — A Second-Hand 5 OR 10 STAMP MILL.

Address, stating particulars, price, etc., A. B., this office.

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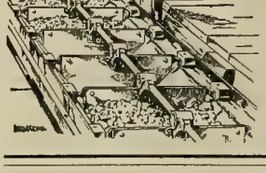

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Mining Summary.

CALIFORNIA.

Amador.

Dispatch: After a long time the Zeila mine is again in operation with nearly a full complement of men. The mill started up also, and will be kept at work day and night from now on.

At the Oneida the shaft is now down 1060 feet and sinking is progressing steadily.

At the Amador Queen No. 1 sinking is progressing, about 48 feet having been obtained since last report. The crosscut to the east is now about 50 feet from the shaft and the face of the drift is in hard rock.

At the Valparaiso sinking is being prosecuted, the rich ore shoot still holding as they go down on the ledge. An expert visited this mine this week in the interest of a Chicago company.

The flow of water in the Alma still continues, but the management is able to handle it as yet. They will put in machinery to handle the water and admit of work at the same time. It is intended to use the diamond drill again shortly.

On the Kennedy the new machinery at the north shaft is nearly all in place.

The cleanup at the Zeila mill of the last run from the Argonaut mine proved more satisfactory than any heretofore. Work on the new 40-stamp mill is progressing favorably.

Butte.

Register: The Rock River mine, near Oregon City, is running night and day with a force of about a dozen men to a shift.

In Cherokee the Coster Company is working twelve or thirteen men. Another Portuguese company will commence operations this week with about the same number of men.

Calaveras.

Prospect: The 700-foot mark in the shaft of the Thorpe mine at Fourth Crossing has been reached and another level is being run to tap the ledge.

In a short time operations will be commenced on the river between the Davis ranch and La Grange by a company to dredge the river bed and secure the gold that is lodged on the hardpan that forms the bed of the river. Ten or twelve miles of river have been bonded.

Fred Greve of Blue Mountain bonded last week to Oakland and San Francisco parties the Eureka, Neutral and Oro Fino or Black Wonder quartz mining claims, all in Blue Mountain mining district, for a term of two years for $19,000.

Citizen: The Table Rock mine, owned by Cunningham, Fisher & Defoor, has commenced work again.

The Plucky Tom mine is shut down at present.

The Page-Cutting mine is proving a success.

On the Fricot tunnel on the Albany mine the present contract is nearly completed. The tunnel will tap the Columbus lead at about 400 feet.

Work upon the Cow Bell mine, owned by Ehrhart & Worcester, has been temporarily suspended.

The Grace Darling mine, E. Moores superintendent, continues as for the past twenty-five years to turn out good rock.

The Coralie mine, H. W. H. Penniman owner, is temporarily shut down, awaiting supplies and timber.

Mariposa.

(Special Correspondence).—The mill of the Merced Co. is running steadily on ore from the Mary Harrison, and monthly shipments of satisfactory size are going forward. All the men who can be worked to advantage are being put into the stopes, and no attempt is being made to keep the development work in the mine even abreast of the ore extraction. The haste is said to be due to the desire to make as good a showing as possible before the failing water supply causes a suspension of milling for the season. A great many miners from Michigan are coming into camp and find immediate work on the Merced properties. One of the company's hoisting engines is being run by a boy of eighteen, probably the youngest engineer in the State. At the Virginia crosscutting and drifting continue at three points in the old incline shaft.

Mark Parker and Austin Shimer have bonded their two claims on the east lode to Dan'l O'Toole for $7000, and the first payment has been made. Mr. O'Toole is part owner of the Virginia, adjoining these claims, and is supposed to have taken the bond in the interest of the California Exploration Co., who are working the latter mine.

The Plain View has suspended operations indefinitely.

The new mill on the Louisiana will be ready to start in a few days.

Work on the Contention at Bull creek is virtually suspended. This is the property extensively written up lately by the San Francisco dailies as having large bodies of black slates assaying $600 per ton.

The Garibaldi Mining Co. has been formed to work the Blue Lead mine, and incorporated with a capital stock of $1,000,000. The difficulty over the title to the property has been adjusted and the purchase price, which was in the neighborhood of $5000, has been paid. An effort to open the property will now be made. Attempts by the former owners to work the mine some years ago were unsuccessful, by reason of the large bodies of water encountered, and the mine was flooded and abandoned. It is believed that with better pumps the flow can be controlled.

In the Bondurant tunnel the new compressor has raised the rate of progress to 25 to 30 feet a week. It is thought the vein will be cut in a few days.

Bert McFadden, Robert Barnett and others have located the old French mine, near the northeast corner of the Mariposa grant. This property has always been claimed as a part of the grant, but is now asserted to be just outside the limits.

The Spencer mine near Whitlock is sold and a strike of considerable importance is reported from the same property.

The heavy bullion shipments from the Tendron continue.

The bullion shipments of Mariposa county for the past three months have exceeded those of the entire year of 1896.

Coulterville, July 20th, '97.

Nevada.

(Special Correspondence).—The litigation on the Gold Bar mine, one-half mile from town, has been settled, and preparations are being made for reopening the property. It has a shaft 200 feet deep, and years ago, before trouble came upon the place, good ore was taken from the mine. It is owned by W. H. Weldon and others.

The Bodie, five miles west of town, owned by local capital, associated with F. W. Page and Geo. H. Nihell, is being developed. The shaft is 60 feet with a drift 40 feet on the ledge, which is 3 feet. Assays of ore from the hanging wall run $52.53 and from the footwall $132.48. The sulphurets run 3%.

At the Brunswick Consolidated the shaft has reached 900 feet. Drifts have been opened east and west on the 900 level, reaching 375 feet from the face, showing a vein of 20 inches the entire distance. The vein in the west drift is 3 feet. A new plant of 10, 12 and 14-inch plunger pump is being placed. At present ten stamps are running night and day, and ere long twenty will be dropping. The property is owned by a New York company. C. H. Mallon of Nevada City is superintendent. The mine is one and one-half miles from Grass Valley and 1500 feet from the old Idaho property. J. F. L.

Grass Valley, July 19, '97.

(Special Correspondence).—The owners of the Home mine have purchased the Texas and Minerva properties and have begun development work. D. J. McFaull, superintendent of the Home, has charge of the new work also.

At You Bet the Red Dog Gravel Mining Company are doing extensive development work. The shaft has reached 200 feet, from which a drift of 200 feet is run in bedrock under the channel. The company expect to strike the channel within 200 feet by an upraise of 40 feet.

At the Providence mine a 300-foot drift has been run at a depth of 1780 feet. Superintendent McKinley is cutting a chamber at the end of the drift, where an engine will be placed and a shaft started. The power drills will be run by compressed air.

Whilst Grass Valley and Nevada City are two prosperous mining towns, labor is abundantly available at home, and it is not advisable for persons to come from the outside to seek employment in the mines.

Over in the Washington district a rich find has been made by Patrick Dillon on Poorman's creek, about a mile southwest of the Spanish mine. He has a tunnel in 120 feet on the ledge, and has just made a crosscut. The main ledge itself is 23 feet wide, and the whole formation between the walls is from 35 to 40 feet wide. J. F. L.

Nevada City, July 17, '97.

Herald: In the Bellefontaine mine at Willow valley in sinking the shaft 40 or 50 feet the ledge widened 13 inches, and there is now a 2-foot ledge. The crew take out about three tons per day of high-grade ore just in sinking the shaft. The hoisting works will be finished next week, when crosscutting in the mine will begin.

Hon. J. H. Neff of Colfax and Hon. Edward Coleman of San Francisco have been looking at the Stanford mine, near Indian Flat, and they will probably take it. They are organizing a company for mining development, and W. W. Montague, the new postmaster of San Francisco, will be a member of it.

Telegraph: The Gold Bar and O K mines are to be opened by a company composed of Judge Schell, President; S. K. Thornton, George F. Davidson, Jabez Howes and Daniel O'Connell, all of San Francisco. Henry Phillips, formerly of the Kentuck mine, will be manager.

Union: The owners of the Texas mine at Willow Valley will commence to sink a three-compartment shaft preparatory to developing the property on a big scale. The new owners of the Texas are the same men who own the Home and Cadmus mines.

Placer.

Record-Union: The Bartley Consolidated drift mine is three-fourths of a mile east of Dutch Flat. The company own 110 acres on the course of the channel. A tunnel was commenced last September and has been extended 900 feet. Two crosscuts have been run, one north across the channel 310 feet and one northeast 140 feet, and still another 125 feet. The tunnel has not reached bedrock yet, but will as it is completed up stream. Developments prove that the channel is 1000 feet in width. The material extracted while running the tunnels and crosscuts, without breasting out, has paid two-thirds of the work of development. The gravel when worked will be from 6 to 20 feet in height.

The Alta Gold Mining Company's claim runs under and beyond the town of Alta. It includes one mile of surface ground. When the present owners got possession they started a tunnel from Canyon creek and have extended it over 4000 feet. Two distinct white gravel channels have been crossed, and now the tunnel has penetrated a blue gravel channel which is considerably deeper. The work so far done is only exploratory.

On the Truro mine the owners commenced work a year ago. They only had to run a tunnel 315 feet before striking the channel. They have already crossed 100 feet, and there are no signs of the opposite rim yet. The gravel will be worked 5 feet high.

Ex-Governor Willey of Idaho is superintending the Redstone quartz mine for a Philadelphia company. The mine is about one and a half miles southeast of Blue canyon. There is a mill having ten stamps and concentrators, all run by water power. The ledge varies from 3 to 15 feet in width. It is encased with porphyry and slate. The ore is low grade, but it can be worked for $1.25 per ton.

Sierra.

Mountain Messenger: At the Gold Bluff mine four men are now at work as tributers.

The season's run at the Excelsior is about over.

A number of Chicago mining men are in Downieville. They are interested in the Sierra Gold Company.

Siskiyou.

News: The Klamath Flume and Mining Company started their sawmill last Saturday and will run it night and day on lumber for the flume. There will be nearly eighteen miles of flume put up. They will probably have at least 150 employed as soon as there is room for them. The company have good water rights and their flume will cover all the ground they own. It is expected they will be washing dirt in about eight months.

The Minetti B. mine at Nolton has suspended work until their suspension bridge is completed and a hoisting plant is put in.

Journal: The Bennett mines on Salmon river are reported to be doing splendidly this year. Mr. Bennett recently took a large amount of dust to the mint.

All of the river claims along the Klamath are busy at present hoisting gravel and accomplishing all they can before the fall storms drive them out. A number of these mines are run by Chinamen, and in nearly every instance they make it pay, as they usually form a company and do their own work, whereby all share in the profit. Mines that white men cannot work are sometimes paying properties when they come into the hands of Chinamen.

Tuolumne.

Union-Democrat: C. G. Bacon has purchased a one-half interest in the St. Helena group, and a tunnel has been driven in 64 feet, crosscutting at face showing 23 feet of well-defined quartz.

On the Golden Gate the main shaft has attained a depth of 700 feet, at which point sinking was discontinued. The ore reduced comes from the 300 and 400 levels, the latter being the bottom one, none having been run between that station and the 700.

Crandall and Dull have secured control of the Golconda group of mines and will shortly begin operations on a large scale.

The Rawhide continues to daily work up 100 tons of good ore from the stopes between the 1000 and 800, and the main shaft is being pushed on toward the 1200 level.

In the Consuela, of the East belt, that has recently been reopened, drifting and crosscutting are being done. The ledge is big, and a strike of rich ore is reported.

Gus Ogden has bonded the Providence mine to San Francisco people. The new company propose to operate the property on an extensive scale, and have retained Mr. Ogden as superintendent.

Independent: At the Arbona the new 10-stamp mill has been started up.

On the Dutch mine the new twenty stamps were started up last week.

At the Whiskey Hill group improvements have recently been made. On the surface twenty-five men are kept busy. The main shaft is now down 50 feet. The frame for the perpendicular hoist is completed, and in a few days more two cages will have been put in.

In Woods creek, in Jamestown, Burns and Haley are washing the gravel with good pay results.

At the Shawmut mine, near Jacksonville, the ten stamps recently put in operation are dropping on a high quality of pay ore.

The old abandoned Green mine, in the vicinity of Confidence, is being reopened.

At the Tarantula mine the tunnel is now in 225 feet. At a depth of 150 feet crosscutting is going on. The character of ore taken out is encouraging.

NEVADA.

Silver State: Since the 22d of February of the present year the Dexter Mining Company at Tuscarora, according to the directors' report, have produced gold bullion of the value of $35,896.76, cyanides of the value of $13,142.27, and tailings that netted the company $3096.65.

Lyon County Times: Machinery is piling up at the copper smelting plant in Mason valley. The boiler is set and work is progressing on all parts of the plant as rapidly as possible.

At the Logan & Hully mine the mill will be furnished with a concentrating plant. This method will take out the objectionable features in the ore for cyanide working, and the tailings, which will be caught, will probably be worked by the cyanide process. The new lower tunnel has reached the ledge, which is 20 feet wide. The development work so far done shows 100,000 tons of ore in sight.

WASHINGTON.

Spokesman-Review: At Marcus the Little Giant is now a shipper. It has been under development for more than a year, and over 500 feet of work was completed before the first shipment went to the smelter. The mine now has a producing capacity of 10 tons of shipping ore per day.

At Boundary Florman & Hays have sold the White Cap group of mines on Red Top mountain to Mason & Palmer of Bangor, Maine, for $20,000. The group is a fairly well developed proposition and susceptible of being a shipping mine at an early date. The purchasers propose to commence work at once.

At Bossburg Gerg & Parkin have arrived with a large plant of gold saving machinery, which they will place upon the Coxey bar, on the reservation side of the Columbia river. The bar contains in the neighborhood of 1000 acres of low bench land. The plant, when in full operation, will employ in the neighborhood of fifty men. The Paris, across the river from Bossburg, is being worked by a full force of men. The Young American will resume work soon, and the Bonanza will begin making regular shipments about the first of August.

BRITISH COLUMBIA.

(Special Correspondence).—The Smuggler Mining Company have leased the Strathyre mill and are putting in new engines and boiler. When the lease expires at the end of the year they are going to put in a 15-stamp mill.

There is a new mill going up on the Winchester.

The Joe Dandy has received a carload of hoisting machinery for its three shafts.

The Stemwinder, the pioneer mine in camp, has passed into the hands of Doer & Davidson of Victoria, who will put up a mill. It is a large body of free-milling quartz.

Capt. Duncan of the Montreal and British Columbia Development Company, was in camp this week buying properties. At present he owns the Fern group at Nelson, on which a 20-stamp mill is being put up.

The Quintette is shipping 75 sacks a day to Tacoma. They are sinking a 50-foot shaft, besides running crosscuts. A one-half interest in this was sold for $65,000 to L. Fender and partners of Portland by Dr. Langhammer.

The Tin Horn mill, 20 stamps, is nearing completion. They have four claims, 1500x1500, on this lead, and it can be traced the whole distance. At present about 25 miners are employed at the mine running four tunnels and sinking a winze.

Ore has been struck in the Oro Fino, a new prospect.

In the Gladstone the ore runs well in free gold, but it is characteristic of this belt that most of the gold lays in galena.

Fairview, July 14, '97.

(Special Correspondence). — At Cayoosh creek, Lillooet, the contractors for the Golden Cache mill have promised to be ready for crushing on August 1st. In No. 4 tunnel, the last driven in the mine, rich free milling ore, that made the mine first known, has been struck.

On the Alpha Bell property, which contains the same vein as the Golden Cache, a tunnel is being driven in. At 7 feet the Golden Cache free milling ore was struck, thus proving the Golden Cache and the Alpha Bell property also.

The Money Spinner mine, owned by the Fire Mountain Company, Harrison lake, New Westminster district, has a tunnel in on their vein. It is 30 feet long. The walls are well defined, and gouges run along both sides between the vein and the walls.

The Athabasca mine, Nelson district, has uncovered another lead on the property. The Athabasca Company have made their first shipment to the smelter.

Vancouver, July 19, '97.

Spokesman-Review: At Grand Forks Schuller and Willett, who are interested in the Eighteen Karat group of placer claims, while putting in a 500-foot flume to work fine gold, discovered coarse gold lying in the black sand and on the water's edge.

ALASKA.

(Special Correspondence). — All the big stories sent from Alaska about the gold finds are upheld by actual occurrences. The Klondyke placers are the richest since the early days of California. I doubt if anything richer was ever found than the claims that have lately yielded so much gold in Dawson, Bonanza and Hunker districts in the Klondyke region. Nearly a year ago reports came from the dreary tundras of the upper Yukon that extraordinarily rich placers had been found, but the news was generally believed to be greatly exaggerated. It is now evident that less than the truth was stated. The steamer Portland came in yesterday from St. Michaels with about eighty people, most of whom were miners from Alaska. The boat had on board gold dust and gold nuggets worth considerably over $1,500,000, all of which came from the Klondyke section, and most of it was taken out of the ground in the last four months. One of the party—Clarence Berry, a Californian—had about $125,000 which he got from his claim in about ten weeks. Others had amounts from $5000 to $75,000 each. The arrival of the miners and so much gold has occasioned great excitement here and a good many are preparing to go to the new El Dorado. Two steamers will shortly leave here for Dawson—one this week and another next week—and already every bit of room is engaged. The returning miners warn all that they are taking big chances, that they should have plenty of money, abundance of food, good grit and a stock of patience; but the fact that with the rudest appliances (ordinary sluice boxes) men have taken out $100 to the pan sends a multitude on a stampede to the scene of such good fortune.

Dawson City is in the British Northwest Territory, about fifty miles east of the Alaskan boundary. About 2000 people are there, and nearly 1000 claims of 500 feet each are staked out. Miners' wages are $15 per day. The country is a rough one, everything freezes solid in winter, and many a poor fellow will wish he had never heard of it. But the fever is on, and thousands will go up there this summer.

Seattle, Wash., July 18, '97.

(Special Correspondence).—Under date of June 22, Mr. B. E. Janes, a University of California graduate, who has charge of the assay office in the Klondyke district, writes from Dawson City:

Bonanza and El Dorado creeks have turned out very much better than anyone expected. Probably $800,000 has already been taken out. They will likely turn out many millions. Gold dust is very plentiful and common now. Everyone has plenty. Dawson is a very lively camp. About 1000

men (che-cka-kers) have come in so far. Most of the rich men here now were new men last year. Mr. Lippy, of whom I have written before, has done about the best. Last fall he hadn't money enough to pay his store bill. He came down last night and is going out tomorrow. He has with him over 200 pounds in placer dust. Besides, he has left sufficient for running his claim for the next year and paid the expenses of the past year—labor $1.50 per hour—which makes the expenses very high. His claim is No. 16, El Dorado. There are about thirty or thirty-five 500-foot claims on El Dorado which will average about the same as his. From Nos. 4, 5 and 6, El Dorado, a man named Berry has taken out over $100,000. On Bonanza there are located 180 claims. Half or two-thirds of them have an average market value of $15,000 to $30,000. A short time ago a man bought a claim for $4500. He set some men to rocking and they took out several hundred to $1000 a day each, and he was able to make his payment all right. A claim four numbers below mine sold for $10,200 to a man who hadn't any money. When the payment became due, which was not in very many days, he sold a half interest for $10,000 cash and met his payment, keeping the dump which had been taken out during the winter containing about $5000 net.

A man on El Dorado has a claim from which he has taken $20,000. He is now ready to sluice and expects it to yield $1000 per day to each man he employs, which will mean several hundred thousand dollars this season.

The other boys who worked in the store have done very well. Stauf quit in February and has property worth tens of thousands, and has more money to handle than any other man here. Baker, who is still in the employ of the company, sold his interests for $7000 or $8000. One man has been buying very heavy. He owes over $100,000 to be paid very soon, but his original claim on El Dorado is expected to pay $30,000 to a box length, *i. e.*, 12 feet. I could not believe it till I came up here and saw the amount of gold and handled it.

The company lost a steamer this spring. The Arctic, which I came up on last year, wintered near Forty Mile. The water fell very fast in the river after the ice went out, and left the steamer high and dry on big blocks of ice in a slough, where the ice had pushed her. In trying to get her out powder was used to break the ice underneath her, and one charge blew her up—that is, loosened the ice suddenly and subjected her to severe strains, so that the bottom leaked very badly. The water began to rise and raised very fast. Finally it got so high and the current so strong through the slough that it carried the boat out into the river, and she stranded on a bar a mile and a half farther down. They have left the hull there, but taken out the machinery and sent it down to be put into a barge. The Bella, a boat built last summer, arrived at Forty Mile June 1st, having wintered at Fort Yukon, about eighty miles below Circle City. She had a fair cargo of provisions, which were taken to Dawson, arriving here the 2nd, since which time the receipts have been over $40,000.

On June 16th the steamer Alice arrived at Forty Mile, having wintered at Androsky near the mouth of the river, about 300 miles this side of St. Michaels. She brought a good many provisions and other articles. I came up on her to Dawson with my outfit. Labor is $1 per hour here, and scarce. Building material is hard to get, and so the store buildings are progressing slowly.

I am working in the store at present, receiving the dust for the sales. It keeps me very busy sometimes. Yesterday the sales were $4500. To-night I weighed up a shipment of over 2000 ounces, to go by the Alice to-morrow. Our safe is almost as full as it can be and contains about $150,000 to $200,000, deposited in small and large lots for safekeeping. Heretofore all gold has been taken at $17 per ounce. With the dirt and all in it it would not average quite that. I have made twenty-three assays of the placer gold so far.

The gold in this district is much lower than in the others, some not going $14, dirt and all. For drafts or currency, we pay only $15.25 for it. The miners don't like it, and think I must be wrong. The other day a man who went out in the winter took out dust which contained El Dorado gold. He got $17.10 per ounce after it was melted. As soon as the miners heard it they were tickled to death and knew I was wrong. When I met the man I found out the gold included a good deal of Forty Mile gold, and $17.10 after melting is only equal to about $16.50 before, so I think the assays I made will stand, though made on small samples.

Every day there is a stampede for a new creek. Every little stream for miles around will be located. This country will pay to tie to for money making. It has been but little prospected.

UTAH.

Salt Lake *Tribune*: At Deep Creek, Mr. McVichie and his associates, working the Pole Star, have followed the vein down a distance of 75 feet from the surface, and it is 35 feet between walls.

Garrison brothers have developed properties on Dutch mountain that promise to make of them wealthy men. The ground is productive of lead and silver.

Work on the Silver King is progressing steadily, and everything in the underground workings looks favorable.

In Dry canyon, which is the principal portion of Willow Springs district, Day & Co. are working a force on the Lion group, from which ore is being taken.

Watson brothers have signified their intention of working the group of claims that was located by them at an early day, at once, and several men are now on the ground.

At Spring creek the Queen of Sheba is making another mill run, and in its workings is some of the best ore that has been uncovered in the locality.

A force of fifteen men have left Richfield to work on the Holland mine, Gold Mountain district, where the owner is planting an amalgamator. Water has run low and the hydraulics have been abandoned. The amalgamator will be set at the mouth of a large open cut on a rich vein of decomposed quartz that has cleaned up well and will be operated by the fifteen men in three shifts.

Grading for the big mill which is to be erected by Capt. De Lamar for the treatment of the big ore bodies that Manager Cohen has blocked out in the Golden Gate mine at Mercur has been commenced. All contracts pertaining to the plant have been let, and in the next four months the plant will be running.

At Park City the Crescent Mining Company is going to make an effort to pay off the $75,000 indebtedness of the company. A force of men will be put to work in a few days taking out ore.

On the Utah Mining and Development Company's property the shaft has reached a depth of 30 feet and is well timbered. It is expected that the vein will be cut when a depth of 80 feet has been attained.

Bingham *Bulletin*: Since the Old Jordan and Galena mines and mill started up last spring there has been an estimated average reduction by the mill of about 100 tons per day, mostly of leasers, ore from the Galena, second grade that was passed in former workings of the Old Jordan, and ore from the dumps which are still heavily loaded. But for upward of a year, and especially since the completion of the South Galena drain tunnel, developments have been steadily progressing in Old Jordan new ground intersected by the tunnel. Large areas of new territory have been opened by tunnels, drifts, crosscuts and upraises.

Mercur *Mercury*: The Geyser-Marion force has been increased from time to time until there are now almost 100 men on the payroll.

The Wachusetts closed down for an indefinite period last week.

Fires were started under the boilers at the Marion last week and about sixty tons a day is being treated.

Silver City *Star*: A survey for a mill for the Star Consolidated Mining Company has been made at Robinson. There are large bodies of milling ore in sight in the North Star, and this move on the part of the company has long been in contemplation.

J. Osborne has commenced work with a force of men on the Silver King claim, which belongs to the Alma Mining Company.

A limited quantity of high-grade ore is now being shipped from the Orient in West Tintic.

Shipments from this end of the district for the week are as follows: From the Swansea three carloads; from the Buckeye, two carloads; from the Iron mine, two carloads daily.

Tintic *Miner*: The Mammoth mill has been started up and now everything is activity in the towns of Mammoth and Robinson.

Salmon *Recorder*: Last week the group of seven claims, in Blackbird district, owned by W. J. Rose, P. Rose, H. Rose, E. Edwards and I. Bohannon, was bonded to W. C. Hall of Salt Lake for $30,000.

Mammoth *Record*: The Emerald shaft has reached a depth of about 650 feet and is being pushed on. Another shift has been put on. At the 700-foot level drifting for the vein will be commenced.

The Mammoth mine mill is now filled to the guards with ore and there is nearly 1500 tons more broken in the mine. About the first of August the force will be increased to what it was before the mill closed. This will give employment to about seventy-five more men.

Whitaker & Burton started work last week on the Home Rule at Diamond. A drift is being run from the bottom of the snaft which is now down 200 feet.

WYOMING.

A large body of low grade, free-milling ore has been found on Battle mountain, near Dixon, and prospectors from all parts of the surrounding country are taking up claims. The ore body is a blanket vein and is found in numerous places on the mountain.

At Grand Encampment the Gold Eagle has opened up to a 4-foot vein of ore paying throughout the entire width. Shipments from this property will begin at once.

MONTANA.

Inter-Mountain: S. Ayotte, the owner of the Celebration in the Mayflower district, is driving the tunnel on the claim to the east end line of the Mayflower No. 3.

D. Reinhart is making preparations to sink a 200 foot shaft on the Sunrise for W. A. G. Birkin.

No ore is being shipped from the Mayflower, but work on the tunnel is in progress. It is said that in driving the tunnel some ore assaying as high as six ounces in gold to the ton was found.

Never before in the history of Butte has there been as much development work planned for the mines of the district as during the present season. Within a month all the big mining companies will be engaged in developing their shafts to a greater depth, and many have just completed the work.

The Parrot Company will begin this week to develop the Minah, a property which was thrown aside several years ago by that company, and the Parrot shaft will also be developed to a great depth.

The Boston & Montana people have decided to begin work on the Moose, which has been idle for a number of years. The old shaft house is being prepared for the reception of large machinery.

A few weeks ago it was stated that the Anaconda Company had erected a mammoth engine at the 1400-foot level of the Green Mountain mine and would sink to the 1800. That work is now well under way. This company will also begin the work of developing the old Bell shaft to a greater depth within a few days. Last week orders were also received from Manager Daly to begin making preparations at once for the development of the shaft of the Mountain Con. No. 1 and the Buffalo to a depth of 2000 feet. It is understood that at the latter level the two shafts will be connected. Around the mines it is stated that Manager Daly has two years' work planned out ahead, and that within a year the company will have four shafts 2000 feet deep.

COLORADO.

Republican: At San Bernardo the San Bernardo mine, on Wilson mountain, which has been a big producer for years, is leased to Sam Wallace & Co., for two years, and preparation is being made to push work, both in taking out ore and developing.

The Butterfly, on Zellow mountain, recently purchased, in connection with the Buckeye, by K. Benson of Ouray, is being put into shape to take out ore. Mr Benson is owner of the Terrible, on the same hill.

On the Eldorado group, purchased a few weeks ago by a Parisian company for $110,000, a force of men are taking out a good grade of gold-bearing quartz from the old workings, while development work is being pushed from several points.

At Cripple Creek all the details in the sale of the Orphan Belle claims Nos. 1 and 2 on Bull hill, save the paying over of the money, have been arranged. The consideration is $450,000, $100,000 cash and the remainder in bankable paper, payable in sixty days. The purchasers are owners in the Calumet and Hecla copper mine in Michigan.

The new lessees on the Jack Pot, Kafier & McMurtray, are in great ore. Last week the work of sinking the shaft was resumed, and at a depth of 50 feet the vein showed 10 feet in width, and practically all the rock in the bottom was pay ore.

In the Birch lease on the Mary McKinnie considerable ore is being taken out, and another shipment will be made in a day or two. The grade of the rock is about 1½ ounces.

On the Ida B. on Raven hill, under lease to J. A. Smith, sub-lessees Bird and others made a shipment of twenty tons lately which was the result of one month's work.

The Moon-Anchor Company has just completed a 70-ton shipment to a local sampler, the average value of the ore being fifteen ounces in gold to the ton. The property never looking better than it does to-day. The Moon-Anchor is producing now at the rate of $1,000 per day at a total cost to the company of not to exceed $200 for each twenty-four hours.

Some Denver parties have started up work on the Alhambra on the southwestern slope of Squaw mountain.

The Bonanza King now has two shafts in ore. One hole is only 20 feet deep, and from the other a drift is in ore at 55 feet. The shafts will be connected.

A week ago Walter Green, who is subleasing on the St. Thomas, broke into a body of ore 30 feet from the surface. He now has over 3 feet of mineral that is high-grade sylvanite rock and assays anywhere from four to twenty ounces.

The output from the Modoc on Bull hill during the month of June reached 125 tons, averaging $60, with a small amount of mill ore sent out in addition. The lessees have been opening the ground at greater depth during the month, and the production was lower than at any time for the past six months.

The Michigan syndicate that recently purchased the Burns of the Acacia Company on a bond and lease, has the new machinery plant in operation, and the shaft is being pushed down for a new level on the ore chute.

The Christmas is again under production, and two carloads of medium-grade ore were shipped last week. The work which is being done under the supervision of the president of the company is more with a view to determining the value of the property than to crowd output.

Tutt & Penrose have started a suit against the Marinette Company, claiming $30,000 damages for refusal of the company to extend their lease on the Abe Lincoln after the property was drowned out by the shutting down of the Arcadia pumps.

The Lawson district of Clear Creek county, while confined almost exclusively to silver-lead ores, has made a record during the past six or seven years.

Ore of a very high grade is being regularly shipped from the Jo Reynolds mine. It is an old producer and is one of the old standby mines of Clear Creek county.

The American Sisters, also an old mine, is a steady producer of high-grade ore, and is one of the most valuable properties in the Lawson district.

The Millington property is now producing ore much of which runs $2,500 to the car and some running as high as $6,000 to the car. Ore is blocked out to the amount of nearly $100,000 in the upper workings.

The Bellevue-Hudson is also producing ore of a high-grade, from its upper workings. The dump of this property contains ore of sufficiently high-grade to stand shipment and is now being worked under lease.

NEW MEXICO.

Silver City *Enterprise*: At Pinos Altos the Treasure Mining Company is sinking the main shaft upon the Atlantic vien, and have reached a depth of 417 feet. Drifts will be started next week. The new concentrating machinery at the mill is working well. The tailings now only carry one dollar per ton as against four to eight dollars by the old method. The new process employed entirely dispenses with amalgamation, the values saved being in the concentrates. The ore is passed through a set a rolls, thence through sizers to three improved Hartz Mountain jigs, where the coarser particles of ore free of gaugue rock, are extracted; the remaining material is then recrushed under stamps to be again concentrated on Gilpin county bumpers, the tailings from the bumpers passing over Wilfley tables which recover nearly all of the remaining metal.

The Maud S mill has started. Good ore bodies are exposed in the 375-foot level of the mine.

The development work on the Confidence mine is showing up good ore bodies in the lower workings. An upraise is being made from the adit level at a point about 1550 feet from the mouth of the level.

The Driscoll Company is working twenty-five men on the old Carrasco dumps concentrating the ora by the old Mexican process of planiering.

J. B. Glichist has thirty-five men employed upon the Guadaloupe, Chino and Oxide mines. He is taking out about 200 tons of second-class ore per month which is shipped.

ARIZONA.

Journal-Miner: The Copper Queen Company one year ago was carrying 600 men on its payroll; it is now carrying 1200.

A deed has been filed for record from A. L., J. W. and A. P. Smith to S. E. Fuller for several placer claims in Weaver district, the consideration being $9500.

Republican: Work upon the shaft of the Copper King is being pushed ahead and blasts in the bottom can already be plainly heard and counted from the workings of the Copper Queen mines, proving beyond a doubt that the Copper King will soon reach the continuation of the same ore body as that upon which the Copper Queen is working.

MEXICO.

(Special Correspondence).—The State of Oaxaca is the most southerly of the Mexican States, with the exception of Chiapas, and extends from latitude 18 deg. 20 min. to the Pacific ocean, a distance of about 180 miles, and from east to west for some 300 miles. It contains 27,470 square miles, (about the size of the State of Maine), and the population is about 1,000,000. It has a great diversity of climate; from the hot lands of the coast and of the Isthmus of Tehuantepec to the bracing atmosphere of the mountains at an elevation of 7,000 to 9,000 feet.

The great Cordillera which extends diagonally across the State from southeast to northwest, and thence through Guerrero, Michoacan, Jalisco, Sineloa and Sonora, is extensively mineralized, and mining has been successfully carried on in many portions of the State. The principal gold belt lies to the west of the capital at a distance of 15 to 25 miles, and extends some 100 miles from Santa Catarina on the north to the Atoyac river on the south.

Santa Catarina is a station on the Mexican Southern, about 50 miles from the city of Oaxaca, and here are found some mines which were worked many years ago, with what results is not known, and which have recently been taken up by Americans. The principal mine shows a 4-foot vein, averaging about an ounce of gold to the ton, without sorting, and from which several carloads have been shipped yielding over three ounces to the ton. The claim is on the side of a steep mountain and can be advantageously opened by means of tunnels to a great depth. There is considerable ore on the dump awaiting the erection of a mill, for though this ore will run over an ounce of gold to the ton, it does not pay to ship, owing to the high cost of freight and treatment—viz., $46, (Mexican) per ton. The gold is very free in the present workings.

From Santa Catarina to the south about 10 miles is Parian, also on the Mexican Southern, the headquarters of several mining companies, whose properties are within a few miles of the town. Perhaps the most important of the mines in this neighborhood is the Rescate, owned by the Rescate Mining Company of Mexico. This mine has produced many thousands of dollars and has been worked for a long time. The vein is some 2 to 3 feet wide, and has been worked to a depth of about 250 feet. The ore is high grade and free. There is water in the lower workings and this has lead to the abandoning of that part of the mine. Other parts of the mine have been allowed to fall in, and, altogether, the mine is in rather bad shape. Some Denver parties have a bond on this property, and are at work cleaning out the old workings.

On the property of the Parian Mining Company work is being carried on under the direction of a competent manager and the companies' mines are in good shape to produce ore at a low cost. The company has ordered a 5-stamp mill to treat its ores, and the ores from neighboring mines as well.

The veins in this vicinity are not wide, averaging about 18 inches; but the ore is of good grade and is all free milling. Most of the ore will run above an ounce to the ton, and much of it will run from two to four ounces. In this neighborhood, as well as near Santa Catarina, there is plenty of timber, and there is enough water for steam and milling purposes. The elevation is about 5,000 feet, and the climate is pleasant and healthy.

The next point near which gold is found is Etla, a station some ten miles from Oaxaca; though there is but little mining going on there at present.

There are some good-looking veins, one or two of which have been worked a little, but the ore is said to be low grade, and the Mexicans are not in the habit of working anything under an ounce to the ton. There would be a good field here for the establishment of a mill to treat ores running about half an ounce, as there is a fine water power, and labor is very cheap.

The above are the only places near the railway where gold is found in paying quantities, or, at least, where the veins have been worked to any extent. Of the mines to the west and southwest, near Penoles, Tlasoyaltepec and San Miguel Peras, the writer will treat in another communication.

Oaxaca, July 9, '97.

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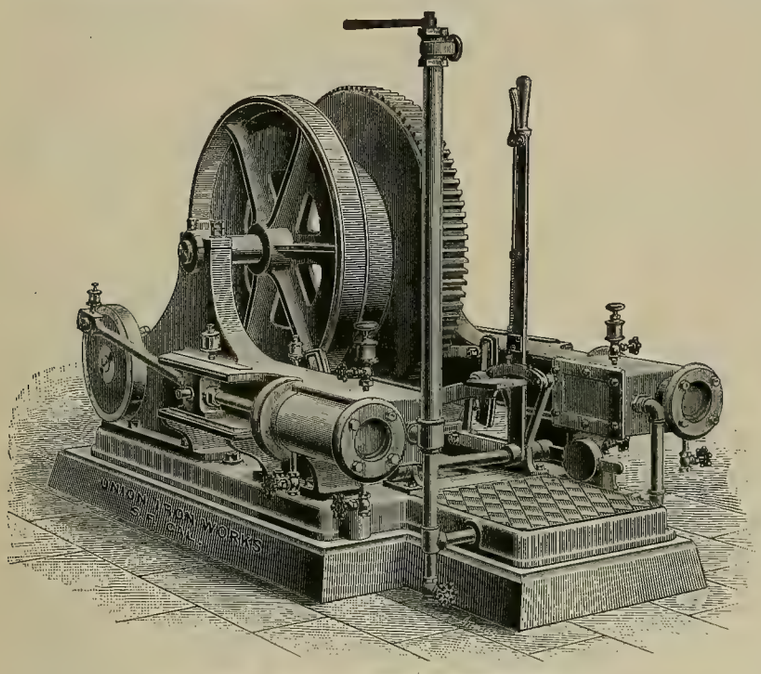

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The entire hoist is self-contained, being mounted on an iron sole plate or bed which carries all the operating levers and provides a footboard for the operator. The engines are provided with reversible link motion and the drum with a broad strap brake, insuring safe and rapid work.

The general lines upon which this hoist is designed are neat, strong and substantial and all the operating parts are conveniently arranged.

The size herewith illustrated is the 4 in. x 10 in., rated at 15 horse power. The larger sizes, 8 in. x 12 in. and upwards are provided with post brakes.

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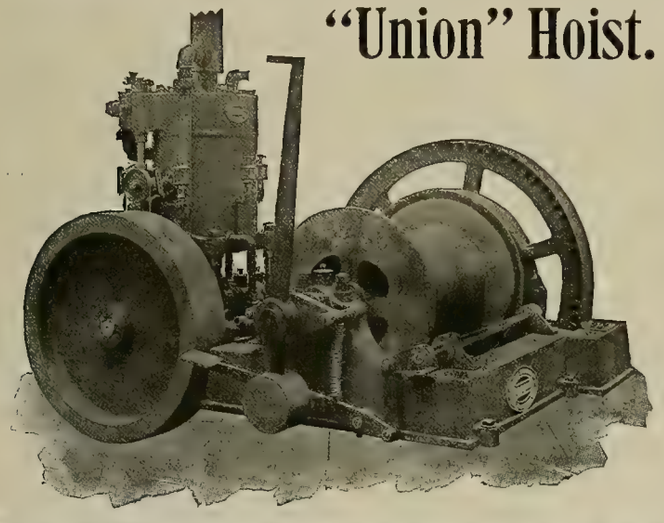

The above cut represents our 10 h. p. Double Cylinder Engine of latest type, and Hoist combined on strong iron base. This hoist is designed to raise one ton125 feet per minute from an inclined shaft, or 1500 pounds at the same speed vertical lift. The drum will hold over600 feet of ⅝-inch cable. The outfit weighs 3500 pounds.

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Which use either Manufactured or Natural Gas, Ordinary Stove Gasoline (Naphtha or Benzine), Distillate or Kerosene.

STATIONARY ENGINES for All Kinds of Work, Built in Sizes from 3 to 200 h. p.
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"UNION" MARINE ENGINES, 4 to 200 h. p., of Single, Double and Four-Cylinder Types.
TEN YEARS' EXPERIENCE Building Gas and Oil Engines.
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These wheels are durable, highly efficient, and are the only wheels which have perfect regulation, which feature makes them especially suitable for the operation of electric machinery.

Coast Industrial Notes.

—Twenty eight carloads of California fruit were sold last Tuesday in New York City at good prices.

Los Angeles county is assessed at $103,000,000 this year an increase of $6,000,000 over the '96 assessment.

—Wheat continues to rise in price and is now $27 per ton. California will have a surplus of 500,000 tons for export.

Nearly all the wool of Eastern Oregon, several million pounds in the aggregate, has been sold at 10 cents per pound.

—Water has been turned on in the Yaqui ditch, destined to irrigate the desert lands of the valley of the Yaqui, Mexico.

—Columbia river salmon canners in Oregon and Washington have reduced the price paid fishermen from 4 to 3 cents per pound.

Commissioner of the General Land Office Hermann will appoint two land agents at Circle City and Forty Mile Creek, Alaska.

—Grading on the Valley road from Reedley to Visalia, Cal., has been completed. The Reedley bridge will be completed this week.

—A London corporation is reported preparing to put in an opposition steamship line between San Francisco and Central and South American ports.

The Standard Oil Company is trying to freeze out the Puente, Cal., Oil Company, and has put the price down locally to 9 cents for oil and 10½ for gasoline.

The *Pall Mall Gazette* says that owing to the drouth in South Africa and New South Wales it will be necessary to import a thousand tons of California wheat.

—A representative of a London company is in San Francisco preparing a report on the advisability of starting a new steamship line between San Francisco and Panama.

—It is reported that nearly 10,000 head of horses have been bought between Umatilla, Or., and Castle Rock, Wash., by the Linnton cannery, at an average of $1 per head.

—Sonoma county, Cal., winemakers have agreed to advance $5 per ton for grapes to growers, and within one year pay $1 per ton for each cent per gallon obtained for the wine.

—The Chino, Cal., sugar factory started up last Saturday with 488 men employed. The largest beet crop in the history of the factory will be manufactured, requiring a run of 150 days. The crop refined into sugar will make 33,000,000 pounds.

—The conference committee from both houses of Congress have agreed to a duty on lead ore of 1½ cents per lb., pig lead 2¼ cents per lb., cyanide of potassium 12½%, bituminous coal 67 cents per ton, pine lumber $2 per M., citrus fruits 1 cent per lb.

—The new tariff on Mexican cattle will check the shipment of cattle from Mexico to the United States. During the past two years a very large number were shipped in from Mexico, owing to the low duty of from $1 to $1.50 per head. The new tariff schedules them at $4 to $6 per head.

—The S. F. & S. J. V. R. R. has reached Reedley, California, and it is expected it will be built to Visalia by the 15th prox. In the last fiscal year the company has laid 210 miles of track, built 3000 feet of bridges and constructed 116 miles of telegraph lines, besides sundry road equipments.

—This week the Blue Lakes Water Company near Mokelumne Hill, California, began the operation of its plant, one of the largest on the coast, furnishing water power from pipes at 1500-foot pressure. It is the ultimate idea to furnish light and power to most of the mines in that part of Calaveras county.

—In a race against time to reach the bedside of his dying brother, C. F. Crocker, George Crocker last week made the fastest railroad run on record over the Central Pacific, the last ninety miles from Sacramento to Oakland, including the transfer across the Straits of Carquinez, being covered in one hour and forty-five minutes.

—The Mexican Financial Syndicate, a London company, has been granted a concession by the Mexican Government for the establishment of a steamship line between Guaymas and Salina Cruz and intermediate points on the Pacific. The Government gives a liberal subsidy. The service must be in operation by August 21st.

—The customs business of the Puget Sound Collection District for the fiscal year ending June 30, 1897, shows 2290 entrances, tonnage 1,148,081, and 2307 clearances, tonnage 1,156,653. Imports $7,064,934, as compared with $5,483,846 for 1896. Exports $11,858,062, compared with $6,854,707 for 1896. The total receipts of the district were $272,528. Tacoma's portion of the imports was 83 per cent, exports 49 per cent. There are twelve ports of entry in the district.

—A contract for the transportation of power of the river running through the Santa Ana canyon to Los Angeles and Pasadena, a distance of eighty miles, has been concluded between the Southern California Power Co. and the General Electric Co. The amount of power to be transmitted at first is 4000-horse power. The station will be located in the Santa Ana canyon, twelve miles from Redlands and about eighty miles from the towns in which the electric power will be utilized. The water will be taken from the river through canal, flume and tunnel along the side of the canyon. Here it will be led into a pipe line 2200 feet long, giving what will be equivalent to a vertical fall in the water of 750 feet. The wheels will be of the impact type, directly connected to the generators, of which there will be four, each of 750-kilowatt (1000 H. P.) capacity. The maximum line potential will be 33,000 volts, to which potential the initial voltage will be raised by twelve 250 K. W. step-up transformers. This transmission will be the longest commercial electrical power transmission as yet undertaken, as well as that using the highest voltage. At present the longest is that transmitting the power of the waters of Ogden canyon in Utah to Salt Lake City, a distance of thirty-six miles. The Los Angeles transmission will be over twice that distance, and three times the longest distance yet tried with the power of Niagara, which to date has only been transmitted to Buffalo, a distance of twenty-six miles.

—Japan has no iron ores worthy of mention. The nearest are in Corea and are none too good. She must buy her iron and steel in foreign markets. The nearest is this country. She needs the machinery of her cotton mills, the locomotives and cars, the light-draught steamers, the trolleys which are to carry the bales and the finished goods, the tools and appliances of machine shops, repair yards, graving docks, engine works and electrical plants. She will need turbines, dynamos, motors and illuminating installations. She will need and she will employ, no matter what the cost, the best artisans and experts to oversee and to teach her docile workers. On account of the earthquakes and typhoons in Japan, which are so often a curse to her people, she will be compelled when she begins to build large structures to use the steel frame system so common in this country. She will need steel bridges, steel depots, steel cannon, ships and forts. The nearest land in which to buy these is the United States.

—Of the coal supply of Japan, the Osaka *Mainichi* says: "The advance in the price of coal of late is doubtless due to some extent to an increase in the demand both at home and abroad, but the principal cause is a decrease in production at Kiushu. The chief coal districts of the empire are Kiushu and Hokkaido. If the production of coal in Kiushu has a tendency to decrease, it is of serious import to manufacturers and others. But it is possible that the production in Hokkaido may compensate for the decrease in Kiushu. There are three important coal mining districts in Hokkaido—namely, the mines of the Hokkaido Colliery and Railway Company, and those of Iwanai and Kushiro. The output of the colliery and railway company's mines will, it is estimated, show an increase this year of between 160,000 and 170,000 tons over the amount for last year, and the total output of the other Hokkaido mines is expected to total 640,000 tons, or about three times the output of 1892. The Iwanai mine is worked by two capitalists or owners, and its annual output is not more than 20,000 tons. The output of the Kushiro mine is about 30,000 tons a year. Iwanai and Kushiro coal find a market at Hakodate, Nemuro and Kushiro, and is mostly used as bunker coal. Some coal is mined in the northeastern provinces, the colliery known as Iwaki being the most important of all, from whence comes the Shiramizu, Ibaragi and other descriptions of coal, the total output of which this year is estimated at about 100,000 tons. Lump coal from this colliery is imported into Tokyo, but is of inferior quality and has a poor reputation. Until two or three years ago the Akaiwa colliery in Echigo province had an outturn of about 10,000 tons every year, but its working is now entirely stopped, owing to the competition of the cheaper Hokkaido coal. There is a coal mine at Sakata, but its output is not more than 2000 tons a year. The coal consumption of Tokyo alone is about 400,000 tons annually, of which 250,000 comes from the Hokkaido Colliery and Railway Company and 150,000 tons is Kiushu coal. The demand for coal in the Hokkaido has been increasing at the rate of between 40 and 50 per cent during the past few years. Now one-third of the coal mined by the colliery and railway company is consumed in the Hokkaido, a fourth is exported, and the remainder goes to Tokyo, Echigo, Aomori, Shiogama, Etchu, Echizen and Yokkaichi."

Recently Declared Mining Dividends.

Montana Ore Purchasing Company, $1 per share; payable July 16th.

The Homestake mine of South Dakota, $31,250; payable July 26th.

The New York and Honduras Rosario Mining Company, $15,000; payable July 20th.

Alaska-Mexican Mining Co., 10c per share ($18,000)—its eleventh dividend; payable July 28th.

Alaska-Treadwell M. Co., 37½c per share ($75,000)—its thirty-third dividend; payable July 28th.

Catalogues, Etc.

In somber black with silver lettering comes the July catalogue of the Weber Gas Engine Co., Kansas City, Mo., devoted to their latest prices on machinery.

The Hendrie & Bolthoff Manufacturing Co., Denver, Colo., has issued a specially fine pamphlet too handsome for a "catalogue," but giving similar information. The engravings and presswork are well done, and the descriptive matter is unusually good. The blue and olive tints form an unusual chromatic combination. The frontispiece in design and execution is worthy of the best literary magazines.

"*The Ad Book, a Monthly Exposition of Modern Advertising*," the first publication of its kind in this city is received. It is business, is well edited and printed, and has a good many bright ideas on the important subject of advertising. One is "If you consider advertising an expense, the less you do of it the better." That is a concentrated expression of a business fact. The criticism of advertisements is good and the evils of illegitimate advertising are cleverly set forth. There is a place for such a publication, and its clever compilers aim to fill it.

Personal.

William Letts Oliver is in Montana, looking at some of the mines.

H. C. Erman has been appointed superintendent of the Ortiz mine near Cerillos, New Mexico.

J. R. Sears has been appointed superintendent of the Arbona mine in Tuolumne county, Cal.

A. P. Brayton of the Pelton Water Wheel Co., San Francisco, who has been seriously ill, is convalescent.

F. M. Cartwright has resumed his position of electrical engineer with the Fort Wayne Electric Corporation.

Geo. T. Rives leaves San Francisco next week to take charge of the Golden Cache mine, Illiocett, B. C.

J. D. McKenzie has returned from Chihuahua, Mexico, where he superintended the building of some large gold mills.

A. Neustadter has resigned the superintendency of the Ortiz mine in New Mexico to accept a similar position in Ontario, Canada.

Profs. F. S. Emmons, Henry Gannett and F. H. Newell of the United States Geological Survey, are working up the Tintic district in Utah.

Henry Bratnober, who has been in Alaska in the interest of the Exploration Company, has gone up the Yukon river on an exploring expedition.

James Keegan has been promoted from the position of foreman to that of superintendent of the Mountain Consolidated mine at Butte, Mont., owned by the Anaconda Copper Co.

Joaquin Miller, the Poet of the Sierras, announces his departure for Klondyke, the new Alaska Eldorado. A. T. Hatch, the California fruitman, who recently failed, is another prominent resident who goes to that northern country.

President McKinley has appointed R. T. Rombauer and E. S. Hathaway of Montana, and W. V. Tompkins of Arkansas, as Montana Mineral Land Commissioners. The California Mineral Land Commissioners constitute a very remote possibility.

At the recent trans-Mississippi Congress, in Salt Lake City, Utah, Mr. Benj. C. Wright, for thirty years commercial editor of the San Francisco *Bulletin*, delivered a valuable address on "The Contribution of Western States to the Gold and Silver of the Country."

Charles G. Yale, Edward H. Hamilton, Joaquin Miller, E. J. Livernash and Miss Helen Dare start next week for the Yukon gold fields for the San Francisco *Examiner* and New York *Journal*. All, except Mr. Livernash, will sail on the Excelsior, while he goes by the Juneau route.

The Grass Valley, Cal., Miners' Union has elected the following officers for 1897: J. C. Williams, president; M. M. Wallace, vice-president; E. F. Whiting, recording secretary; M. M. Mitchell, financial secretary; W. H. Bawden, treasurer; G. Stacy, conductor; J. Allen, inside warden; J. Peterson, outside warden; T. R. Edwards, R. D. Gluyas and S. Keast, trustees; J. E. Hogan, member finance committee.

B. F. Allen, Covina, Cal., has been appointed special agent and supervisor of forest reservations in California and Arizona. There are nearly eight millions of acres thus reserved exclusive of those added by order of Ex-President Cleveland. He will have his office in Los Angeles. He says: "The burning or cutting of timber must be stopped. In this, I will have the support of all Californians except those who are engaged in perpetrating these offenses. I will have full power to end the devastation of these forests and will exercise that power to whatever extent may be necessary to protect the forests, but I will, while acting firmly, endeavor to so conduct the affairs of my office that none need fall under the censure of the law. Every possible notice will be given and there is no desire upon the part of the Government or upon my part to oppress or injure any one. It is of the utmost importance to the State of California that the timber should be left undisturbed. All of the rivers flowing into the ocean find their sources in these mountains, and to denude the land there of its timber means to greatly injure the entire State. I will take charge of it and protect it precisely as though it was my own property. In this I am certain that I will have the cooperation and assistance of the people."

Recent California Mining Incorporations.

Jackson Lake G. M. Co., San Francisco; J. M. Sandford, J. J. Scoville, C. O. Poole, W. H. Morton, D. L. Steele; capital stock, $1,000,000; subscribed, $180.

Santa Rosalia Bay M. Co., San Francisco; W. S. Chapman, B. Henley, C. B. Henderson, A. W. Hall, C. A. Macomber; capital stock, $100,000; subscribed, $50,000.

Mazourka M. & W. Co., Los Angeles; C. F. Campbell, F. Manuel, F. A. Hines, B. F. Orr; capital stock, $1,000,000; subscribed, $630,000.

Alaska and Yukon G. E. & T. Co., San Francisco; D. C. Hobart, W. Jones, J. S. Johnson, E. J. Carter, T. Stensel; capital stock, $200,000—all subscribed.

Commercial Paragraphs.

The Bowers Rubber Co. of San Francisco has the contract for supplying the city fire department with hose for the ensuing year.

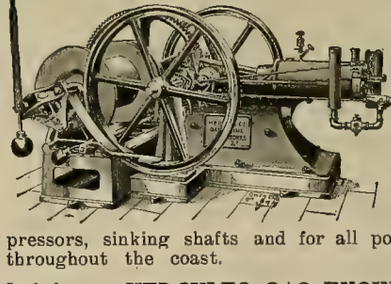
The Pacific Refining and Roofing Co. has moved its office from the Crocker building to more extended quarters at 118 New Montgomery street. The refining works at the Potrero are in full blast and prepared to supply coal tar and asphalt in any quantity.

The St. Lawrence Construction Company of New York has awarded to the Westinghouse Electric and Manufacturing Company a contract for fifteen 5000-horse power generators, to be erected at their plant at Massena, New York; the amount directly involved is about $750,000.

Book Notices.

"*Osborn's Prospector's Field Book and Guide.*" The third edition of this justly popular book, revised and enlarged, shows careful preparation and is of practical value. Chapter V, "Special Mineralogy—Gold," is alone worth the price of the book. It is published by Henry Carey Baird & Co., 810 Walnut street, Philadelphia, Pa., who will send to anyone anywhere, upon application, a four-page circular giving full table of contents. It will also be sent from this office, postpaid, upon receipt of price, $1.50.

Hercules Hoisting Engines



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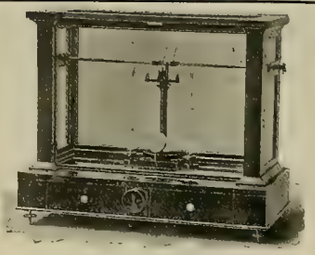

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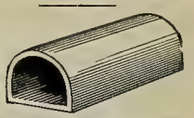

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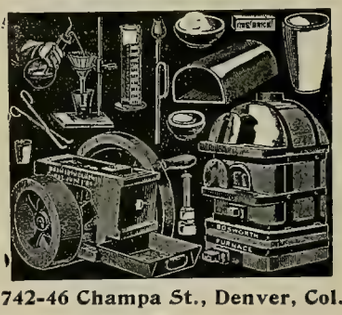

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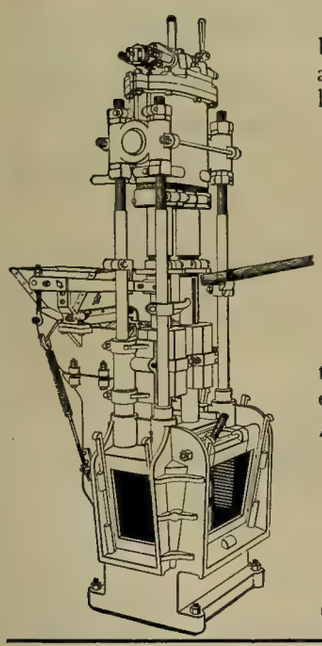

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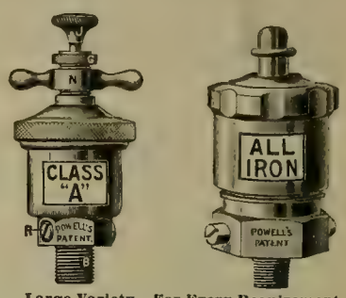

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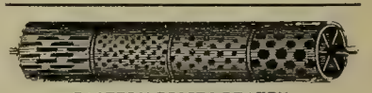

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List of U. S. Patents for Pacific Coast Inventors.

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586,375.—DOOR OPENER—D. B. Akard, S. F.
586,328.—VOTING MACHINE—C. L. Bancroft, Browns, Nev.
586,417.—CAM—G. W. Borrowe, Bodie, Cal.
586,475.—BOTTLE—P. A. Campbell, Pollasky, Cal.
586,476.—BUX COUCH—R. G. Coates, Pasadena, Cal.
586,284.—NECKTIE—C. W. T. Davies, S. F.
586,484.—SACK HOLDER—F. H. Gilbert, Ridgefield, Wash.
586,176.—UNIVERSAL JOINT—H. H. Gorter, S. F.
586,179.—METAL PIPE—C. S. Hamlin, Los Angeles, Cal.
586,180.—METAL FLUME—C. S. Hamlin, Los Angeles, Cal.
586,311.—CONCENTRATOR—J. Jacobs, Henley, Cal.
586,442.—JOINTER FOR SAWS—G. W. Kunze, Bryant, Wash.
586,443.—MOTOR—C. P. Lablatt, Los Angeles, Cal.
586,189.—GLOVE—G. A. Moss, S. F.
586,390.—PROPELLING SHIPS—J. B. Pinchard, S. F.
586,398.—WATER REGULATOR—J. B. Runk, Lamesa, Cal.
586,369.—PARCEL CARRIER, ETC.—J. Sauze, Walla Walla, Wash.
586,292.—SEWING MACHINE RIPPER—Scott & Spink, East Oakland, Cal.
586,372.—INSULATOR—H. W. Steinberg, Jr, Walla Walla, Wash.
27,361.—DESIGN FOR SHOE TIP—H. Waters, Bisbee, A. T.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SEWING MACHINE RIPPING ATTACHMENT.—John R. Scott and George W. Spink, East Oakland, Cal. No. 586,292. Dated July 13, 1897. This invention relates to an attachment for sewing machines which is designed to be used to rip seams that have been previously sewed, and it consists essentially of a strip of metal attached to and movable with the needle bar of a sewing machine, having a knife fixed to it, a portion of its front edge extending above and below the knife and flanged outwardly away from the knife, another strip of metal of the same width as the first similarly flanged and of the same length, both being provided with corresponding holes and means for fastening them together with the knife between them. The edge of the knife projects outward sufficiently far to rip the seam, which is pressed against it without danger of cutting the material. When used without a guide both upper and lower ends are bent at right angles so as to connect with the needle bar, but a guide may be used at the top, in which case only the lower end need be connected.

NECKTIES.—Charles W. T. Davies, assignor to the Hand-Tied Tie Company, San Francisco, Cal. No. 586,284. Dated July 13, 1897. This invention relates to an improved article of neckwear specially designed for ladies' or gentlemen's use, and it consists essentially of a center piece, two side pieces secured thereto, said side pieces extending rearwardly from the center piece to form a neck band and also extending forwardly from the said piece to form the tying portion or means for the attachment of the tie and a separable attaching means for connecting the free ends of the rear extensions, or, if preferred, if the tie is permanently made up one end of the center piece may be so arranged as to connect and disconnect. The device serves to keep the tie well in place about the collar, to hold it up in front, and also prevents its slipping up or down with relation to the collar.

ENDLESS BELT CONCENTRATOR.—Jehu Jacobs, Henley, Cal. No. 586,311. Dated July 13, 1897. This invention relates to improvements in that class of mining apparatus known as "endless traveling belt concentrators." It consists in a frame having drums or rollers at opposite ends, with an endless belt passing around them, and a means for gradually advancing it up the incline formed by the relative position of the drums upon the frame, means for producing a transverse oscillating and tilting movement of the belt, a worm gear by which the belt is gradually advanced up the incline and a flexible jointed connection through which power is transmitted to drive the worm, while still allowing the belt to have the transverse movement. By means of a vertically disposed screw the journals at one end of the belt may be raised or depressed so as to change the angle of its travel. In order to keep the edges of the belt upturned so as to prevent the escape of the pulp upon each side, I have shown loose cones at the ends of the rotary supporting shafts, intermediate between the end drums, and these cones act to turn the deges of the belt upwardly along the sides of the top. Washers between the ends of the rollers and the cones, and between the ends of the cones and the bearings, are adjustable so as to regulate the position of the cones as the belt becomes shrunken in its width. The belt itself is composed of overlapping sections of canvas stitched together at intervals so that the overlapping edges form a shallow riffle in the direction opposite to that in which the belt is traveling, and in this riffle the exceedingly fine sulphurets and heavy valuable portions will settle so as to be carried up the incline and eventually be washed off when the belt passes over the lower portion of its travel. The boxes in which the supporting roller shafts are journaled are closed at the ends so as to prevent the rollers from moving endwise.

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In the Superior Court of the City and County of San Francisco, State of California, Department No. 8. John V. Kimball, plaintiff, vs. Mabel L. Kimball, defendant. Action brought in the Superior Court, City and County of San Francisco, State of California, and the complaint filed in said City and County of San Francisco, in the office of the clerk of said Superior Court. The people of the State of California send greeting to Mabel L. Kimball, defendant. You are hereby required to appear in an action brought against you by the above-named plaintiff in the Superior Court, City and County of San Francisco, State of California, and to answer the complaint filed therein within ten days (exclusive of the day of service) after the service on you of this summons, if served within this county; or, if served elsewhere, within thirty days. The said action is brought to dissolve the bands of matrimony now existing between yourself and plaintiff, on the ground of habitual intemperance on your part for more than one year past. All of which will more fully appear in the complaint on file herein to which you are hereby referred. And you are hereby notified that if you fail to appear and answer the said complaint, as above required, the said plaintiff will apply to the said Court for the relief prayed for in the complaint. Given under my hand and seal of said Superior Court at the City and County of San Francisco, State of California, this 9th day of April, in the year of our Lord, one thousand eight hundred and ninety-seven. C. F. Curry, Clerk. By Joseph Riordan, Deputy Clerk. R. Thompson, Attorney for Plaintiff.

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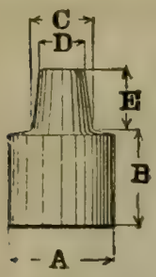

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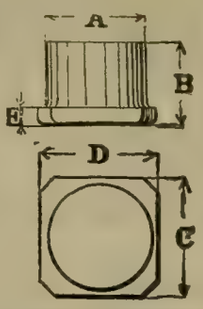

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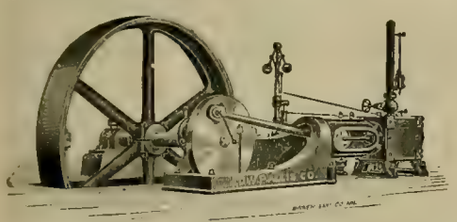

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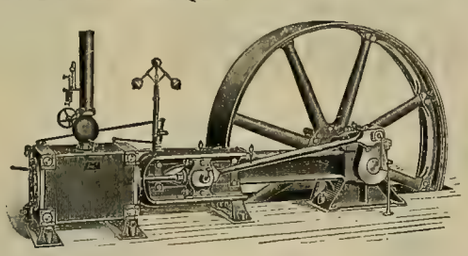

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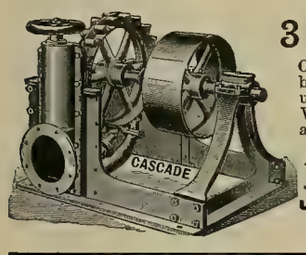

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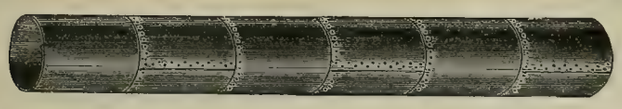

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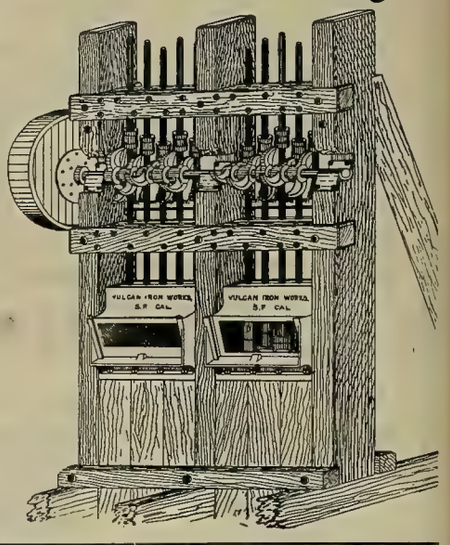

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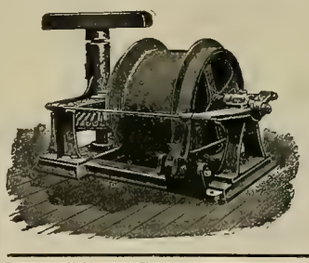

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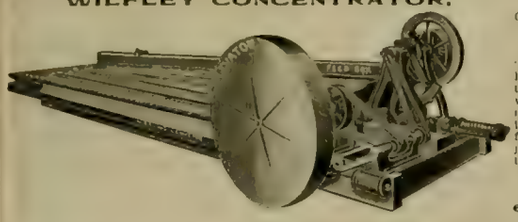

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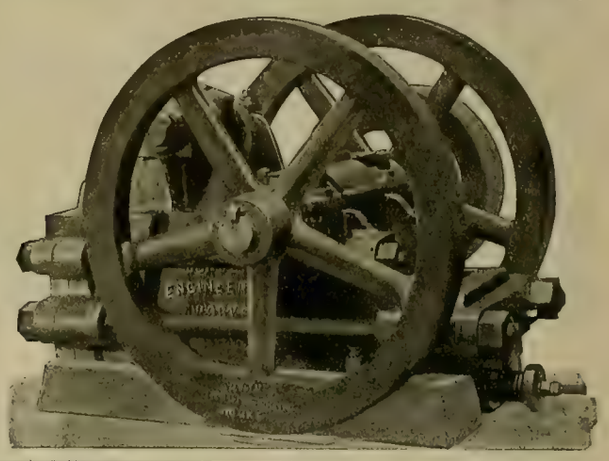

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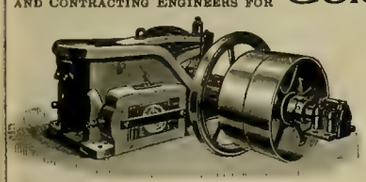

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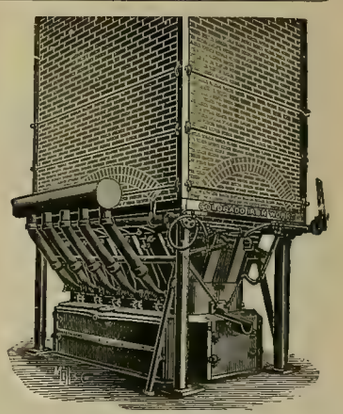

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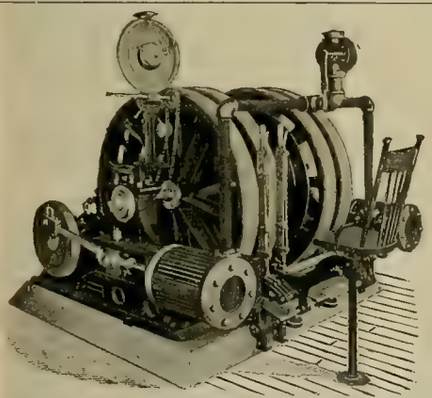

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Market Reports.

The Markets.

SAN FRANCISCO, July 22, 1897.

General trade continues to enlarge with both jobbers and distributors disposed to buy in larger quantities. This is quite a departure from the conservatism which has marked business for a long time past. It shows re turning confidence based on higher prices for farm products, the gold mining industry still forging ahead and every other industry feeling the beneficial effect. There is no doubt that merchants and, as a rule, manufacturers are making more money than they have for several years past, but they have been so habituated to speaking in a pessimistic way that it is second nature to cry hard times. Collections are reported good from mining districts and lumbering camps, and improving from farming sections. It is the general belief that many grain farmers will be able to get out of debt this year, while others will have their indebtedness reduced quite materially. The East reports improving business, with the outlook quite promising for more general activity than for several years.

The local money market continues easy, with outside capital seeking profitable investment. The banks report large surplus funds on hand with, so far, the call for crop-moving purposes not so large as was expected by them. The light demand is due largely to better accommodations in the interior. It looks now as if farmers will market their products early and not hold for a market, which, if done, will ease the situation still more. Our advices state that fruit dr ers, fruit and salmon cannerymen are marketing their packs at current prices: this will also provide more funds. The flood of gold from Alaska is having its effect, for the belief prevails that the bulk will go into circulation either in loans or in investments. Our New York correspondent writes: It is evident that there are enormous amounts of money in this city belonging to life insurance and other great corporations awaiting suitable investment, which they are placing on call loans so as to draw it in when required for investment. There is very little demand for time money just now. In connection with the statements regarding the location of the gold stocks in Europe, it is perhaps worth noting that in addition to the actual gold holdings reported by Russia and Austria, both these countries hold bills of exchange on other centers which can be collected in gold at any time. Russia holds about $6,500,000 of these, and Austria over $11,000,000. Italy also has about $14,500,000 of bills of exchange or credits for the purpose of paying coupons on its foreign debt.

Under date of July 16, J. F. Matthews & Co. of New York City write:

SILVER EXPORTED FROM THE PORT OF NEW YORK, JULY 1ST TO DATE.

Date.	*Steamship.*	*Ounces.*	
July 10..	Etruria....	494,000	
July 13..	Saale.. ...	225,000	
July 14..	St. Louis..	437,000	
		1,156,000 @ 60¼c —	$ 695,045 00
Reported July 9....		1,322,000	794,852 50
Total.....		2,478,000	$1,489,897 50

Commercial price of bar silver, closed yesterday, 60⅜. Mexican silver dollars, 46⅞@48⅜. Bar silver in London, 27 9–16d.

COPPER.

There is nothing new to report in the copper market since our last issue. The export movement continues and prices are practically unchanged at 11⅜@11¼c for Lake, 10¾@10⅞c for Electrolytic, and 10½@10¾c for Casting. In London copper closed: Spot, £47 15s; Futures, £48 2s 6d. Market quiet, but firm.

LEAD.

The market is rather weaker than it has been of late, and a few holders seemed inclined to sell at prices on the basis of 3.65c for carload lots. London cable quoted soft Spanish at £12 3s 9d.

New York Silver Prices.

NEW YORK, July 22.—Following are the closing prices for the week:

	Silver in— *London.*	*N. Y.*
Friday	27⅜	60¼
Saturday	27⅜	60¼
Monday	27⅜	60¼
Tuesday	27 9–16	60⅜
Wednesday	27 7–16	59⅞
Thursday	27 6–16	59⅝

	Copper.	*Lead.*	*Iron.*	*Tin.*
Fri....	11 00 @11 12½	3 60	10 00@12 00	13 90
Sat..	11 00 @11 12½	3 70	10 00@12 00	13 85
Mon..	11 00 @11 25	3 75	10 00@12 00	13 85
Tue..	11 10 @11 25	3 82½	10 00@12 00	13 90
Wed..	11 10 @11 25	3 85	10 00@12 00	13 85
Thur..	11 10 @11 25	3 85	10 00@12 00	13 85

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	.12½c Prem
New York Telegraphic Transfer	15c Prem
London Bankers' 60 days	$4.87
London Merchants	$4.85
London Sight Bankers	$4.88
Refined Silver, per oz., 1000 fine	59⅝
Mexican Dollars	49@49⅜

SILVER.—The market held to steady prices up to Tuesday, when it was easier at a slight decline. On Wednesday the market was still lower. The decline is said to be due to the belief that the silver pool formed many months ago has unloaded the bulk, if not all, their holdings, and, with a very light demand from any country and no moneyed pool to sustain values, prices have set off. The Indian loan may also have its influence, and also the marvelous reports from the Alaska gold find, under the belief that when the source of the gold flow is found, the ledges will be large and rich. Everything is taken advantage of to depress the markets at home and abroad for silver.

MEXICAN DOLLARS.—The market is weak at quotations, in sympathy with silver. The steamer to leave next Friday will take out liberal consignments to Hongkong.

QUICKSILVER.—Our market is quiet, with some shading under quotations.

Our market is quoted at $40 for domestic consumption.

COPPER.—The markets here, at the East and abroad have been fairly firm the past week. The consumption abroad continues heavy, while in this country it is steadily increasing.

The local market is quoted as follows:

Ingot casting, jobbing	13@—
Ingot " wholesale	12½@—
Sheet copper	—@16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½

TIN.—The market is firm for pig. In tin there is some cutting. The demand is slow.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " light, "	4 00@—

LEAD.—The market strengthened at the East, closing strong at the advance. With us quotations have not been marked up, but will be soon, if the advance is maintained at the East.

Our market is quoted in jobbing lots as follows:

Pig	—	@	4 50
Bar	—	@	4 60
Sheet	5 75	@	6 00
Pipe	5 00	@	5 25

SHOT.—The market does not follow lead, owing to a fight on from the East.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 35
Drop, B and larger sizes, " "	1 60
Buck, Balls and Chilled, do, " "	1 60

POWDER.—The market is steady.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9c to 11c, according to strength and quantity.

IRON.—The market is reported steady to firm for both foreign and American. The East reports a very heavy consumption and fair export movement.

AMERICAN.

	To Arrive.	*Spot.*
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

COAL—If the tariff bill passes it ought to help domestic some. The demand is good for the season. The market is fairly steady. The cargo of coal brought by the bark Theobald from Cook's Inlet, Alaska, for the North Pacific Mining and Transportation Company has been sold to a large operator.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$8 00@— —
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 50@ 6 00
Coos Bay	— —@ 4 75
Cannel	8 00@— —
Egg, hard	12 00@13 00
Wallsend	6 50@— —

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	— —
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	9 50	@	— —
" spot, in bulk	10 00	@	— —
" in sacks	11 00	@	12 00
Cumberland	— —	@	— —

ANTIMONY.—The market is steady.

Our market is quoted at 7¼@8¼c in a jobbing way. New York mail advices quote 7½c for Cookson's, 6⅞@7⅛c for Hallett's and 6⅞@7c for Japanese.

NAILS.—The market is strong.

Wire, carloads, basis per keg		....
" jobbing, " "		$2 35
Cut, carloads, " "		....
" jobbing, " "		2 25

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4½

PLATINUM.—The market is quiet.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is steady.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 50 cents per pound for ingots.

Chemicals.

The market is practically unchanged pending the passage of the tariff bill. It is stated that heavy stocks of all kinds affected by the bill are held at the East and also on this coast. It is not at all unlikely that several changes in quotations will be made soon after the bill is law. The consumptive demand is fair to good.

SULPHURIC ACID.—The demand is fair.

We quote in a jobbing way at 1½c per lb for 66°.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported firm from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is steady.

We quote in a jobbing way at 4½c per pound.

SPELTER.—The market is quiet

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is steady.

Our market is quoted in a jobbing way at $1.50 a pound.

BONEASH.—There is a fair movement at steady figures.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is firm.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firm at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is quiet at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—There is a fair demand at 2½c a pound from stores.

NITRATE OF SODA.—Market is steady.

Our market is quoted from store at 4c for 95%.

Mining Share Market.

SAN FRANCISCO, July 22, 1897.

There is no doubt that the support given the market by some unseen moneyed force, combined with active speculation at the East in sugar stocks, with which other securities sympathize, is having a favorable influence, and if continued our market, it is the belief with operators, must also have a bull movement. It would not take much to bring it on, for the public are ripe for speculation and any signs that mining shares are being manipulated by a moneyed pool will unquestionably draw in large numbers from the outside. Then there are other very important factors which are creating a bullish sentiment, viz., improving business, higher prices for nearly everything grown or raised on the farm, the large packs of canned and dried fruit meeting with ready sales, canned salmon—the largest pack on record, valued at over $8,000,000—meeting with quick sales at home and abroad, and the gold mining industry booming ahead. That the inside moneyed pool can have two or more bodies of good grade ore shown up when desired is the firm conviction of mining men conversant with the Comstock mines, but when it will be is the problem to solve. Without considerable ore shown up it will be impossible to promote a good-sized deal, unless there are several million dollars pooled for the purpose, so as to catch a large short interest. Considerable attention is attracted to the work in the Chollar mine on the Brunswick lode, but better informed miners watch that in Potosi on the Comstock lode. The belief prevails that in Sierra Nevada not much ore will be found yet awhile; but if there are enough shorts out some ore will be found, or at least reported, so as to advance prices to make them fill. The work in Con. Virginia is again attracting attention, but in a quiet way. The promised ore developed in Alpha, and also in Con. Imperial through the joint crossdrift of Confidence, Challenge and Con. Imperial, has not materialized yet, but shares of the two latter are firmly held. There is considerable writing up and many points out on Yellow Jacket. They are bullish with big things ahead as the work on the 1000-foot level progresses. Some attention is also given to the joint work to the west that is being done in Kentuck by Yellow Jacket, Kentuck and Crown Point.

From the Comstock mines official advices do not report any material change in the general situation; but, owing to progress made at several points, all information is eagerly sought, and, as usual, grapevine advices have been set afloat for the benefit of the more credulous. In Utah they are still running, but at a slow pace, the north drift from the main west tunnel crossdrift. Nothing of note has been found. In Sierra Nevada work is continued on west crossdrift No. 3 on the 900-foot level without finding anything of material interest as yet, but outsiders expect the crossdrift to run into ore any day. No change is reported in the work on the Layton tunnel level. In Union they continue to run south from an upraise on the 900-foot level. They are in about 300 feet on the 1000-foot west crossdrift. As they have reached promising vein matter, it seems as if the work ought to be stopped, unless they can go still further west without striking ore. Work in Ophir is reported on the 1000-foot and Central tunnel levels. No change is reported in the formation. In Con. Virginia active exploiting work is carried on on the 1000-foot, 1550-foot and 1650-foot levels. So far as official information goes, there is no change worthy of note, but private information is said to be more encouraging. No change is reported in the Best & Belcher and Gould & Curry joint work. No work is reported by Hale & Norcross and Chollar. From Savage nothing new is reported. There ought to be an improvement before long. They are working west on the 450-foot level of Potosi. About thirty-nine tons of fair-grade ore were extracted last week. They sent to the mint bullion of the par value of $5564, of which $2391 was gold. From Bullion nothing new comes to hand. They are still fooling around in Alpha on the 500-foot level. In Yellow Jacket they are opening up the 1000-foot level. In Kentuck the joint work of Yellow Jacket, Crown Point and Kentuck ought to attract attention soon—probably after the treasury stock of the latter has been sold.

Official letters filed this week reports that work has been suspended in Belcher. From Crown Point nothing of interest is reported. The same can be said of Confidence and Overman. The joint west crossdrift of Challenge, Confidence and Con. Imperial has been extended so far in that it is so hot that they have to pump air in.

Interest in work on the Brunswick lode still centers in Chollar as it goes towards Potosi, although some are watching developments on

MINING ASSESSMENTS.

Company and Location.	*No.*	*Amt.*	*Levied.*	*Deling't and Sale.*	*Secretary.*
Alpha Con M & M Co, Nev	19	10c	July 8	Aug 12..Sept 2	C E Elliott, 309 Montgomery
Belcher S M Co, Nev	55	10c	July 19	Aug 23..Sept 13	C L Perkins, Mills Bldg
Best & Belcher M Co, Nev	62	25c	July 1	Aug 5..Aug 26	M Jaffe, 309 Montgomery
Brunswick Con G M Co, Cal	12	3c	June 22	July 22..Aug 14	J Stadtfeld, 309 Montgomery
Bullion Con G M Co, Cal	11	22c	June 22	Aug 2..Aug 23	C A Grow, Mills Bldg
Eureka Con D M Co, Cal	9	2c	June 30	Aug 7..Aug 28	D M Keat, 330 Pine
Gold Hill M Co, Cal	13	25c	June 16	July 26..Aug 12	C A Grow, Mills Building
Horseshoe M Co, Cal	3	40c	July 12	Aug 23..Sept 20	C E Green, 532 Market
Jamison M Co, Cal	9	5c	Nov 27	June 23..Aug 18	Sam W Cheyney, 120 Sutter
Nth G & C G & S M Co, Nev	18	10c	June 26	July 28..Aug 14	E W Sichel, 337 Pine
Osceola Con M Co, Cal	6	1c	June 30	Aug 2..Aug 21	Holland Smith, 307 Montgomery
Pine Hill G & S M Co, Cal	10	5c	May 10	July 1..July 22	Chas A Hare, 1003 Railroad Ave
Rose Creek M Co, Cal	1	15c	June 28	July 28..Aug 30	J M Wilmans, Crocker Bldg
Thorpe M Co, Cal	7	2½c	June 9	July 31..Aug 21	A F Frey, Phelan Building
Utah Con M Co, Nev	25	5c	July 6	Aug 9..Aug 30	A W Havens, 309 Montgomery

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We have correspondents in Chicago, New York and London, and are prepared to place good gold and copper mines. Mines in California, Nevada, Arizona, and New and Old Mexico a specialty. Write us for circulars, etc. DR. STEPHEN BOWERS, Pres.; H. C. SIGLER, Sec. Corner Temple and New High Streets.

The right of the advertiser to know the measure of his purchase in circulation is no less than the right of the publisher to know the weight of print paper received from the mill.

the 600-foot level. They are exploiting on the 300-foot, 400-foot and 500-foot levels. Last week little over 100 tons of ore was raised. The assays were higher. Returns from the ore milled have not been received yet. In Occidental active work is being done on the 550-foot and 650-foot levels. There is no change in the work in Savage or the joint work being done by Best & Belcher, Gould & Curry and Con. Virginia, although an improvement is liable to be reported any day.

The following illustrates the changes of the week:

MINES.	July 15.	July 22
Alpha		$ 14
Alta Consolidated		06
Andes		16
Belcher	$ 22	24
Best & Belcher	41	42
Bodie		
Bullion		
Challenge		41
Chollar	80	80
Confidence		
Consolidated California and Virginia	1 30	1 45
Consolidated New York		03
Crown Point	18	21
Exchequer		
Gould & Curry	34	41
Hale & Norcross		
Justice		
Mexican	32	38
Ophir	64	72
Overman		03
Potosi	48	50
Savage		28
Sierra Nevada	80	1 10
Union	41	47
Utah	06	06
Yellow Jacket	50	53

San Francisco Stock Board Sales.

SAN FRANCISCO, July 22, 1897.

9:30 A. M. SESSION.

300 Alpha	14	1300 Gould & Curry	44
300 Andes	15	200 Ophir	72
800 Belcher	24	200 Overman	03
900 Best & Belcher	42	500 Potosi	50
100 Challenge	41	500 Savage	25
750 Con Cal & Va	1 45	300 Sierra Nevada	1 00
300 Con New York	03	500 Utah	06
100 Crown Point	21	200 Yellow Jacket	53

SECOND SESSION—2:30 P. M.

250 Mexican	38	300 Belcher	24
300 Gould & Curry	42	500 Sierra Nevada	1 10
400 Con Cal & Va	1 45	100 Union	47
1750 Savage	28	100 Alta	06
300 Chollar	80	100 Occidental	09
200 Potosi	50	300 Andes	16
400 Yellow Jacket	53	100 Standard	1 55
200 Alpha	14		

Machinery at the State Fair.

TO THE EDITOR:—The California State Fair this year will be held at Sacramento, beginning September 6th and continuing two weeks. In recent years the machinery exhibits at the State Fair from San Francisco manufacturers have not been as extensive as they should. As a business proposition, it would warrant the manufacturers of all kinds of machinery to make an elaborate display if they desire to keep in touch with the people of the interior. San Francisco has to depend largely upon certain sections of California for this character of trade, and in no way can they better advance their own interests than by making displays of their own goods and wares at the California State Fair.

These annual exhibitions each year are largely attended by the people of the mining districts, who come here for no other purpose (there not being any outside attractions) than to devote their time to the State Fair.

We should certainly like to see a working exhibit of mining machinery, and will furnish all the assistance possible to promote this interest. No charge is made for power or space, and, as transportation is free, the only expense attendant on exhibits from San Francisco is drayage at both ends and a few days' time in arranging exhibits at Sacramento.

As the mining interest is again prominent in this State, we hope to see an extensive exhibit of mining machinery at the State Fair this year. Very truly,

EDWIN F. SMITH, Secretary.

Sacramento, Cal., July 19, '97.

What Mr. Smith says of the State Fair as a place for exhibiting is quite true, and especially for exhibiting whatever will interest the miners, for from the mountains every year come a great many people from the richest mining districts of the State, and they are about the only class of people who have money to spend in these times.

This matter is well worth the favorable attention of manufacturers of mining machinery. Mr. Smith proffers suitable space for exhibition, will furnish free power, and such an opportunity should be embraced.

Rainfall and Temperature.

The following data for the week ending 5 A. M., July 21, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

CALIFORNIA STATIONS.	Total Rainfall for the Week	Total Seasonal Rainfall to Date	Total Seasonal Rainfall Last Year to Same Date	Average Seasonal Rainfall to Date	Minimum Temperature for the Week	Maximum Temperature for the Week
Eureka	00	.03	00	.09	46	66
Red Bluff	00	00	00	.02	68	104
Sacramento	00	00	00	.00	55	96
San Francisco	00	00	.04	.01	48	72
Fresno	00	00	00	T	66	104
San Luis Obispo	00	00	.04		52	84
Los Angeles	00	00	00	.01	54	86
San Diego	00	.01	00	T	60	80
Yuma	00	T	00	.10	70	110

Assessment Notices.

ROSE CREEK MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Star, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 24th day of June, 1897, an assessment (No. 1) of 15 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 85, Crocker building, Junction Post, Montgomery and Market streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 21st day of August, 1897, will be delinquent and advertised for sale at public auction, and unless payment is made before will be sold on TUESDAY, the 14th day of September 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. M. WILMANS, Secretary.

Office—Room 163, Crocker building, San Francisco, California.

BEST & BELCHER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 1st day of July, 1897, an assessment (No. 62) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 23, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 5th day of August, 1897, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on THURSDAY, the 26th day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

M. JAFFE, Secretary.

Office—Room 33, Nevada block, 309 Montgomery street, San Francisco, California.

OSCEOLA CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Amador County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 30th day of June, 1897, an assessment (No. 6) of 1 cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 307 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 2nd day of August, 1897, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on SATURDAY, the 21st day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

HOLLAND SMITH, Secretary.

Office—307 Montgomery street, San Francisco, California.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 9th day of June, 1897, an assessment (No. 7) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of July, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 9th day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors, the day of delinquency of the above assessment has been postponed to July 31st, 1897, and the day of sale to SATURDAY, August 21st, 1897.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from the May Flower Gravel Mining Co., in the May Flower Mine, near Forest Hill, Placer Co., to deposit tailings in Black Hawk Creek; from Dr. J. P. Welch, in the Pactolian Mine, near Genesee, Plumas Co., to deposit tailings in Grizzly Creek; from the Gold Bug Mining Co., in its mine near Georgetown, El Dorado Co., to deposit trilings in Canon Creek; and from E. D. Bowman et als., in the Eclipse and Boston Claims, near Onion Valley, Plumas Co., to deposit tailings in Poorman's Creek, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on August 2, 1897, at 1:30 P. M.

DEWEY, STRONG & CO.
SCIENTIFIC PRESS PATENTS PATENT AGENCY
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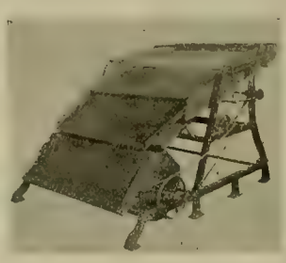

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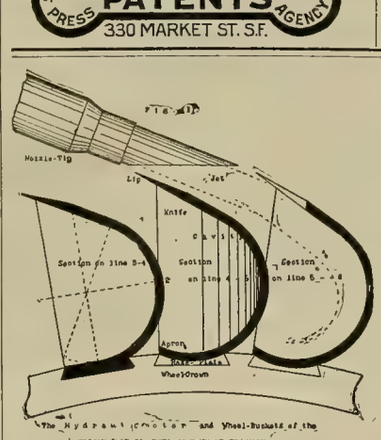

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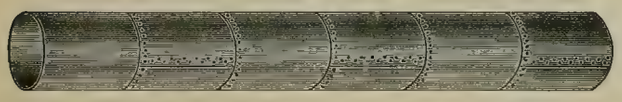

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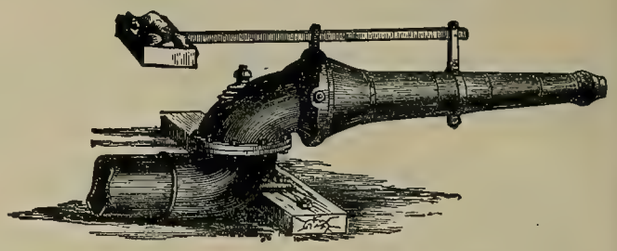

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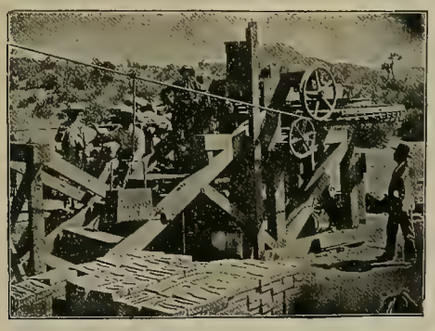

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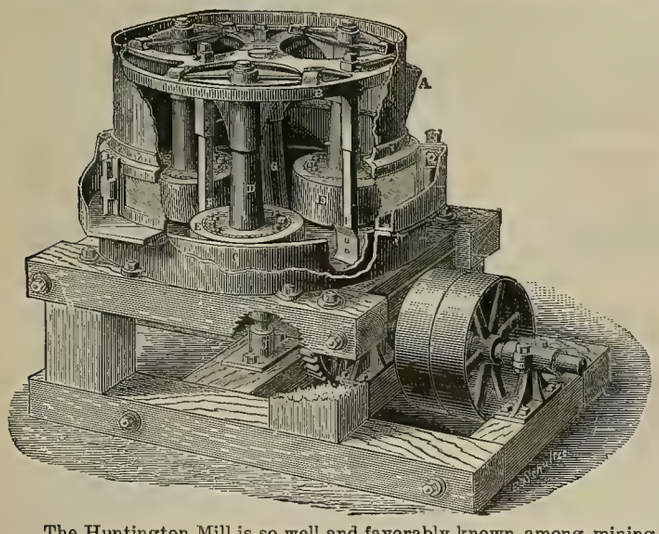

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No. 1934.—VOLUME LXXV. Number 5. SAN FRANCISCO, SATURDAY, JULY 31, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

A High-Speed Battery.

The *South African Mining Journal* notices that English technical engineering journals have been commenting on a paper, "Gravitation Stamp Mills for Quartz Crushing," recently read by D. B. Morison before the North-East coast institution of engineers and shipbuilders, in which, after commenting on the characteristics of the latest pattern of gravitation stamp, the author describes an innovation of his own design which he suggests is in the only direction in which he can find an opening for improvement on existing designs.

Mr. Morison recognizes the indisputable value of the Californian stamp as at present evolved, and retains the whole battery, except cams and tappets. He thinks that in the matter of battery-box, screens, stamp-heads, shoes, dies, etc., the present mill has practically reached finality as regards improvement; and that as far as lifting mechanism is concerned, the speed attained has practically reached its limit as regards the cam. He would replace the cam by the crank, a departure by no means new, but undoubtedly capable of further refinement. Some kind of spring or buffer being indispensable with the crank-action, he has selected a piston in which water and air are confined.

The points on which Mr. Morison's design differs chiefly from the ordinary Californian stamp are these: On the top of the battery frame is a crank-shaft with five cranks at equal angles, each of which is provided with a connecting-rod jointed to a cylinder in such a way that, as the crank revolves, the cylinder moves up and down. Within the cylinder is a piston, the rod of which passes through the cylinder bottom, and constitutes the stem to which the stamp is attached. A jacket surrounds the cylinder, and at a distance from the bottom is an aperture communicating with the jacket-space; while another aperture at the top of the cylinder connects it also with the jacket. The cylinder below the lower part is filled with water, the jacket as well containing water, and above the liquid in both cylinder and jacket is an air-space. To the water is added a sufficient quantity of soap to serve the purposes of lubrication and to prevent corrosion.

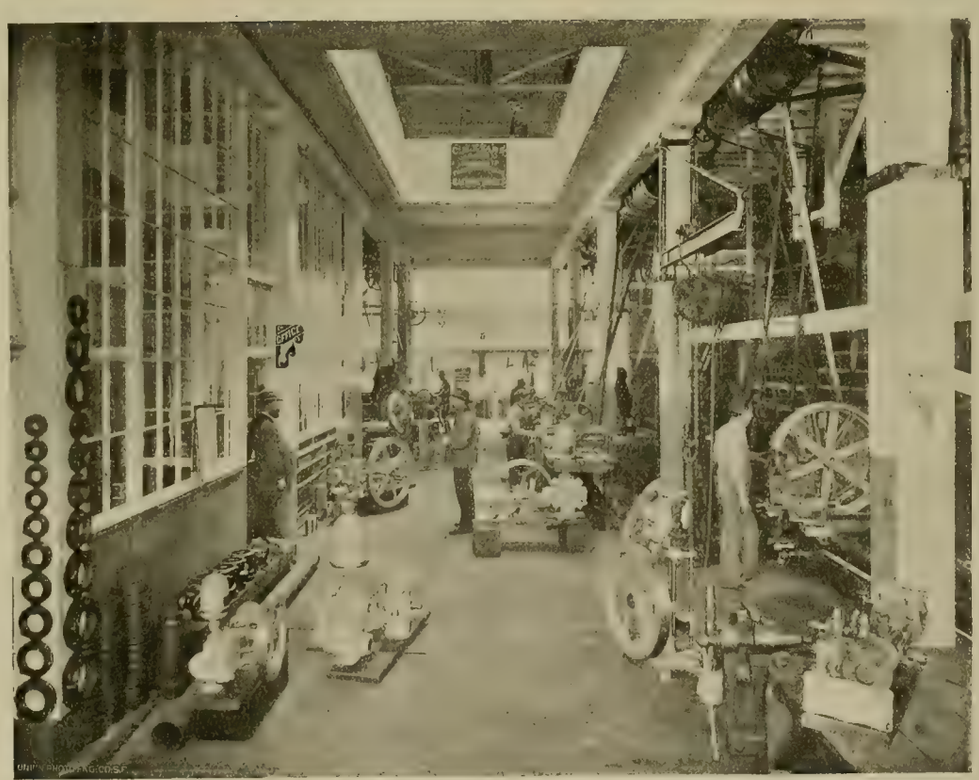
The most notable features to those who conducted the trials with this high-speed mill were: That a comparative low speed with a 900-lb. head gave, under the normal conditions of wet-crushing, 125 and 130 drops a minute; the great difference in vibration, there being no shock, as the liquid is gradually squeezed out until the resistance of the weight is overcome; absence of the usual noise, excepting that due to the blow on the dies; and an increase of 17 per cent in energy of blow per drop as compared with the cam.

The adherents of the new battery claim that faster crushing will probably mean the production of less slimes; but this probability does not, from the accounts to hand, by any means appeal to our contemporary. The wash or splash in the mortar-box due to the high speed of 125 drops is such that a much deeper screen has already been found necessary; it remains, however, to be seen whether the increase of the discharge capacity in proportion to the increase of drops is so simple a matter as it is assumed to be. The design is said, further, to lend itself to an increase in the weight of the stamp up to 1500 or 1800 lbs.—a supposition which may or may not be realized. Whatever the merits of the new design may be, it is an interesting departure from the beaten track, and deserves a thorough and impartial test under normal working conditions. Its shortcomings are likely to be found in the direction of a loss of simplicity in construction and of greater liability to get out of order, as well as in the tendency to increase the percentage of slimes, mechanical disabilities within the power of miners to overcome.

GAMBETTA MINE, MADERA CO., CAL. (*See page 96.*)

Modern Machine Works.

The accompanying engraving (the interior of C. H. Evans & Co.'s Machine Works) illustrates the advance being made along common sense lines in modern machine practice. Contrasted with the darkness, foul air, crowded space and inconvenience of some old-time machine shops, the one here represented is as the incandescent light compared with a tallow dip. Here, in connection with all the latest appliances for the work in hand, are cleanliness, good air, abundance of light and absolute order prevailing in every department. The works occupy the two floors of the new brick building Nos. 183-185-187 Fremont St., San Francisco, each floor having an area of 50x100 feet. The lower floor is concrete and carries the heavier machinery (office and salesroom showing on the left). It is lighted from the roof, as well as from the front and rear, a crane traveling its full length. The upper floor is used for draughting room, pattern shop, storage of patterns, finished work, etc. This firm was established in 1875. It does an extensive business in steam pumps for all purposes, marine engines, etc., and is well and widely known all over the Pacific coast.



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San Francisco, July 31, 1897.

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"TEN MILLION DOLLARS is lying unused in a single Denver bank." So says a Denver paper. 'Tis unfortunate that there should be idle men and idle money, each only needing the co-operation of the other. The circumstance illustrates that the increase in the production of gold is no assurance of an increase of money in circulation, or of money at all, for that matter. The mining of gold is simply the production of a commodity, just the same as the production of anything else. It will continue just as long as there is a market for it; and, whether it will go into the arts, in watch cases, chains and gold-bowed eyeglasses, or into gold dollars and pounds sterling, will depend entirely upon the demand for those things. Money gets into circulation through the demands of business, not through the production of gold. It is the revival of business that will set money in circulation, not the minting of money that will create this business prosperity.

IT is a common impression abroad that few California mines pay dividends because little public notice is made thereof. The fact is that, unlike other places, there are comparatively few incorporated mines, the bulk of them being private partnerships or individual enterprises, and, like any other private business, the annual net sum realized after paying expenses is a dividend. There are thousands of such dividend-paying mines in California. As a matter of fact, the best paying properties in the State are among the least heard of. This doesn't do much to advertise the State's mining resources, but it always was the custom and probably always will be. Last week the writer of this paragraph asked the principal owner of a mine that has been a steady monthly dividend payer for many years: "Is the Golden Lyre still productive? I haven't heard of any dividend in the last three months." "Bigger and better than ever," was the reply, "but Wells-Fargo's agent has particularly requested that no news be given out of our dividends any more—road agents, you know." Some States advertise the fact that paying gold mines are being worked therein. California carefully conceals the fact wherever practicable.

Klondycitis and Alaskamania.

The most senseless rush in the history of gold mining is now being made to the borders of Alaska and the British Northwest Territory. Inflamed by the receipt here of a few thousand ounces of gold of less aggregate value than the annual product of one California county, there has been for the last two weeks a frantic effort on the part of thousands to get away. All sorts of crazy projects are started up, and in addition to the men who have gone on regular and irregular steamers, there is a general furbishing up of everything in the way of sail or steam craft in this port for the conveyance of thousands of others. Some of the projects are suicidal; some of the advertisements murderous in effect. It is gravely promised by advertisers in the daily papers that men will be taken to Dawson City and supplied with one year's provisions for $200—$150—$125. Those who have temporarily lost their heads accept these announcements.

Last week this paper gave due warning regarding this matter—a warning unnecessary to nine-tenths of our readers but of value to many unacquainted with the danger of the trip and wholly ignorant of where they propose going, the unusual risk attending the journey, or the extreme uncertainty of success.

Granting that everything said and sung about the Yukon gold fields is so, it must be considered that there is a speedy limit to available ground; all in Circle City and adjacent thereto have rushed in; letters received at this office from Alaska mining companies say there is a general hegira from other Alaska mining districts; in addition have already gone from northern ports—Seattle, Tacoma, Portland, etc., all who could. What possible chance, then, can the California contingent have, and what remote show is there for those who yet contemplate going?

The cause of the present excitement is evident. Prevalent hard times have much to do with it. Then, in no part of the world is it easier to create a stampede. Such seed falls on fertile ground in California. There was a rush to the Humboldt county beaches in 1851, to eastern Peru in '54, to Kern river in '55, a hegira to Fraser river in '58. Between April 20th and August 9th of that year, as given in "Prices Current," there sailed from San Francisco 23,488, and as many more would have gone but for the adverse reports the returning miners brought. In '59 came the Washoe excitement, and again in '63 and later years came renewed rushes to far-off regions, all ending, mostly, in bitter disappointment. Throughout these years California, as to-day, was best of all. No matter how wild the story, or great the yield, the every-day record of the State as a gold producer equaled the story elsewhere. At Carson Hill, Calaveras county, in '54 was found a 195-pound lump of gold; on August 18, 1860, at the Monumental mine, Sierra county, was unearthed a 133-pound mass of gold and quartz, sold to R. B. Woodward of San Francisco for $21,635.52; from the same mine in '69 was produced another mass weighing ninety-five pounds; in 1871, on Kanaka creek, Sierra county, a 98-pound chunk was found and at Rattlesnake creek, Sierra county, the same year was found one weighing 106 pounds. Duplicate statements can truthfully be made concerning Nevada, Tuolumne, Placer, El Dorado, Trinity, Shasta and other California counties, and throughout the nearly fifty years since gold was first discovered here is the glittering record. Last year six locations in Amador county yielded $1,074,000; twelve mines in Nevada county produced $1,266,000; ten others in Tuolumne, Calaveras and Shasta, $2,707,000. Over twelve thousand million dollars in gold has been authentically ascertained to have been produced by this State, not counting the untold millions of which no record was ever kept.

The knowledge of such great gold finds in this State adds to the willingness to believe the probability of their recurrence in the far north, and thousands who in these dull years have found it difficult to win even a competence are eager to be first in a field where the old days of '49 seem likely to be duplicated. The rigors of that region must be considered, and every possible precaution taken against disaster.

The Klondyke discovery unquestionably is but the first of many rich strikes that will be made in the Yukon basin, both in Alaska and in Canada. It is, indeed, within the possibilities that the annual gold yield of the country will equal that of the early California and Australian days. Yet gold is not to be picked up there indifferently by the expert and inexpert. Men cannot go there with no capital but their physical strength and secure gold as it was secured by the same class of men in California and Australia. The Klondyke itself is a small branch of the Yukon river, and contains an area of placer ground which, though rich, is far too small for the thousands that are traveling toward it. They must strike out and explore for new placers. In this the extravagant theories that have been advanced to account for the presence of the gold are a distinct impediment to successful exploration, and should be discarded. The country is too difficult, the climate too severe, and the value of time there too great, for the expenditure of the enormous energy which has covered other gold mining districts with mining works in places where commercial gold values were demonstrably impossible with or without the costly but useless works. There is no occasion for this expenditure of time, money, and even life itself, in this kind of waste work in the Yukon gold fields. The deductions and experience resulting from the failures and successes of the mining of the last half century in California and elsewhere are a safe guide to the avoidance of avoidable failures. Making intelligent use of this fund of available knowledge, the proportion of successes should be large.

The conditions in the Yukon would seem to indicate organized co-operative work of large companies as likely in the long run to produce a greater average of successes than possible by individual mining. Not only is it possible to cover more ground in prospecting by organized co-operation, but the economy of exploitation can be very much increased by working several claims together as one.

In conclusion, it is suggested that any one contemplating departure should weigh well the situation, take all obtainable facts; should not create an atmosphere in which to flap the wings of fancy, but consider is he fitted for the adventure; can he see it through, and, after all, is he not better off in this favored clime than he possibly could be even with gold amid the terrors of that region?

We would not be understood as decrying Alaska. There is gold there, plenty of it, and the country will be a good one for the adventurous for years to come. But to go there from here this season is unwise. A good many poor fellows will suffer, starve and die. Later on those things will be better understood.

THE lowest price in the history of silver was reached for that metal this week, due, it is said, to heavy sales for American account. From the 17th to the 22nd inst. were shipped from New York to Europe 1,497,000 ounces; to the 9th and 16th, 2,478,000 ounces, making a total of 3,975,000 ounces for the first three weeks of this month. On the 26th inst., New York government assay bars were quoted at 59 cents, which made the silver in a standard silver dollar worth 45.63 cents, as against 45.70 cents in 1894. The London quotation on the 28th for fine silver was 26⅜ pence; during March, 1894, it touched 27. The New York price that day was 57⅜ cents for pure silver. On the 29th it steadied a little, being 57½ in New York and 26 7-16 in London. It is believed that the bottom has been reached, and that silver will now gradually appreciate in value.

THE announcement elsewhere of the sixth annual convention of the California Miners' Association is of more than ordinary interest to the mining industry of this State. The five successive annual deliberations of that organization have been of value. The meeting next October will not be second in importance to any of its predecessors. It is none too soon for the several county organizations to discuss the selection of delegates, the measures to be acted upon and the policy to be pursued. The association has made very few mistakes, has been fortunate in its administration and uniformly successful, and has the confidence of the commonwealth. Considerable valuable work has been done by its committees during the year and a good deal comes up for consideration at the coming meeting.

Concentrates.

AUSTRALIA is shipping gold to the United States.

THE field work of the State Mining Bureau has ceased.

THE Clark road law has been declared unconstitutional.

THE June gold export from the Cape, South Africa, was £985,728.

A LARGE amount of annual assessment work has been done this month.

THE mineral production of Montana for 1896 aggregated in value $50,732,099.13.

THE Copper Queen mine at Bisbee, Arizona, is now producing 1000 tons per month.

"EVERYTHING is cheaper these times" except gold and transportation to Alaska.

DAWSON CITY, ALASKA, has a newspaper, the Yukon *Nugget*, Scott & Carr, publishers.

THE June production of copper in this country was the largest on record—19,658 tons.

BRITISH COLUMBIA has sent its first consignment of copper matte to Swansea, Wales.

THIS paper is weekly seen by nearly every mining man in this west half of America.

A STRIKE of cinnabar is reported by J. C. Henry at Walnut Grove, Yavapai county, Arizona.

THE Le Roi Mining Company has decided to locate the company's smelter at Northport, Wash.

SIX gold-washing machines are expected to be in operation at Olinghouse, Nevada, within two weeks.

ON the 3rd prox. Australia will send $1,000,000 gold to San Francisco, the first consignment of the kind.

THE gold miner continues to be the only one sure of a market for his entire production at the highest price.

IT is calculated that the net earnings of the Boston and Montana Copper Co. this year will be $2,500,000.

COLORADO papers again declare that this year, sure, that State's gold yield will exceed that of California.

IT is now three months since the lost "Blue Bucket" mine, in eastern Oregon, was rediscovered for the thirtieth time.

NEXT Saturday's issue of this paper will have an interesting article on the Yukon, written from a scientific standpoint.

BUT 163 ounces of platinum were produced in the United States—that is, in California—in '96. The commercial value was $944.

C. W. PAULY of San Diego, Cal., is the receiver of the Golden Cross mines, San Diego Co., at a compensation of $400 per month.

THE next annual convention of the California State Miners' Association will be held in this city, beginning Monday, October 18, 1897.

FROM the most authentic sources obtainable it is estimated that to January 1st, '97, Tuolumne Co., Cal., produced $215,000,000 gold.

LIKE all other parts of the world, the June product of the East Indian mines was 25% in excess of that of last year, being 32,008 ounces.

A WEST AUSTRALIAN assayer, who recently discovered telluride, argues that mustard gold is an infallible indication of telluride at greater depth.

THE sale is reported of the Golden Chest, Dora, Katie Burnett, Joe Dandy and Paymaster properties at Murray, Idaho, to G. V. Bryan for $300,000.

SOME of the newspaper correspondents who went to the Klondyke took carrier pigeons, on which they will depend for speedy transmission of news.

DURING the week three steamers have left this city loaded down with passengers for the Yukon. The craze continues and much suffering is inevitable.

THE exact value of a ton of gold is $602,927.23. When you sell a ton take nothing less for it. The gold coin of the United States is worth $18.605 per ounce.

A BILL has passed Congress creating the office of surveyor-general for Alaska at a salary of $2000. Two land districts will be immediately created there.

BRITISH COLUMBIA mining papers are urging the immediate appointment of an inspector of mines, which office was created by the recent legislative assembly.

"ALL the gold in the world could be put within the walls of a room 20 feet square." So could all the silver in the world were the ceiling sufficiently high.

THE French Government are sending two mining experts to British Columbia to investigate the reports circulated in France of the great resources of the Province.

THE nickel mines in Cottonwood canyon, Lovelock, Nevada, have resumed operations under the management of C. P. Turner, who has an electrical process to reduce the ore.

ABOUT as much is at present being put into gold mining in this State, in work, machinery and development, as is being taken out; the profitable outcome will be manifest later on.

ALL who go to Klonkyke are not crazy. Three newspaper men left last Wednesday on the Excelsior, who are paid $10,000 and their expenses. There is a method in their madness.

WELLS, FARGO & Co. will establish an express office in the Klondyke, Alaska district, at the earliest opportunity, charging $8.50 per $1000 for transportation of gold, including insurance.

THE assessment rolls show an increase in aggregate value in every mining county in this State and a decrease in some of the agricultural counties, a direct reversal of the facts in former years.

THE Sierra Co., Cal., supervisors refused B. A. Cardwell a franchise for a toll road from Meadow Lake to Sierra City, so he has determined to build it anyhow. Fifty men are at work constructing it.

SECTION 671 of the Civil Code of California, which took effect July 1, 1874, provides that "any person, whether citizen or alien, may take hold, and dispose of property, real or personal within this State.

IT is none too soon for the Government to begin getting ready the relief expedition that will be inevitably called for to succor the mutable many now crazily heading for the frozen swamps of the Yukon.

VERY little hydraulic or other mining machinery for Klondyke, Alaska, has so far been ordered from this city. The apparatus in use is of the crudest kind, and is likely to continue to be for some time.

AT the Golden Feather, Butte county, Cal., the manager says they have turned the river successfully, and it is all running through the canal. The claim is now practically drained, and he is preparing for sluicing.

THE work of running the boundary line between Idaho and Montana is under charge of E. T. Perkins Jr., who is now at Sand Point, Idaho; headquarters at Spokane, Wash. The work will be made by the U. S. Geologic Survey.

A TUNNEL nineteen miles long has been located, extending from Colorado City, Colo., to and four miles beyond Cripple Creek. The estimated cost is $9,000,000. The proposed tunnel is to be 8x8 feet and is to be driven 15 feet a day from each end.

E. E. MATTESON, who till quite recently was living in Grass Valley, Cal., is said to be the first person to use a canvas hose and nozzle in putting water on gravel claims, and is locally considered to have been "the inventor of hydraulic mining."

THE differences over the use of the water of Spring creek between the Garlick Electric Power Company and the Mountain Copper Company, Shasta Co., Cal., have been adjusted and several mines and mills which have been shut down will start up this week.

THE Alaska-Treadwell mine, on Douglass island, Alaska, paid its 33rd dividend, a $75,000 one, on the 28th inst. It originally cost $150. Nearly $1,000,000 has been spent developing the mine. The ore averages $8 per ton, the average cost of milling is $1.15 per ton.

IN the suit of a French syndicate against E. L. Giroux and P. Griffin for "salting" a mine the jury at Baker City, Or., returned a verdict in favor of the syndicate for $4000. Griffin made a written confession, in which the plot and modus operandi were detailed.

THE Geiser family, which developed and worked the Bonanza mine, near Baker City, Or., has sold it to J. M. Patterson of Pittsburg, G. Crawford of New York, N. P. Hayes of Philadelphia and J. S. Wallace of Denver for $750,000, $50,000 forfeit being paid to bind the bargain.

AT the Broken Hill Proprietary, Australia, 28,151 tons of ore were treated for the four weeks ending June 24th, and the output from the refinery was 406 ounces of gold, 629,435 ounces of silver, 1580 tons lead, 45 tons antimonial lead, the copper matte containing 39 tons copper and 43,486 ounces silver.

THE fifth annual report of the California Debris Commission shows that the commission since its organization has received 311 applications to mine and has granted 238 permits. The only serious accident during the year was the breaking of the Manzanita mine dam, when 130,000 yards of material escaped.

THE Canadian Government proposes to exact a royalty of 10 per cent on claims in the Yukon with a monthly output of $500 or less, and 20 per cent on any claim yielding above $500 annually. This, in addition to $15 registration fee and $100 annual assessment, and every alternate claim to be reserved by the Government.

ACCORDING to returning miners from Peru the Klondyke gold is but a small affair in comparison with the newly discovered gold fields in the States of Cuzco and Pima, in that country, where, it is gravely stated, "gold in a free state is being taken out by the ton." Several Peruvian towns are reported depopulated by the rush.

"WHY did you come back with a little $8000 pile, when you could have stayed and made so much more?" was asked a returned Klondyker this week. "I wanted to get something to eat, and was all broke up in health," was the answer. Just what the unsuccessful, sick and hungry men who couldn't come back are going to do, is another story.

THE Alaska gold find so far differs in two important respects. Ordinarily, when a discovery is made, there immediately pops up reminiuisances of alleged discoveries in the same place in '58 or '64, and the local papers say: "Meanwhile, let no one come expecting work." In this case those two incidents are not accompaniments.

WEST AUSTRALIAN gold exports during June,'97, aggregated 53,348 ounces, valued at £202,725, as compared with 59,111 ounces, valued at £224,624, exported in May. The gold export from Western Australia during the six months ended June 30 amounted to 265,314 ounces, against 114,324 ounces in the corresponding period of last year and 281,263 ounces for the whole of 1896.

MAJOR HEUER of the U. S. Corps of Engineers is detained in Cincinnati, O., and may not take up his official duties here before October, '97. The California Debris Commission, as at present constituted, consists of Col. Chas. R. Suter, Major C. E. L. B. Davis and Lieut. Herbert Deakyne, at Room 59, 809 Market St., San Francisco. Lieut. Deakyne is practically in charge of the work of the Commission.

THE extensive mica beds near Tres Piedras, Taos county, New Mexico, will be worked by a Chicago stove company. The mica district covers about 3000 acres and was discovered six years ago by Col. J. H. Cribben of Chicago. Mica in commercial quantities is a scarce article, the whole United States product of 1896 being worth but $57,041. In 1887, 70,000 pounds were produced in this county worth $142,500.

A BILL recently passed the French Legislature putting duties on lead ore, and lead in pigs, bars and sheets to the amount of 30 cents per 100 pounds. The usual consumption of lead in France is 80,000 tons, while the home product only amounts to 9000 tons. Mining engineers claim that, with higher duties, the home product might be increased to 33,000 tons. Others, however, claim that the valuable mines are worked out, and that out of 184 patents only 28 are or could be worked at a profit.

THE management of the Quincy Mining Co. has under consideration the building of an electrolytic smelting plant at Houghton, Mich. The Quincy ore, as is generally understood, is very rich in silver, running sixty ounces to the ton of copper ore. Under the present system of ore treatment a very large percentage of this silver is practically lost. Under the electrolytic process this silver would be separated from the copper and in consequence the earnings of the company would be materially increased.

OVER $80,000 was taken out of a little "pocket" last week—not in Klondyke, but near Sonora, Tuolumne county, California. There is no "rush" there, it is too close by; it is too steady and regular a circumstance; it is too easily reached; the climate is too fine; the fruit too luscious; the air too balmy; the sky too serene. Were that $80,000 to have been taken out in two and one-half days 4000 miles away in a frozen swamp in the shadow of night and the north pole, amid snow and ice and semi-starvation, there might be a "rush."

AN EXCHANGE after telling you you can get into a good, safe mining proposition at bedrock rates by the use of good, ordinary business judgment, adds: If you go in with them and want to succeed do not put an incubus around their neck by sending a sick relative, a lame uncle, a one-legged brother-in-law, some played-out life insurance agent, or a broken down song-and-dance man from the East to manage the mine. If you do your money is lost every time. First get a mine, then get a good practical miner, pay him a good salary and give him a sufficient fund to pay all bills promptly.

AS USUAL the MINING AND SCIENTIFIC PRESS was first with facts regarding the Klondyke mines, publishing the main point and a description of the manner of working, in the issue of March 20th, 1897, from a scientific miner on the spot. It is seldom this paper calls attention to these things, but in this regard it is also in order to note that in a great many instances it is not until after authentic accounts of matters in the mining and scientific world have been copied by Eastern papers from these columns that more adjacent contemporaries discover the facts and copy the copied accounts, usually crediting the Eastern publication with the statement that originally appeared herein.

A PRESCOTT, ARIZONA, *Courier* reporter asked a miner a few days ago for news about his mine. The miner replied that he did no newspaper mining, but worked in the ground; which is good, as far as it goes, but 100 men might work in the ground for ten generations and, were it not for the newspapers, no one outside of their immediate neighborhood would ever hear of it. They might have the best prospect on earth, but no purchasers would come and no outside investment would be at hand, because the outsiders would never hear of it, without the use of printers' ink to advertise the fact. Colorado owes its prominence in the mining field as much to newspaper advertising as to any other cause. Not to let the world know that you have a good prospect is to "hide your light under a bushel." The newspaper man expects no direct pay for publishing good news about the prospect; he expects to put money into circulation by attracting outside capital to buy that prospect and work it, and, if he can do this, everybody will prosper. If he is not allowed to do it, few prospects or mines will be sold, nobody will prosper. This is the whole thing in a nutshell.

THE Executive Committee of the California State Miners' Association met on the 23d inst. The committee appointed at the last previous meeting to confer with another committee from the Anti-Debris Association reported favorable progress. On motion the report was adopted and the committee instructed to continue on the same lines. The secretary read a communication on the same subject from the Sacramento Chamber of Commerce committee to that body, which was endorsed. On motion a committee was appointed to consider the subject of dredgers. The delegation to the Transmississippi Congress made a report, which appears in full on page 96. The time for the next annual convention was fixed—Monday, Oct. 18—and in connection therewith the secretary brought up the matter of money. Very little money had been received from the various county organizations. Last year Nevada county had paid in nearly $1400; this year, $250. Placer county last year $900; this year, $250. The Association is out of debt, but money is needed for current expenses. There is at present no salaried officer, but the coming convention requires provision for necessary expenses. It being represented that a mistaken idea appeared to prevail among some valley residents that the Association was willing to aid or connive at evasions of the law, in direct contradiction to the spirit and purpose of the Association, the following resolution was adopted: WHEREAS, An erroneous impression seems to have been created in certain quarters respecting the purposes and objects for which the California Miners' Association was organized; therefore, be it *Resolved*, That this committee calls especial attention to section 2 of article I of the constitution of the above Association, which sets forth the objects of the Association, as follows, to-wit: "Section 2. The objects of this Association shall be to protect, develop and foster the mining industry of California in all its branches." Further *Resolved*, That the California Miners' Association will in no manner aid or encourage any mining in violation of any law or the lawful decree of any court.

A STATE LAW which went into effect March 16, 1872, ordains that "it shall not be lawful for any corporation, association, owner or owners of any quartz mining claims within the State of California, where such corporation, association, owner or owners employ twelve men daily, to sink down into such mine or mines any perpendicular shaft or incline beyond a depth from the surface of 300 feet, without providing a second mode of egress from such mine by shaft or tunnel, to connect with the main shaft at a depth of not less than 100 feet from the surface. It shall be the duty of each corporation, association, owner or owners of any quartz mine or mines in this State, where it becomes necessary to work such mines beyond the depth of 300 feet, and where the number of men employed therein daily shall be twelve or more, to proceed to sink another shaft or construct a tunnel so as to connect with the main working shaft of such mine, as a mode of escape from underground accident or otherwise. And all corporations, associations, owner or owners of mines as aforesaid, working at a greater depth than 300 feet, not having any other mode of egress than from the main shaft, shall proceed, as herein provided. When any corporation, association, owner or owners of any quartz mine in this State shall fail to provide for the proper egress as herein contemplated, and where any accident shall occur, or any miner working therein shall be hurt or injured, and from such injury might have escaped if the second mode of egress had existed, such corporation, association, owner or owners of the mine where the injuries shall have occurred shall be liable to the person injured in all damages that may accrue by reason thereof; and an action at law in a court of competent jurisdiction may be maintained against the owner or owners of such mine, which owners shall be jointly or severally liable for such damages. And where death shall ensue from injuries received from any negligence on the part of the owners thereof, by reason of their failure to comply with any of the provisions of this act, the heirs or relatives of the deceased may commence an action for the recovery of such damages as are provided by an act entitled an act requiring compensation for causing death by wrongful act, neglect or default, approved April twenty-sixth, eighteen hundred and sixty-two."

Mines of the Gold Belt.

Written for the MINING AND SCIENTIFIC PRESS by W. H. STORMS, M.E.

The great gold belt in California extends from Kern county on the south to the Oregon State line, those mines lying south of the Tehachapi mountains not being considered as forming any portion of the main auriferous belt.

While those mines south of the Tehachapi may be contemporaneous in origin with those of the gold belt, they are separated from the latter by the Sierra Nevada mountains and are geologically distinctly different. Those great orographic movements, to which the fissures of the Sierra Nevada region may be attributed, evidently have nothing in common with those movements which have fissured, crushed and contorted the numerous mountain ranges which lie scattered about the southern counties of the State.

More particular consideration will be given those mines occurring in that portion of the gold belt lying in the counties of Madera, Mariposa, Tuolumne, Calaveras and Amador, including the great system of auriferous veins commonly known as the mother lode and also the prominent mines of the east lode.

The name "mother lode" was applied in early days to a line of prominent quartz outcrops beginning in the southern portion of Mariposa county and extending in a direction somewhat west of north through Mariposa, Tuolumne, Calaveras, Amador and El Dorado. The best paying mines, as a rule, are not those of large and prominent outcrop along this belt, but are found in either parallel fissures or in off-shoots from the main lode. The name "gold belt" seems much more appropriate and comprehensive than the term "mother lode," and in time doubtless the latter will become obsolete.

General Geology.—The general geological features of the gold belt have been repeatedly described by numerous writers, the most complete being "The Geology of the Mother Lode," by H. W. Fairbanks, in the tenth report of the State Mineralogist of California, and "The Geologic Atlas of the Gold Belt," by the United States Geological Survey.

Throughout the region of the gold belt we find, generally speaking, narrow strips of black slate, limestones, quartzites, mica schist, and other metamorphic rocks, associated with broad or narrow areas of basic rocks, mostly diabase, diorite and serpentine, and in the more southerly portion with granite. There are also many dikes of acid type, ashy-gray in color, and ranging in composition from diorite to micro-granite. Some are coarse-textured and others are felsitic. These latter often contain light greenish scales of chlorite, and probably represent a rock intermediate between diorite and felsite, or perhaps other rocks of micro-granitic type. This is not remarkable, when it is considered that the granite of the Sierra Nevada is nowhere known to be a *true* granite, but is as much entitled to be called diorite as granite. This complex composition has led to the name "grano-diorite," given by the United States Geological Survey. Our granite is made up of all the essential constituents of both granite and diorite.

In a general way the granite follows along the line of the gold belt, though at greatly varving distances. It is usually found in pretty close proximity to the east lode, and in Tuolumne county is the "country rock" of many of the leading mines near Carters and Soulsbyville. In the southern part of Tuolumne county and in Mariposa county large masses of grano-diorite are found between the east lode and mother lode, the gold-bearing veins of the former being inclosed in slate rocks of the Calaveras formation, and the latter in either the black slates of the Mariposa formation or in amphibotite schists, and frequently associated with serpentine.

In Mariposa county large granite masses extend several miles to the southwestward across the strike of the slates, but, contrary to the common belief, do not abruptly "cut off" all the slates and metamorphic rocks, for these latter extend in long, narrow strips between the granite masses far to the southeastward into Madera and Fresno counties, and, possibly, farther. When the metamorphic rocks do abut against granitic masses in Mariposa county, the evidence of contact metamorphism may be very plainly seen. The rocks are crushed, brecciated and are often found contorted to the westward, appearing to have been thrust aside by the intrusion of the granite.

Near the line of Madera and Mariposa counties there are five belts of slaty, or schistose rocks, extending into the granite in a southeasterly direction. In the west, near the San Joaquin valley, is a belt of schists, slates and quartzites, intruded by many dikes, both basic and acid, reaching from the region about Hornitos, through the Buchanan copper mines and beyond. This belt varies from twelve miles in width at the north to three or four miles at the south. Its western and northern boundaries, as far as exposed, are the quarternary deposits of the San Joaquin valley. Eastward a granite area eight to twelve miles in width separates this west slate belt from a second slaty strip, which extends from four miles east of the town of Mariposa, near Big Spring, southeastward through Grub Gulch, Coarse Gold and the vicinity of Hildrethville, in Madera county. The eastern border of this schistose strip is much disturbed, slates and schists being inter-stratified with granite dikes, diabase, etc.

These granite dikes appear to unite in a solid mass northward, and a long tongue of granite extends several miles toward Mount Bullion. Still farther east a third area of schists extends from the region about Snow creek and Buckingham mountain, in Mariposa county, southward through Potter Ridge district, in Madera county. This strip is usually narrow—a mile or thereabouts in width—and on Potter ridge is bounded on the west by diabase. East of this the granite again separates the schists from another metamorphic area consisting of black slates, phthanites, quartzite and limestone (Calaveras formation of the United States Geological Survey). These rocks are much disturbed, crushed and contorted. On the east side of the middle fork of the Merced river, near the Hite mine, a great lens of granite, a mile in length and half a mile in width, appears to be entirely surrounded by slates and schists. Lying eastward from this region is an area of granite and highly metamorphic rocks, the relations of which could only be made clear by a geological map.

The interesting feature of these long arms of metamorphic rocks, which extend southeastward into the granite, lies in the fact that in each of them are found gold-bearing quartz veins, some of which have produced large amounts of gold, and others, undeveloped, give promise of yielding handsomely.

Madera County.—The so-called mother lode does not extend into Madera county, but the gold belt does. Quite a number of writers have declared that the mother lode extends through Grub Gulch, Coarse Gold, etc., but this is not the case. The mines of these camps and those on Potter Ridge are as distinctly different from anything on the mother lode as possible. In the Grub Gulch, Potter Ridge and Coarse Gold regions there are two distinct types of veins. There are fissure veins which occur in granite, and also in slate or schistose magnesian rocks, and when in these latter have a strike and dip across the inclosing rocks. These veins usually have well-defined walls; are narrow, seldom exceeding 24 inches, and frequently carry a high-grade sulphide of iron, sometimes associated with arsenic; sulphides of lead, zinc and copper also occur. Much of the quartz is crystallized; calcite is of frequent occurence and not infrequently small greenish scales of a magnesian mineral occur, much resembling the Mariposite of the mother lode; and, by the way, the occurrence of Mariposite is the only thing, either mineralogical or geological, in which the mines of Madera resemble those of the mother lode. Among the mines of this type may be mentioned the Gambetta, at Grub Gulch, carrying a good grade of ore, and having the peculiar features above described.* The Bullion mine, at Grub Gulch, is also of this type, but differs from the Gambetta in occurring in schistose magnesian rocks which have an easterly dip. The vein conforms with the schists in strike, but dips westward, the angle of intersection being about 90°. Some of the quartz in this little vein is high grade and some of it worthless. The Lillie mine, about two miles east of O'Neal's, is also of this type and occurs in granite. It has been worked with profit to a depth of 400 feet.

Most of the mines of Madera county differ from those just described and form the second type of veins referred to. These occur in fine-grained mica slate; conform nearly with the slates in both strike and dip and are often found associated with granitic dikes. The quartz occurs as an infiltration, saturating the slates and sometimes forming solid masses of quartz, but usually the slaty structure of the original rock may be very plainly seen. The shoots occur in a series of lenses, sometimes following one another in a straight line. In this case one wall is often found well defined, the fissure evidently being one of displacement as well as of fracture. More commonly, however, the quartz lenses, while following a general trend, lie at an angle, the ends sometimes overlapping. Again, several lenses of varying sizes are found in a zone several feet wide, and not only the quartz but the slaty material of the zone are mined and sent to mill. Of this type of mines there are a great many examples. Among them are the mines of the Savannah group; the Starlight, on the same lode, the Fresno Enterprise, and nearly all the mines about Coarse Gold.

Mining operations in Madera county are not in a very flourishing condition and have not been for a long time. Still, I believe that there are a number of mines in that county in the prospective stage of development which will pay if carefully operated in the proper manner. Some of the gold-bearing zones are wide, and, though of low grade, are free milling, and with favorable conditions as to water, wood, etc., should pay well.

There are two large streams in this county and a number of small ones which will furnish abundant power, and both compressed air and electrical plants could be installed here to advantage. The section has been the field of some of the most unfortunate and ill-advised investments, but these facts need not and do not diminish the actual value of the mines.

Never having visited the mines of Fresno, Tulare or Kern counties, I can make no particular mention of any of them, but from such information of an authentic character as I have been able to obtain, they differ in no important particular from those above described.

Soulsbyville, Cal., July 17, '97.

* See illustration, page 93.

Transmississippi Congress.

At a meeting of the Executive Committee of the California Miners' Association, held in this city on the 23rd inst., the following report of the delegates from that body to the recent Transmississippi Congress at Salt Lake City, Utah, was made by Tirey L. Ford, and on motion was adopted and the delegation thanked for their action:

To the Chairman, Officers and Members of the Executive Committee of the California Miners' Association.—GENTLEMEN: The undersigned, delegates to the recent session of the Transmississippi Congress held at Salt Lake City, Utah, appointed by authority of your honorable body, beg leave to submit the following report:

In obedience to your instructions, your representatives succeeded in securing the endorsement by the Transmississippi Congress of the proposition to establish a new executive department to be known as the Department of Mines and Mining, with a secretary thereof who should be a member of the President's Cabinet. The resolution embodying this endorsement was drafted by your representatives, and after its presentation by one of your representatives was unanimously endorsed by the Congress.

The Congress further authorized the appointment of a committee of five to urge the necessary legislation upon the Congress of the United States. The president of the Congress appointed the following delegates upon such committee: Ford of California, chairman; Patterson of Colorado, Richards of Idaho, Lawrence of Utah and Dorsey of Nebraska. This committee was authorized to consult with a similar committee of five appointed by the recent Gold Miners' Convention held at Denver, Colorado.

Your representatives further succeeded in securing the endorsement of the following resolution, to wit:

Resolved, That this Congress earnestly requests the Congress of the United States to make additional appropriations for the construction of restraining barriers for the protection of the Sacramento and Feather rivers in California in manner as set forth in The River and Harbor Act of 1896; and further

Resolved, That the Congress of the United States be earnestly requested to make an appropriation of not less than five hundred thousand dollars for the purpose of dredging and otherwise improving the Sacramento and Feather rivers, which work is imperatively needed and cannot with safety be longer delayed.

Your representatives further secured the endorsement of a resolution requesting the Congress of the United States to thoroughly examine and revise the Federal mining laws. This action your representatives deemed advisable in view of the effort now being made by the California Miners' Association to secure a revision of the Federal mining laws.

At the request of your representatives the Congress also urgently requested the Commissioner of the General Land Office to reverse the ruling of his predecessor in relation to the character of land containing petroleum and other mineral oils, the request of the Transmississippi Congress being that the Commissioner of the General Land Office should delare that petroleum and other mineral oils should be declared minerals and that the land containing them should be declared mineral land, and that such lands should be open to location as other placer mining ground and, furthermore, should be excepted from railroad grants the same as other mineral lands.

Your representatives further secured a request from the Transmississippi Congress that the Federal mining laws should be so amended as to include within the list of minerals embraced within such laws petroleum and other mineral oils, all hydrocarbons, slates, building stones and other minerals.

Your representatives are unable to present with this report a complete list of the minerals included in the above reference, owing to the loss of the original copy of the resolution introduced in that behalf by Delegate Keyes of California. The official proceedings of the Congress, however, which will soon be published, will contain complete copies of all the foregoing resolutions.

In conclusion, your representatives beg leave to say that the thanks of the California Miners' Association are due to the entire California delegation to the Transmississippi Congress, consisting of twenty-six members, for their unanimous and ardent support of the matters urged by your representatives.

Respectfully submitted,

W. S. KEYES, per T. L. F.
DAN T. COLE.
TIREY L. FORD.

Delegates from the California Miners' Association to the Transmississippi Congress at its session held at Salt Lake City, Utah, July 14, 15, 16 and 17, 1897.

The New Labor Law.

In response to sundry requests herewith is published the new labor law passed at the last session of the California Legislature:

SECTION 1. Every corporation doing business in this State shall pay, at least once a month, each and every employe employed by such corporation, in transacting or carrying on its business, or in the performance of labor for it, the wages earned by such employe during the preceding month: *Provided, however*, that if at the time of payment any employe shall be absent, or not engaged in his usual employment, he shall be entitled to said payment at any time thereafter upon demand.

SEC. 2. A violation of any of the provisions of Section 1 of this Act shall entitle each of the said employes to a lien on all the property of said corporation for the amount of their wages, which lien shall take preference over all other liens, except duly recorded mortgages or deeds of trust; and in any action to recover the amount of such wages, or to enforce said lien, the plaintiff shall be entitled to a reasonable attorney's fee, to be fixed by the court, and which shall form part of the judgment in said action, and shall also be entitled to an attachment against said property. An unrecorded deed shall be no defense to such actions.

SEC. 3. That on the trial of any action against such corporation for a violation of the provisions of this Act, such corporations shall not be allowed to set up any defense for a failure to pay monthly any employe engaged in transacting or carrying on its business the wages earned by such employe during the preceding month, other than the fact that such wages were not earned, except a valid assignment of such wages, a set-off or counter claim against the same, or the absence of such employe from his usual employment at the time of the payment of the wages so earned by him.

SEC. 4. No assignment of future wages, payable monthly under the provisions of this Act, shall be made to the corporation from which such wages are or may become due, to any person, on behalf of such corporation, for the purpose of evading the provisions of this act, and all such assignments are hereby declared to be invalid.

SEC. 5. No corporation shall require, and no employe of such corporation shall make, any agreement to accept wages at longer periods than as provided in this Act as a condition of employment.

SEC. 6. All wages earned by any employe engaged in the service of any corporation in this State shall be paid in lawful moneys of the United States, or in checks negotiable at face value on demand.

SEC. 7. Any corporation violating any of the provisions of this Act shall be subject to a fine not exceeding one hundred dollars, or less than fifty dollars, for each violation, the same to be imposed by any court in this State having jurisdiction of offenses in which the penalty does not exceed a fine of one hundred dollars; said fine to be paid, by the judge or magistrate before whom a recovery may be had under the provisions of this Act, into the general fund of the treasury of the county in which said conviction may be had.

SEC. 8. This Act shall take effect and be in force from and after the first day of April, eighteen hundred and ninety-seven.

Approved March 29, 1897.

On July 2, 1897, the Superior Court of Mendocino county sustained the constitutionality of the above.

Report of the De Lamar, Idaho, Mining Co.

The following data is given as to the cost of mining and milling at the De Lamar mine, in Idaho, in the annual report made by Mr. Dwight B. Huntley to the company. The total cost was $11.14 per ton, but in this must be taken into account the fact that at the mine wood is $9 per cord, mining timber 18 cents per foot, lagging (5 feet long) 9½ cents each, and freight hauled fifty miles by wagon and pack animals.

Mr. Huntley assumed charge in October, '96. The report is for the year ending March 31st, '97.

The following are results of milling operations:

Mill in service (40-stamp basis)	290 days 4 hours.
Wet tons crushed	44,948 tons.
Dry tons crushed	40,453 tons.
Assay value of ore:—Gold, 0.7035 ozs. @ $20 = $14.07	
Silver, 7.8615 ozs. @ 65c = 5.11	
	$19.18.
Percentage saved according to assay	72.16%.
" " " bullion returns	71.35%.
Number of ounces pure gold produced	18,557.906 ozs.
" " " silver "	276,026.28 ozs.
Total value of gold and silver	£117,035 19s 2d.

Of shipping ores sent direct to the smelters there were produced 115.553 tons, yielding $43,101.57, or $373 per ton, of the value of £9104 18s 10d. The total product of the mine was thus £126,140 18s, obtained at a cost of £92,629 5s 1d. The cost per ton of obtaining the above results, including development work and all expenses, was $11.14, as compared with $11.64 the preceding year. Included in the foregoing is the cost of obtaining the shipping ore, viz., $23,757.59, or 59 cents per ton on the total production. The average price obtained for silver was 65.85 cents, compared with 66.53 cents the previous year. The ores treated have yielded 18,558 ounces gold and 276,026 ounces silver; of the total value recovered the gold represents 67.75 per cent and the silver 32.25 per cent, against 63.61 and 36.39 per cent last year. The mill ran during the year on a 40-stamp basis 290 days 4 hours, and the ore crushed per stamp per day was 3.48 dry tons. The production of shipping ore was 115 tons, averaging $373 per ton, compared with 193.807 tons, averaging $468.31 per ton, last year. As has been frequently pointed out would be the case, the supplies of this ore obtainable in the present known ground have been on a steadily diminishing scale. In the early part of the year a strike occurred among the miners and laborers for higher wages, which was granted after a stoppage for about five weeks. In February last wages were again reduced to the old terms, as regards miners. The additional cost to the company in wages alone, while the advance lasted, was about $13,000, besides the labor incurred in effecting necessary mine repairs when working was resumed. Mr. Huntley discusses fully the question of milling ore reserves, which he estimates at 9350 tons first-class and 101,500 tons second-class ore. Progress has been made with the Pelatan-Clerici installation. The large oblong tank first erected having failed, the General Gold Extracting Company was allowed to erect small circular tanks, which on a ten-ton scale have proved quite successful, and are now being completed to a capacity of fifty tons as originally proposed. The costs in connection with the failure of the oblong tank are being borne by the General Gold Extracting Company out of accruing royalties. The board are daily expecting advice of the completion of the whole plant. [This plant was completed June 1st, '97.—ED. M. & S. P.]

Mr. Huntley continues: The De Lamar mines have contained large, rich and continuous ore bodies, extending from near the surface to about the tenth level; then a barren zone has been encountered, although the veins continue of good size and seemingly identical in general characteristics with those parts nearer the surface. This condition is not an uncommon occurrence at other mines. That the ore in a vein does not occur in one body is the rule rather than the exception in most mines. Hence I believe it reasonable to expect that we shall find other ore bodies with deeper development. I cannot see into the earth, and, with present knowledge, will not prophesy either of large, new ore bodies or of barren areas beyond the present workings. But I believe it good mining policy to continue prospecting in your claims for considerable distances, both in depth and laterally, from the present openings which have yielded so largely.

Shipping Ore Reserves.—The known bodies of shipping ore in the parts of the mine known as the "silver stopes" are exhausted; still, we may expect to find from time to time bunches of this ore which will more than pay the expense of the few men now employed in this department.

MILLING DEPARTMENT—TABLE OF RESULTS FOR THE YEAR.

Number of wet tons crushed	44,948.23 tons.
" dry " "	40,453.41 tons.
Average assay value of ore milled:—	
Gold, 0.7035 ozs. @ $20 = $14.07	
Silver, 7.8615 ozs @ 65c = 5.11	
	$19.18.
Percentage saved according to assay	72.16%
" " " bullion returns	71.35%
Number of Dore bars produced	164 bars.
" ozs. pure gold produced as per bullion returns	18,557.906 ozs.
" ozs. pure silver produced as per bullion returns	276,026.28 ozs.
Value of the gold (realized at $20.67 per oz.)	$382,284.70
" silver (realized at $0.6585 per oz.)	181,770 39
Add for residues, etc., realized	5,364.13
	$569,419.22

This includes the ore worked by the Pelatan-Clerici process and the bullion obtained therefrom.

Mill was in operation during the year (40-stamp basis)	290 days 4 hours.
(Time lost during the strike, 42 days)	
Ore crushed per stamp per day	3.48 dry tons.

COST OF OPERATION.

The average mining cost, for the year, including its proportion of departmental charges and incidental expense, the costs in the prospecting department, and all mine labor and supply expense, has amounted to	$ 5.30	per dry ton.
A further sum of	0.59	" " "
must be added to the above as the cost of mining and marketing shipping ore.		
The average milling cost for the year, including its proportion of departmental charges, etc., labor, supplies, repairs, and all other mill expense has amounted to	4.49	" " "
The cost of extraneous expenses, etc., the large items of which are:—		
Taxes	$3,500	
Insurance	5,000	
F. Haggerty—Compromise of suit for damages by man injured in mine	2,500	
Annual assessment work on claims	1,000	
has amounted to	0.76	" " "
Total cost	$11.14	" " "

This is a reduction of $0.50 per ton on last year, and had it not been for the strike a very much larger decrease in cost would be shown.

SUMMARY.

	Dry Tons.	Gross Product.
Shipping ore department	115.553	$ 43,101.57
Milling department	40,453.410	569,419.22
Miscellaneous revenue	.....	3,205.05
Grand total	40,568.963	$615,725.84
Yield per dry ton		$15.17
Cost " " "		11 14
Average profit per dry ton		$ 4.03

Milling Ore Reserves.—In a report, November 20th, 1896, upon the condition of the property, I gave a full statement of the workings and the ore reserves of the several veins. That report is so recent it is not necessary to repeat its details here. I estimate the following as approximately the tonnage of the reserves on March 31st, 1897:

	1st Class Tons.	2nd Class Tons.
Wilson and Hamilton veins	3,600	15,000
77-foot vein	5,500	79,000
Other veins	250	1,500
2nd class ore dumps (estimated value at $9 per ton)	....	6,000
Totals	9,350	101,500

The first-class ore is that valued above $14 per ton; the second-class ore is that valued between $14 and $4, and will probably average $5 per ton. These are wet tons, and contain about 10 per cent moisture. For the above values gold is counted at $20 and silver at 65 cents per ounce. As considerable of the second-class ore will assay $6 to $9 per ton, with occasional bunches of even high grade, a part of the second-class ore can be counted at a higher average value than before stated. But the tonnage of that part would be only a small proportion (possibly ⅓, ¼, or ⅕) of the total amount. It is not possible at the present time to give the second-class values and tonnage more closely than as above. In my opinion, with the present local conditions and processes the lower grades of the second-class ores cannot now be profitably worked. But it has been the experience of most Western mining camps that if large bodies of ore exist—even though low grade—somehow, after a time of idleness or of experiment, the prices and processes become adjusted to the ore, and a small profit is realized. This will probably be true also at De Lamar. To sum up, the present conditions show that the milling department has worked the first-class ore faster than the prospecting department has developed it.

Tailings.—The company also own 50,000 to 70,000 tons of tailings, assaying $5 to $7.50 per ton, which are stored in a reservoir about two miles below the mill. These can be reworked at a profit, but neither the process nor the means of transportation have yet been decided upon.

ANALYSIS OF COSTS PER TON OF ORE TREATED IN THE MILL FOR THE YEAR ENDING MARCH 31, 1897.

Labor.	Amount.	Per Ton, Dry. Cents.
Superintendence and foremen	$10,056.25	24.86
Crushermen	3,440.01	08.51
Batterymen	3,930.80	09.72
Tankmen	7,774.55	19.22
Panmen	5,253.00	12.98
Pan helpers	4,614.74	11.41
Repairmen	2,231.85	05.52
Retortmen	1,348.00	03.33
Engineers	2,835.00	07.01
Firemen	1,955.27	04.83
Machinists	3,571.43	08.83
Blacksmiths	1,330.00	03.29
Watchmen	3,886.06	09 56
Carpenters	3,396.37	08.39
General labor	2,840.37	07.02
Wood and teams	2,455.90	06.07
Oiler and iron scraper	799.20	01.97
Assayer, proportion	1,839.50	04.05
Storekeeper, "	1,527.25	03.78
Office expenses, "	2,123.96	05.25
Incidental expenses, "	613.53	01.51
Total, as per revenue account	$67,603.04	$1.67.11

Supplies.	Amount.	Per Ton, Dry. Cents.
Chemicals	$ 8,109.67	20.05
Lubricants	452.16	01.12
Illuminants	299.28	00.74
Fittings	148.62	00.35
Castings	9,805.94	24.24
Iron and steel	125 60	00.31
Lumber	808.32	01.99
Coal and Charcoal	1,559.19	03.85
Belting	505 93	01.25
Quicksilver	29,030 34	71.76
Salt	4,912.50	12.14
Fuel	39,930.68	98.71
Bolts and nuts	92.88	00.23
Tools	145.56	00.36
Pipe	59.72	00.15
Sundries	3.773.78	09.33
Assay office supplies, proportion	955.85	02.36
Stable supplies, "	1.501.14	03.72
Office and incidentals, "	672 93	01 66
Freight and expressage, "	9,525.00	23.54
Stationery and printing, "	196 63	00.48
Telegrams and postages, "	633 42	01.57
Legal expenses, "	927.08	02.30
Total, as per revenue account	$114,167.22	$2 82 21
Insurance, proportion	4.380.00	10 83
Extraneous expenses, "	6,594.36	16.30
Freight and charges on bullion, "	7,272.85	17.98
Total	$132,414.43	$3.27.32
Labor		$1.67.11
Supplies		2.82.21
Total mill cost, as per revenue account		$4.49.42
Sundries		0.45.09
Total cost per ton		$4.94.41

Ingenious Signal Bell Arrangement.

TO THE EDITOR:—At the Magalia drift mine, Butte county, considerable difficulty was experienced in making the underground signal bell work successfully. This bell consisted of the ordinary steel triangle, operated by a bell cord or iron wire running through the tortuous gangways of the mine, and worked satisfactorily for about a thousand feet. As the distance increased and the curves became more numerous, the friction made it difficult to give the proper signals.

Recently an 8-inch electro-mechanical gong was put in and works very satisfactorily. The gong strikes one for each contact and will give 300 or 400

blows before it is necessary to rewind it. The metallic circuit is complete, about 2600 feet long, and made of No. 12 Habershaw rubber-covered wire. As the mine is very wet, particular attention was paid to the insulation. The ordinary porcelain knobs, attached to the timbers by screws, are used for insulators.

At present a battery consisting of four Hercules cells is amply sufficient and is arranged in a dry place near the underground hoist. An ordinary push button, placed in a waterproof case near the face of the mine, closes the circuit. A. D. Y.

Magalia, Cal., July 25, '97.

Treatment of Low-Grade Ores by Concentration.

The above is the title of a paper read by E. B. Kirby of Denver, Colo., at the recent meeting of the International Gold Mining Convention in that city. The following is a condensation of the article:

It is well understood that most ores of the precious metals are composed of rock with mineral crystals distributed through it. Those minerals present in any particular ore may comprise one of several out of a large list. As a matter of fact, there are four which are so common and prevail so universally in mining districts that few mills have to deal with any others. These minerals named in order of frequency with which they occur are pyrite (iron sulphide), blende (zinc sulphide), galena (lead sulphide), and chalcopyrite (copper and iron sulphide). Each of these minerals may contain both gold and silver, but pyrite and chalcopyrite are the common carriers of gold, while galena and blende have a special affinity for silver. It is also well known that in unoxidized or sulphide ores the gold and silver contents are not distributed uniformly through the mass, but are generally confined to these mineral crystals. By crushing the ore and separating out the valuable crystals from the waste material or gangue its value is concentrated into their small bulk. This will bear the expense of shipping and smelting, or of treatment by the more expensive processes.

Concentration milling is, therefore, the most important of all processes applied to low-grade gold and silver ores. It is of the same fundamental importance here as in the field of simple lead, copper and zinc ores. It is of more general application than any other process, and by one simple treatment, performed at the mine, it gets rid of the mass of valueless gangue. The cost ranges from 20 cents to $1.50 per ton, according to the capacity of the mill and the system employed. It is, therefore, the cheapest of all processes, with the single exception of free gold stamp amalgamation, which costs from 35 cents to $1.25 per ton and produces a product in the form of bullion which requires no further treatment. The more expensive processes of pan amalgamation, barrel chlorination, cyanide and smelting entail an expense per ton of ore which greatly exceeds that of concentration. The latter will always maintain its superiority in cheapness, and also in its range of application. The other processes find their special field in the treatment of concentrates, or of high-grade ore, or of ores which are of exceptional character, and do not yield their values to the simple operation of concentration, or free milling. The gold ores of Mercur, or of Cripple Creek, or the quartzite ores of the Black Hills, together with the oxidized lead and heavy sulphide ores of various districts, are illustrations of the latter class.

Before mining men it is unnecessary to dwell upon the extent of our resources in low-grade ores of gold and silver. All realize the opportunities they present for the future application of capital. The majority of these ores can be utilized only by concentration milling. As costs lower and extraction improves they will be gradually brought into use. But the extreme economies in mining and milling can only be secured by operating with modern skill upon a very large scale, and this requires a large capital. Hence, these resources are not waiting for the invention of some new and magic process. The process is already at hand. According to the skill and capital with which it is applied, it can now be made to yield almost any results within reason.

The more recent processes like barrel chlorination and cyanide, together with their various modifications, have developed so rapidly within a few years that they have attracted great attention. Much has been written and published about them, and the mining world is already well informed upon the latest methods, results and costs of each one. Concentration, although of more importance and more widely applied, has not progressed in such a startling way. The general mining public have, therefore, had less information upon its present development.

In crushing ore for the process, it must be broken fine enough to free the mineral crystals from the gangue. For most ores the size necessary for this purpose is quite small, so that the crushing unavoidably produces a large percentage of flour or slime. Moreover, this slime generally contains the richest minerals present in the ore, because these are more soft and pliable than the quartz. Slime requires the most elaborate and expensive machinery for its treatment. It has to be handled more slowly and is subject to heavier losses than grains of larger size. The problem always presented, therefore, is how to crush so as to liberate all the mineral, but at the same time to avoid a large slime production.

These objects are secured by making use of one or both of the two following methods:

1. The ore is subjected to an operation of part-crushing, which is repeated several times. After each operation the grains which are small enough are sifted out.

2. The ore is crushed to a size somewhat larger than that necessary to liberate all the included material, and the oversized grains are then subjected to a rough concentration on jigs. This takes out the liberated mineral and thus promptly withdraws most of the values from the danger of further crushing. The impoverished grains are then crushed again to the proper size and concentrated.

Each of these methods calls for a more complicated and expensive crushing plant. How far their advantages outweigh the cheapness and simplicity of crushing to the final size in a single operation, is always a question for calculation and experienced judgment. In general it is to be noted that American mills differ from those of Europe in showing a marked preference for the more simple plan.

The grains of the crushed mass range in size from the crushing limit of, say, one-quarter inch diameter down to microscopic flour. They possess two properties, and only two, upon which it is possible to operate. These properties are size and specific gravity. It is, therefore, necessary to operate first on one and then on the other. Strictly speaking, it is impossible to effect any separation by acting upon both at the same time. For instance, a grain of pyrites is heavier than quartz, if the two grains are of the same size, and it will therefore fall more quickly in water. But it is not heavier than a very large quartz grain, and, if two such unequal grains fall together, the quartz will fall more rapidly.

Hence, in order to make a separation, it is always necessary to perform two distinct operations in succession upon the crushed grains. The order adopted is not an essential matter, and concentration is therefore effected either by sizing and then sorting, or, on the other hand, by first sorting and then sizing. According to one plan, the grains are first divided into a number of different sizes. Each size is then subjected to the sorting effect of a fall in winter, which separates all the quick falling mineral grains from the slow falling rock. By the reverse method the grains are first sorted into a number of classes, each of which includes those grains which fall in water at the same velocity. It takes a large grain of the light quartz to fall at the same speed as a small grain of the heavy pyrites; so that in each equal falling class the quartz grains are all of larger size than the pyrites grains. The subsequent operation of sizing, performed on each class, separates the large grains from the small ones and completes the concentration.

These well known principles are simple enough and the two operations required do not seem difficult. Nevertheless, there is a great variety in the machinery and apparatus for performing each one. In practice the work of a concentrating mill is rarely confined to these two simple operations. It is complicated in various ways. If one operation is not done well, those which follow it suffer. Imperfect work, therefore, often makes it necessary to repeat the series. There is a large class of grains in which the crushing has failed to break the mineral from the rock. The grain, therefore, has an intermediate specific gravity and does not find its proper place. Other grains have peculiar shapes, which alter their rate of fall in water. Such middling products must be provided for and require special treatment. Most ores are more difficult than the simple case of quartz and pyrites. The differences in specific gravity are slight, or it may be necessary to separate several minerals not only from the gangue, but also from each other.

For the operation of sizing grains, screens are naturally employed whenever it is possible to use them. In practice screens do not work well on grains smaller than coarse sand. Inclined plane sizing machines are, therefore, used for all fine material.

Machines of this class have an inclined plane over which a very thin sheet or film of water is made to flow. This sheet of water is only one-twentieth of an inch thick and moves most rapidly at its upper surface. At the bottom, where it is in contact with the inclined plane, the water flows more slowly on account of friction. When grains of different size are treated the large grains, resting on the inclined plane, reach into the quick-moving part of the stream and are rolled down the slope. The small grains lying in the slow-moving region, close to the bottom, roll more slowly or not at all. The small grains which thus remain upon the inclined surface are either allowed to accumulate, as in hand or intermittent buddles of all kinds, or they are removed automatically by various methods. In one class of machines percussion or jerking movements are applied to the table. They cause the deposited grains to crawl out of the way and thus discharge themselves. In revolving buddle and belt machines the surface itself moves slowly from under the depositing current and thus carries its deposit to the discharging point.

All these appliances, when used according to the scientific principles of concentration, are sizing machines, and the grains which deposit upon them do so because of their smaller size, and not because of their greater specific gravity. In order to secure good results from them it is, therefore, necessary to treat only grains which are equal in falling and in which the mineral grains are consequently all smaller than those of the rock. It follows that they cannot do good work, unless the preliminary sorting has been well done.

The second fundamental operation of sorting is performed either by hydraulic classifiers or by jigs. There are two leading varieties of hydraulic classifiers. Those of one kind sort by allowing the grains to fall in a deep on-flowing stream of water. This deposits the quick-falling grains near its head and carries the slow-settling grains further on. Each class of grains is, therefore, deposited at a different point. Another type of classifiers subjects the grains to a series of rising currents of different velocity. Each of these is adjusted so that grains of a certain falling speed will sink through it while the others are carried on.

The jig, though a simple machine, is remarkably efficient; and, unlike classifiers, it does its work very perfectly. It is most remarkable for the fact that, like a jack knife, it can be applied to a variety of uses. It will either sort or size, according to the way it is used. Moreover, it can be made to do good sorting on grains which vary greatly in size. The complex laws of jig action have been the subject of elaborate scientific investigations which are not within the province of the limits of this paper. The greatest American improvements in concentration, however, are based upon certain methods of utilizing jigs. It is, therefore, necessary to refer briefly to the main features of their action.

Mining men are familiar enough with the machine itself, which, in its present form, is very simple. Two to four flat stationary sieves, arranged in a row, are partly submerged in a box or tank of water. The stream which conveys the grains to be jigged is led upon the first sieve of the series and flows along the row to the point of discharge. By means of large pistons applied to the water in the box, it is caused to pulsate or rise up and down in rapid succession through the apertures of the sieves. At each pulsation the entire mass of grains resting upon the sieve is suddenly lifted up a short distance by the water, and is then allowed to fall back upon the sieve. The more rapid falling grains gain a little upon the others during each fall, and finally reach the bottom of the mass. Grains too large to pass the sieve accumulate upon it and are discharged by simple devices. Small grains which pass through the sieve fall into the body or "hutch" of the jig and are drawn off below as "hutchwork." The slow-falling grains accumulate at the top of the mass and are carried off by the on-flowing stream. For some purposes it is necessary to have the water sink down again after each lift. The fast-falling grains are thus drawn down more rapidly by its quick suction. For other work this down suction is injurious. The machine is then so arranged that it will merely give a series of sharp lifts, after each of which the water either falls back slowly or remains stationary.

The jig is applied to three classes of work:

1. It is used to sort grains of the same size, and in this case each jig is fed with one of the sizes produced by the screening apparatus. When such equal sized grains are jigged the quick falling mineral grains promptly descend to the bottom of the mass.

2. It is used to size the grains of an equal falling class which are delivered to it from a hydraulic classifier. In order to accomplish this work each sieve is provided with a permanent bed or layer composed of large grains of heavy mineral. The interstices between these large grains have much the same effect as a sieve. The small or mineral grains descend through them against the rising currents and finally pass into the hutch.

In the German system of concentration the use of jigs is restricted to the two aforesaid operations. There is, however, a third way of using jigs known as the English method of jigging. This is because it was most extensively practiced in the mining districts of Great Britain, and attracted attention because of the remarkable results of the old-fashioned hand jig. American practice has taken up and improved this method of jigging and made it the basis for one of the most efficient modern systems of concentration.

In this method the jig is not fed with grains which have been previously either sized or sorted. On the contrary, it treats the entire mass of material just as it comes from the crushing machinery, and includes grains of all sizes and all specific gravities. A heavy bed of coarse grains is kept upon each sieve and the water pulsations are arranged so as to give a downward suction after each lift. It is found that those grains which are too large to penetrate the interstices of the bed are near enough to the same size to separate very well upon it. The sands and slimes

which do enter the interstices are subjected to peculiar laws of fall and of suction which prevail in such restricted channels. The result is that the mineral grains of greatest specific gravity pass through into the hutch, while the others are driven back and carried off in the tailings. The action of currents in these interstitial spaces has a very singular effect. They lessen the influence which differences in grain size usually have upon their falling speed. In consequence it becomes possible to thus operate at once upon the specific gravity of grains which differ very greatly in size. The very finest slime, however, cannot be concentrated in this way, and must be separated and treated by the usual methods.

The hutchwork concentrates which have been made with such an apparent disregard of size are not very clean, and require another treatment in order to yield a pure product. This is done by the simple plan of repeating the same operation with some slight differences in its details. The impure hutchwork from the roughing jigs is delivered continuously to finishing jigs placed at a lower level. These complete the work and produce clean concentrates.

But one class of machinery remains for consideration, and this is important, because it has found its chief use in the stamp mills of the West. It is, therefore, the basis for what might be termed the stamp mill system of concentration. This class includes vanners, bumping tables, and shaking and jerking tables, of many designs. They are intended to treat only finely crushed material like sand and slime. They do excellent work on assorted grains. Moreover, they do not perform a single fundamental operation, like sizing or sorting. On the contrary, each machine performs two operations in succession, one of which might be termed "settling," while the other is an imperfect zig-zag, generally called "washing." Machines of this class maintain a flat shallow stream of water, which flows down an inclined surface. This stream is not a thin sheet or film, as in the zig-zag machine previously described, but it is from one-half to three-fourths of an inch thick. The crushed material is generally treated as it comes from the stamps and without any preliminary sorting. As the grains settle out of the stream, they are prevented from packing and are kept in a semi-fluid condition by shaking, bumping or jerking movements imparted to the inclined surface. The effect is rather complicated. The quick-falling grains, whether large or small, tend to work to the bottom of the mass, while the small grains tend to sift down through the interstices of the larger ones.

There is no clear or definite separation, but as a final result most of the mineral grains sink beneath the top layer and accumulate near the bottom. This enriched bottom layer is gradually drawn out from under the settling stream. This is effected either by the gradual travel of the surface or belt, as it vanners, or by the crawling action of the grains themselves, caused by the bumps or jerks. The concentrates thus produced by this "settling" operation are impure and have to be cleansed by "washing." This is done on the same machine just before discharge, generally by a thin sheet of water applied in jets. The precise effect of this "washing" varies with the movement and the surface used, and is too complex for analysis here. In most cases it is a quick and imperfect sizing. Although each of the aforesaid operations is imperfect in itself, the two in succession effect a very satisfactory concentration upon fine crushed and unsorted grains.

When machines of this class are fed with equal falling grains produced by a hydraulic classifier, they then become very efficient sizing machines and the concentration is greatly improved. When acting upon sorted grains the settling operation causes the small grains to work through and under the large ones. The final quick washing by a thin sheet of water upon the inclined plane of the machine is, of course, a sizing action, and in this case it is not complicated by the presence of unsorted grains. Vanners, which are the best known of these machines, have found an extensive use for treating sorted grains in complete concentrating mills.

Gold and silver stamp mills operate upon ore which either contains free gold or silver in forms which will yield to the process of amalgamation with mercury. But very few ores found at the present time are strictly free milling, and as a rule part of the values are contained in sulphide crystals. It is, therefore, generally necessary to supplement amalgamation by the concentration process.

Amalgamation requires very fine crushing, and therefore furnishes material very difficult to concentrate. Moreover, there are many stamp mills which are designed solely for concentration, in which this fine crushing has been adopted because the minerals are finely disseminated through the ore. When such fine material is to be concentrated the standard German system for treating sands and slimes, if properly designed, will generally secure the best extraction. At Western mills, however, simplicity of plant is a very important matter. The general preference is, therefore, for machines of the class just described which have the advantage of giving good working results on unsorted or poorly sorted material.

In many cases this desire for simplicity has been carried too far. These machines save more and have greater capacity when they are fed with properly sorted grains. To introduce hydraulic classifiers in a mill causes some complications, particularly when the mill has not been built for their use. The plant also requires more attention and skill. There are few cases, however, when the increased saving will not more than offset these disadvantages. When hydraulic classifiers are adopted, it then becomes a question whether the standard German sizing machines are not best for these sorted grains. Here opinions differ. Rittinger percussion tables, belt percussion tables and revolving buddles now become rivals of the Western vanners, bumping and shaking tables. It may be well to observe that upon most sorted grains both classes of machines do good work. In treating the very finest slime, however, the inclined plane sizing machines, when properly adjusted, appear to have the advantage.

In reviewing the standard machinery and operations of the process, the Missouri and the stamp mill systems have been described. The other two are now easily understood.

The German system is the one most generally used, even in this country. In this system all large grains are first carefully sized by screens. Each of the many sizes is then sorted on a jig. The smaller grains, from sand-size down, are, on the contrary, treated by reversing these operations. They are first sorted by hydraulic classifiers, and each class is then treated in a sizing machine designed for it. Those classes which include the large sands are put through jigs, which are operated as to size, instead of sorting the grains. The fine sand and slime classes are treated upon the standard inclined plane sizing machines, such as Rittinger percussion tables, continuous belt percussion tables and revolving buddles.

The German system requires a complicated plant, which has a comparatively small tonnage for the money invested. The cost per ton is also great, but against these faults it presents the advantage of effecting a closer saving than other systems. It is also preferred for difficult work; when the differences in specific gravity are slight, or when several minerals have to be separated, not only from the gangue, but also from each other.

The Lake superior system was evolved to treat great quantities of ore with a more simple plant. The ore is crushed by steam plants, each head having a capacity of 300 tons daily. The grains, both large and small, are at once sorted into equal falling classes by hydraulic classifiers. Without entering into the peculiar details of Lake Superior jigging, it is sufficient to say that each class of large grains is put through a jig, whose principal function is sizing. This action is complicated somewhat on account of the fact that the preliminary sorting is not very perfect. The concentrates discharged from the hutches of these first jigs are not all pure. Some of the hutchwork is therefore treated again upon finishing jigs set at a lower level. The fine slime and sand classes are sized on revolving buddles, as in the German system. In some mills the hutchwork from the roughing jigs is sorted by hydraulic classifiers before it goes to the finishing jigs.

The mill of the Calumet and Hecla mine has a capacity of 6000 tons of ore per day, and the cost is under 20 cents per ton. This system has also supplanted the German at the copper-silver mines of the Anaconda Company in Montana and also at the Butte reduction works. The Anaconda concentrating plant has a capacity of 6000 to 7000 tons daily.

This system, together with that used in the Missouri lead and zinc regions, is specially adapted to ores which concentrate easily and do not require fine crushing. Constant improvements are being made in their efficiency, and on suitable ores they may yet rival the German system in close savings. It is impossible to discuss the numerous technical points, which determine the question of choice, but it is well to call attention to the fact that the Missouri system is specially adapted to many gold and silver ores of the West. It is, therefore, sure to find a more extended use in this field. A plant of the most simple description applied to suitable ores will give satisfactory results. Through the Missouri mining districts numerous cheap but money-making mills may be seen, which include only a crushing plant and two to four jigs.

Irrespective of the system used, there is a radical distinction between American and European mills in the fact that the latter are intended to save all that is possible out of an ore. There is plenty of capital for elaborate and expensive plants, which will accomplish this purpose, and they are not run at the high pressure which prevails here. American mills are built for a different purpose. In our mining regions capital is scarce, while there is a superabundance of ore. The problem presented is always how to make money most rapidly out of the limited amount of capital which happens to be at hand for mill building. In general, it is most profitable to handle a large tonnage at the sacrifice of close savings, and mills are therefore arranged for this purpose. Even when designed to extract a high percentage of values, it is afterwards generally found best to crowd the machinery beyond its normal capacity, at the sacrifice of its efficiency.

Generally speaking, therefore, the tailings losses of well-designed American mills do not result from any lack of knowledge or skill. The principal losses occur in two ways: In the mineral crystals which remain included in the coarse grains and in the imperfect concentration of the fine sand and slimes. The first loss can only be remedied by re-crushing and re-concentrating the coarse jig tailings. The second loss may be prevented by the use of more elaborate machinery for treating the fine material. Each remedy calls for more capital, and, when this is available, it is generally found better to use it for increasing the entire mill capacity, instead of perfecting these details.

In conclusion, it may be said that the selection of the best system for any particular ore, and the question of how elaborate and perfect the mill shall be, are matters which call for careful judgment. Any error here results in a failure to secure the best paying mill for the money invested. Moreover, in no process is it so necessary to fit the mill to the ore. No two ores break alike, or require the same outfit of machinery in each department of the mill. The selection and arrangement of machines and apparatus, the percentage which will be saved and technical details too numerous to mention all depend on the special character of the ore. In modern mill designs all these metallurgical questions are settled before building, and both the results and the cost of a mill may be known as accurately beforehand as in the case of any ordinary factory.

Temescal Tin Deposits.

In the July number of the *American Journal of Science* H. W. Fairbanks has two papers, the first describing a striking case of contact metamorphism on Black mountain, of the El Paso range, a spur of the Sierra Nevada mountains, extending easterly into the Mojave desert. This is illustrated by a figure showing the diabase dike, with a slaty zone adjoining, of hard, firm rock, into which the soft tufa has been baked. The second paper describes the tin deposits at Temescal, southern California. The tin deposits here lie nearly in the center of a rudely semi-circular area of granite about two miles in diameter and connected on the east with the great body of similar rock extending indefinitely in that direction. The sedimentary rocks along the edge of the granite area consist of quartzite, mica schist and conglomerate of unknown age. A part, at least, of the slates and limestones of the Santa Ana range are Carboniferous. The semi-circular area of granite and portions of the adjoining porphyry has been fissured in a general northeast and southwest direction along almost innumerable lines, and a black vein matter deposited. The veins are generally small, varying from one-fourth to a few inches in thickness, but in the case of the main tin-bearing vein an enormous size is reached at Cajalco Hill. As the hill is approached the veins become larger and finally culminate in this elevation, which is about 300x250 feet in diameter at the base. The veinstone of which it is mostly composed rises in prominent and bold croppings. With one or two unimportant exceptions, the material of which this, as well as the other veins, is formed consists wholly of tourmaline and quartz, with which the tin ores are locally associated. The larger veins, and the Cajalco in particular, are very irregular in size, sometimes appearing to be mere bunches in the granite. A few hundred feet northeast of the hill the vein has narrowed to 6 or 8 feet, and it is here that the large body of tin was first discovered and the main shafts sunk. A slide prepared from one of the smaller veins, which in the hand specimen appeared to consist wholly of tourmaline, showed bunches of tourmaline crystals radially arranged and imbedded in interlocking quartz grains.

In "Further Contributions to the Geology of the Sierra Nevada," by H. W. Turner (17th Ann. Rept. U. S. G. S., 1896, 521–1076), Table mountain, near Oroville, Butte county, Cal., is illustrated in an excellent plate. The deep, steep-sided canyons that have been cut into the uplifted mass of the range often have benches on their slopes, caused by landslides. These, with the falls in the streams and the inaccessible character of the canyons, may be taken as features of a youthful stage of geographical development. Associated with them as indications of recent uplift are occasional fault scarps, still steep and bare, one of these being shown in a plate. Of a little greater age are the fault-block lake basins, now drained by filling with sediments and cutting down at the outlet, Meadow valley, Nevada county, being of this class. Mohawk valley, first holding a Pliocene lake in a fault basin, was afterwards obstructed in Pleistocene time by fragmental andesite flows. Much of the volcanic material, once broadly spread over the Sierra area and now greatly dissected since its regional uplift, is shown to be fragmental, coarse and fine, less or more stratified. It is compared in origin to the mud flows of modern volcanoes. The flows came from the crest of the range and ran for fifty miles on the comparatively gentle slope of the then low-lying region. The "hog-wallow" mounds on the valley plain and margin of the foothills are also described and illustrated.

Electrical Progress.

Electricity in Mining.

The comparatively recent developments in the manipulation of alternating current electricity have, in broadening the whole field of electrical application, extended the use of the current also in the mining industry and given to the mine operator a system extremely efficient and flexible both in its distribution and adaptation. The alternating current possesses one great advantage, among others, which no other system presents, in the ease with which the voltage may be varied. This is done by means of transformers, and allows the electricity to be transmitted at a high voltage, and, consequently, cheaply over long distances, to be transformed down at the point of utilization. It also allows of the use of motors which, equally effective in their performance with direct current motors, are free from commutators and moving contacts, and consequently from sparking, as well as from other shortcomings.

To the mine operator the alternating current system, or rather a modification of it, known as the three-phase system, offers special advantages. Mines many miles apart may be operated by current generated at a single central point, situated where it can be procured and distributed most economically. The electricity, transmitted at a suitable high voltage, on reaching the mine mouth, is reduced in pressure and the wires taken down the shafts carry a low voltage current only. It can then be used not only to drive the mine machinery, but also to light the arc and incandescent lamps on branches from the same main circuits at even a lower voltage than that used for the machines. In case continuous current is required in lieu of alternating, as for the operation of mine locomotives, the alternating current can be converted into continuous in a rotary converter, and the voltage of the latter current regulated to the necessary pitch for the new use. Furthermore, although three wires are used with the three-phase system and two with the direct, the cost of the three wires is one-quarter less than that of the two wires, allowing the same loss in transmission and using the same initial voltage.

The development of electric mining machinery to be operated on the three-phase system has been carried forward vigorously by the General Electric Company, and, convinced of the advantages of the system, while recognizing the need of propaganda, it equipped a large freight car as a central three-phase station with boiler, engine, alternator and station equipment complete. This was held ready for installation at the mouth of the mine of any operator desirous of investigating the economy and efficiency of the system. The installation made, station and mine apparatus were left with the operator. He was then placed in a position to watch both generating and operating machinery and judge for himself. This car was never long out of requisition. To the cutting of coal by machinery the three-phase system seems peculiarly suited. The chain coal cutter illustrated shows the latest type—a stationary frame and traveling carriage carrying the motor, driving gear, feed gearing and cutting chain. The motor is an induction motor laid on its side. It has neither commutator brushes nor moving contacts, and as it cannot spark can be used in gaseous or dusty mines where a spark might result in a costly disaster. The windings of the motor are stationary coils embedded in metal and protected from injury, and as these coils are separately formed and insulated they may be readily removed and replaced. The motor is entirely enclosed and, no starting box being necessary, complete control is given by a simple enclosed switch. The motor stops work the moment it is overloaded, and the machine is thus subjected neither to strain nor breakage. The shaft of the motor is vertical and runs at a low speed, allowing the chain sprocket wheel to be driven by a single reduction spur gear, thus avoiding on the main drive both worm and bevel gears. The feed gearing is driven by a worm at the lower end of the armature shaft. The backward thrust of the feed gearing is taken by a single rack, so located as to compensate largely for the side thrust of the chain as it cuts the coal. Into this rack mesh two pinions, one for the forward and one for the backward motion of the carriage. The reverse lever at the back of the machine throws clutches in or out of these gears, and is so arranged to throw automatically when the end of the cutter travel is reached. A characteristic feature of this cutter is the small amount of gearing employed and the reduced number of wearing parts.

The chain is arranged to take three shapes of bits, each form cutting grooves about 1½ inches deep, separated from the next groove by a ridge of coal which is broken down by the links. The cut is about 4 inches high by 36 inches wide, and the bits, made in the form of an arc of a circle, can be set out as required. This gives a great advantage in sharpening, as no part of the bit except the cutting edge needs redressing, and all of the steel may be used up. The chain is built to stand the strain and the vibration of the cutter. The bit links are of a tough phosphor-bronze and the strap links are steel drop forgings of such shape as to bring all the strain directly upon the solid forgings and not on the rivets.

In rooms where the proper clearance can be obtained, this coal cutter can be shifted or moved from the first position ready for the second cut in an average of two minutes, it being understood that the props are away from the face, the floor reasonably smooth and the face of the coal properly squared. The time of loading and moving the cutter from room to room will average about fifteen minutes, provided the rooms are adjacent. The time required for setting the bits will average ten minutes. The cutter has in favorable coal, where other conditions were rather unfavorable—such as roof, props, track, etc.—been able to average eight cuts or runs each 36 inches wide per hour, or at the rate of 240 lineal feet per ten-hour shift. The conditions can scarcely be so unfavorable that it will not always be able to average at least four runs per hour.

An approximate idea of the number of machines required for any particular mine can be obtained from the following formula, which gives the tonnage output:

$$\frac{(\text{Number of ft. face per 10 hr. shift}) \times (\text{depth undercut}) \times (\text{height coal})}{27 \text{ cu. ft.}} = \text{Number of tons run of mine coal.}$$

To reduce this to lump coal, the percentage of fine coal that passes through the screens from pick-mining is ascertained. The percentage of lump from the machine will then be 25% greater than when produced by pick or hand

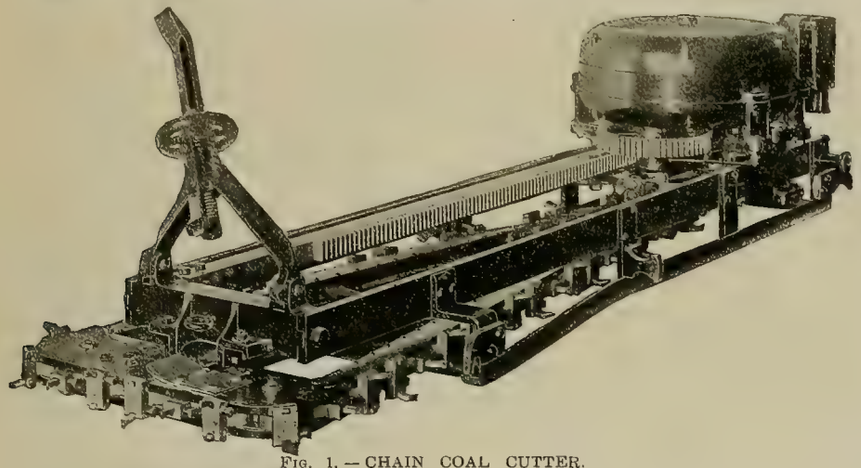


Fig. 1.—CHAIN COAL CUTTER.

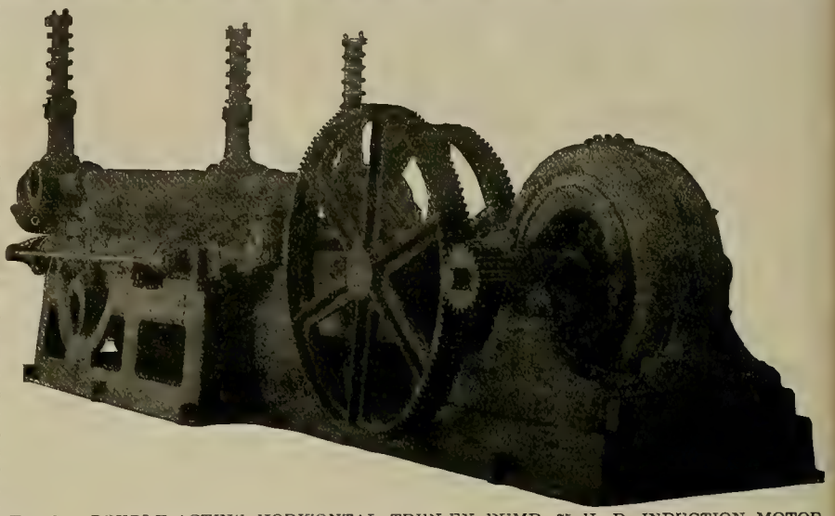


Fig. 3.—DOUBLE-ACTING HORIZONTAL TRIPLEX PUMP, 75 H. P. INDUCTION MOTOR.

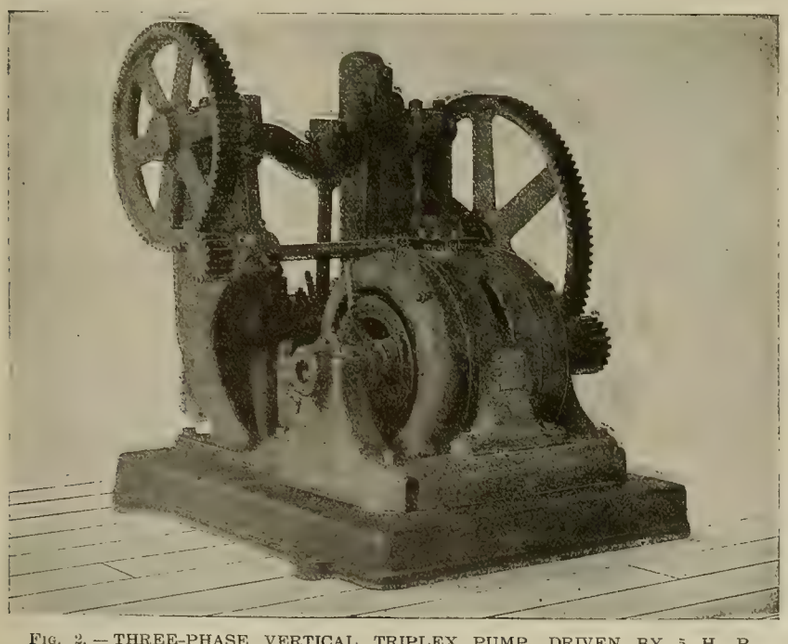


Fig. 2.—THREE-PHASE VERTICAL TRIPLEX PUMP, DRIVEN BY 5 H. P. INDUCTION MOTOR.

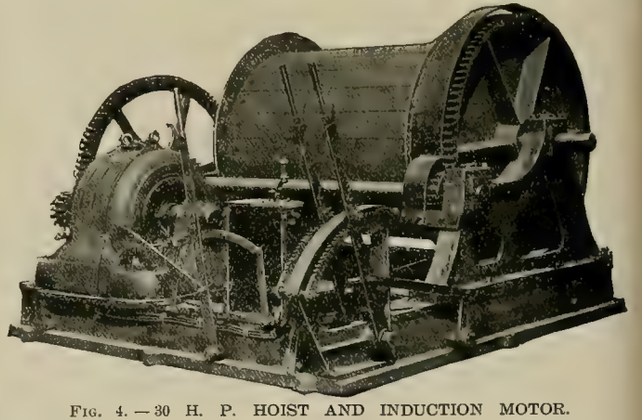


Fig. 4.—30 H. P. HOIST AND INDUCTION MOTOR.

abor. The amount of powder to shoot or break down the coal is also largely decreased. Any coal that would require ordinarily an 18-in. cartridge to break down, will require when the same coal is properly undercut with the machines, an 8-in. cartridge for the same or a greater amount of coal.

Accompanying the cutter is the electric mining pump, which presents the great advantage of portability, which renders the electric pump superior for mine work. With an electric pump the pump-shaft is free from all machinery. It contains only the conductors and discharge pipes. Indeed, the three-compartment shaft so common in mines, one for pumping and the other for hoisting, can by the use of the electric pump be reduced to two, as the discharge pipes and wires which occupy so little space can be placed in one of the hoisting compartments. Furthermore, the three-phase pump requires no attention beyond an occasional oiling, and needs no attendant to start or stop it. It can be operated by a switch from the engineer's office at the mine mouth.

There are different types of electric mine pumps, but the three-phase pump presents features of excellence similar to those noted in the coal cutter. Our illustration shows a Knowles 4 in. by 6 in. vertical triplex pump, with a capacity of sixty gallons a minute against 300-foot head. It is driven by a sparkless induction motor of 5 H. P. capacity mounted on the same bedplate as the pump and driving it through a double reduction. The weight of the motor and pump complete is about 2480 lbs. Another type of of three-phase pump is shown in Fig. 3. This is a Knowles 7½ in. by 12 in. double-acting horizontal triplex pump, having a capacity of 600 gallons a minute against a head of 200 feet. The motor is also of the sparkless induction type, but of 75 H. P. capacity and the outside dimensions of the combination of motor and pump are 9 feet high 6 inches wide and 25 feet 6 inches deep. This mine pump is now in use in Mexico.

This description of three-phase mining machinery would be incomplete without an illustration showing the application of the induction motor to the hoist. Fig. 4 is rated at 3300 pounds at 200 feet per minute. The drum is 4 feet in diameter and 5 feet between flanges. It is fitted with friction clutch and usual hand brake and is stopped, started and reversed by a cylindrical switch or controller. The lever at the left of the controller is connected to the resistance switch by a cam, and is used for short-circuiting the resistance in the armature as the motor comes up to speed. The motor is a standard General Electric 30 H. P. motor, with the denomination of 8–30–900.

Generally speaking the use of electric mining machinery reduces materially the amount of deadwork, and, in the case of the cutter, reduces the amount of haulage. These two factors alone result in a decreased cost of mining, and although it is difficult to state the extent of the saving, the practical operator will be able without effort to realize the benefit derivable from the use of electric mining machinery. Beyond those already mentioned the following may be enumerated: Ventilating fans may be placed in any part of the mine and be driven by motors; partitions can be lighted by incandescent lamps; the coal can be hauled by electric locomotives and all with no greater encumbrance in the mine workings than some small wires strung on porcelain conductors out of sight, almost on the roofs.

Cost of Power for Trolley Cars.

The annual report of the Railroad Commissioners of New York and Massachusetts contains a table for nearly all of the street railway properties that shows the cost of the electric power required to run a car one mile under average conditions of load, etc. The table gives the number of cars owned, the car mileage per year and the cost of the electric power per car mile and per passenger. Of the nineteen companies operating less than 250,000 car miles, four are obtaining power at a cost of less than two cents per car mile, six between two and three cents, five between three and four cents, one between four and five cents, and three at more than five cents; of the five companies operating over 5,000,000 car miles per year one obtains the power for less than one cent per car mile, three between two and one cents, and one between two and three cents; other similar figures are also given between these limits. The Brooklyn Heights Company has the cheapest power, 0.86 per car mile, followed by the Binghampton with 0.94: the cost of power for the Massachusetts roads includes repairs and depreciation of the station plant, which is not the case for the New York roads.

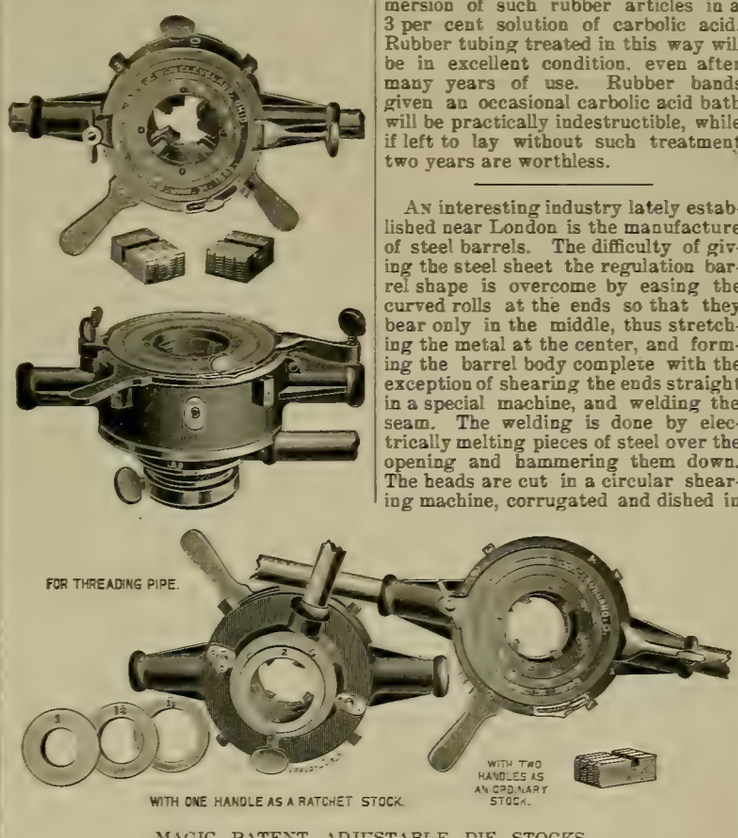
Mechanical Progress.

Adjustable Die Stocks.

The Magic patent die stocks, herewith illustrated, combine several mechanical principles in a way that will commend them to the machinist.

They are claimed to be lighter and stronger than some other makes.

Each tool is warranted to stand the hardest usage required of a threading tool. The dies are made of tool steel,



MAGIC PATENT ADJUSTABLE DIE STOCKS.

are quick opening and can be instantly released from the work without running back over the finished threads. The patent gauge enables the operator to cut any number of threads of the same size with one adjustment; also enables any inexperienced person to make exact duplicates. The dies and guides are self-centering and adjustable to variations in fittings without hammer, wrench, screw driver or other tools. One set of guides adjusts for all sizes the tool will thread, thus insuring in every case, whether over or under size, a perfect center of the work to the dies, and makes it possible to produce a perfectly straight thread. The stocks can be fitted with dies of special threads, or with brass and bolt dies. There are no loose bushings with the stocks which cannot be found when required. The cut-off is practical, combining two tools in one. The cut-off blade can be quickly removed and sharpened on a grindstone. The manufacturers say theirs admits of "the quickest and simplest method of putting the dies in the stock, without lifting covers or contending with other devices which consume time. Put the dies in the slots as far as they will go, and you are ready for work." Long-continued use does not affect their reliability and ease for operating.

Parke & Lacy Co., 21 and 23 Fremont street, San Francisco, are the sole agents for this coast.

THE importance of leaks in a steam plant is brought out with distinctness by the following: A square inch of area will discharge one-seventieth of a pound of steam per second for each pound absolute of pressure. Suppose a station to have 125 pounds guage, 140 pounds absolute pressure, then a square inch of area would discharge two pounds of steam per second or 7,200 pounds an hour, which at the standard rate of thirty pounds per hour per H. P. is 240 H. P. How many leaks does it take to aggregate a square inch? In a small station the unsuspected leaks assume a large proportion of the steam produced.

ONE of the greatest objections to the use of rubber is its quality of crumbling or breaking after it has been used for a while. Many methods of preventing the breaking of rubber articles have been suggested, but the most reliable seems to be the least complicated, i. e., the occasional immersion of such rubber articles in a 3 per cent solution of carbolic acid. Rubber tubing treated in this way will be in excellent condition, even after many years of use. Rubber bands given an occasional carbolic acid bath will be practically indestructible, while if left to lay without such treatment two years are worthless.

AN interesting industry lately established near London is the manufacture of steel barrels. The difficulty of giving the steel sheet the regulation barrel shape is overcome by easing the curved rolls at the ends so that they bear only in the middle, thus stretching the metal at the center, and forming the barrel body complete with the exception of shearing the ends straight in a special machine, and welding the seam. The welding is done by electrically melting pieces of steel over the opening and hammering them down. The heads are cut in a circular shearing machine, corrugated and dished in a 400-ton hydraulic press, and secured in place by a ring of metal, which is welded to both the end of the barrel and to the head. The bung bosses are also welded on. The welding by the Bernados process requires no skilled labor, and but moderate power is needed to supply the current.

AT the conference of the Institution of Civil Engineers in London lately, in the course of a discussion it was strongly brought out that nickel steel is the coming material for shipbuilding, provided its cost can be made satisfactory. For this, it was said that new deposits of nickel must be discovered and the cost of its metallurgy must be reduced.

A NEW fireproof building brick will shortly be placed upon the market. The block is composed of pulverized stone, marble, coal cinder or sawdust mixed with magnesia and two secret chemicals. The composition in liquid form is poured into moulds of the desired size and the "setting" follows by chemical process, no baking being required.

Scientific Progress.

A Greenwich Transit.

At the Greenwich Observatory the transit circle consists of a large telescope, the outside of which is not unlike a great cannon, being of solid iron, and is supported by trunnions which allow the telescope to be elevated or depressed, to point north or south, and to make a complete revolution, but never to diverge from the north and south line. Its field of view is large, admitting a great amount of light, thus fulfilling its purpose, viz., that of noting the exact time at which stars and planets pass south and north of Greenwich. Upon looking through this telescope is noted what seems to be a vertical row of iron bars at equal distances from each other—they are, however, spiders' webs, the center one, passing through the focus of the object glass, being the meridian line. By observing the time, therefore, at which the "clock stars" pass over these web lines, or "wires," as they are called, is sidereal time regulated.

A REMARKABLE PATENT has just been granted by the German Patent Office. It is for making rubies. M. Gin, the patentee, has discovered that by volatilizing alumina in an electric furnace in conjunction with certain coloring substances the vapors, upon cooling, become rubies of any desired size and indistinguishable from the natural ruby. The artificial ruby has the composition, form, color and hardness of the natural ruby. It is well known that by passing a suitable and sufficient current of electricity through carbon, enclosed in an iron rod, very small diamonds have been made. They are not of commercial value on account of their smallness and of the difficulty of recovering them from their matrix. M. Gin's success with volatilized alumina suggests great possibilities in the artificial production of diamonds and other gems. In this connection it is interesting to learn that the British Patent Office has allowed a patent for making gold, and that in the United States Patent Office is pending an application for a similar patent.

FLUORINE has been at last liquefied. It becomes liquid at —185° C., is clear yellow and possesses great mobility. At this low temperature silicon, carbon, sulphur, phosphorus and reduced iron previously cooled in liquid oxygen and then placed in an atmosphere of fluorine, do not become incandescent, and the iodine of potassium iodide is not displaced by fluorine. Benzene and turpentine are, however, decomposed with incandescence when the temperature rises to —180° C., showing the great affinity of fluorine for hydrogen. Note is made of the fact that when fluorine is passed through liquid oxygen a white flocculent precipitate is formed, which, when filtered off, deflagrates with great violence as soon as the temperature rises. It would seem to be a compound of fluorine and oxygen, and is being further investigated.

ACCORDING to Prof. Dewar, when the earth freezes and all forms of life disappear, there will float above the present ocean of water, long since changed to ice, an ocean of liquid air 33 feet deep on the average.

AMONG the animals which surpass man in the ratio of brain weight to body weight are the following: Among the Rodentia squirrels and mice, among the Primates many old and new world monkeys.

THE extreme degree of external atmospheric heat which can be endured for any time has never been determined, but as high as 400° to 600° F. was endured by Chabert on experiment.

It is said that the patterns on the finger tips are not only unchangeable through life, but the chance of the finger prints of two persons being alike is less than one chance in sixty-four billions.

Mining Summary.

CALIFORNIA.

Alpine.

For the first time in twenty years, writes our Alpine county correspondent, Alpine county is moving in mine development. Mr. Packard, representing the Michigan company that has taken hold of the Leviathan copper mine at Monitor, will put men to work on the mine.

Amador.

C. D. Canon, part owner of the Daisy mine at Pine Grove, and Andreas Bros. have bonded that mine, through C. H. Wilson, to a Denver syndicate headed by C. H. Wolcott, for $30,000 for one year, payable in monthly installments. The company will thoroughly develop the property.

W. Craib has the Krueger & Vaughn mine bonded, and is virtually the owner of it. This mine is known as the two first south extensions of the Amador Queen No. 1, which extensions were worked in 1852 by an arrastra. Three years later, 1855, the output, which ran $7 to $8 per ton, was milled, but at that early period before improved methods were introduced such rock would not pay, and the work, except so much as was necessary in order to secure a patent on the claim, was given up. He is cleaning out the old abandoned shaft, which was put down in 1854, preparatory to sinking deeper. In doing this he will go down from 150 to 160 feet.

The *Record* says the new 40-stamp mill at the Argonaut is going up and the company expects to have the stamps dropping some time in September. The runs from ore crushed at the Zeile mill have proved dividend-paying. The Amelia, formerly the Muldoon mine, is sinking; a new hoist is being built and other improvements of a permanent nature.

The Jackson *Dispatch* reports the Monte Cristo mine is being worked by Mr. Dillon. At first it was intended to run the mill with water power, but the water failing, steam was resorted to, which has delayed the start.

It is the intention of the men having the Muldoon mine bonded to sink the shaft 1000 feet and then drive a drift north and a crosscut to the east. They are going down on the ledge, and the shaft will be put down the desired depth as rapidly as possible. The easterly crosscut will be the width of the ledge. A steam hoist is now being put up over the shaft.

Supt. McLaughlin of the Iron Mass says that the shaft has been put down 48 feet since the 3d of July. Sinking goes on.

The Zeila Chlorination Works have started up again, and now the whole plant of the mine is in operation. The Zeila is one of the institutions of that county, and it makes a material difference in the prosperity of the community whether it is at work or idle.

Butte.

Frick & Pratt of Chicago have bought all the machinery of the Palo Alto mine, including the batteries, Burleigh drills, etc., and will remove the same to Granite Basin and rebuild the mill on the Robinson mine.

At Enterprise J. Carlisle is now putting five more stamps in his quartz mill and will then have ten at work. He will have about twenty-five men in a short time. The Denver mill is still idle. The Red Point mine is still being worked. Mr. Champion was up from San Francisco a few days ago. If he does not sell the mine he will put in a 25-stamp mill. A new tunnel is being run on the Pactolian mine near Hurleton. Twelve men are employed at the Crystal Peak mine. The rock is paying well.

Register: There was delivered last Monday an engine for the Banner mine, capacity 250-horse power, weighing over eleven tons. Mr. Evans, the superintendent, is placing this for sinking 2000 feet.

The *Mercury* gives a list of Butte county mines and their yield for 1896. The names of the mines are left out. The term "county mines" means gold sent to other counties from Butte: Bangor, $15,000, 1400, 4000; Bidwell's Bar, $1000; Berdan's, $11,000.25, 75, 17,800, 1700, 900, 500, 600, 300, 400, 3500; Berry Creek, $20, 20, 125, 128, 50, 500, 100; Brush Creek, $3000, 500; Butte Meadows, $200; Cherokee, $1100, 75,000, 3000, 500; Chaparral, $9000; Clipper Mills, $400, 300, 400, 250, 5000, 1000; Concow, $75, 5000; Coutolenc, $10,000, 3000; Enterprise, $1950.68, 500, 600, 1200, 3850.90; Forest Ranch, $1500; Henry, $45,000, 2000, 600; Hurleton, $12,000, 1468, 15,000; Inskip, $1800; John Adams, $4460, 11,245.40; Lumpkin, $600, 3000; Lovelock, $260, 500, 1200, 2481.29; Magalia, $71,405.73, 5000, 10,000; Mooretown, $200; Merrimac, $3000, 500; Nimshew, $10,032, 2525.65, 3000; Oroville, $40,000, 35,000, 135,000, 10,000; Palermo, $600; Powelliton, $850, 199 50. 2000, 500; West Branch, $600, 450, 300, 750; Wyandotte, $200, 175, 400; Yankee Jims, $250, 100, 230, 1000, 2000; county mines, $148,679. Total, $744,316.

Calaveras.

The poles and wires of the California Exploration Company's electric line are in position as far as the Kentucky House, a distance of seventeen miles from the plant on the Mokelumne river. Mokelumne Hill and San Andreas have been wired for lighting purposes, and the company expects to have everything in active operation by August 1st.

Chronicle: At San Andreas the Stevens mine was recently bonded to P. L. Schumann, the owner of the Paragon group of mines at West Point. The water has been pumped out of the old shaft, which was 100 feet deep, and sinking continued for 25 feet farther, when the ore was tested. The test went $20 per ton. The shaft will be sunk 300 feet deeper as soon as the machinery can be hauled to the mine.

Flattering reports come from the Golden Hill mine, one of the California Exploration Company's properties, situated about two and a half miles west of this town. At a depth of 240 feet in the shaft the vein is 7 feet wide, and a sample of the ore in a recent test went $140 per ton.

The Fellowcraft mine near San Andreas, owned by Provard, Lewis and others of Oakland, was bonded about a year ago to some Eastern parties. The bond expired and the mine has reverted to the original owners, who are now reopening the property.

Preparations are being made to sink a shaft 500 feet deep on the J. R. mine at Old Gulch. A tunnel will then be driven from O'Neill's creek to tap the ledge at a depth of 350 feet. Grading for an 8-stamp mill was completed last week and the machinery is now being hauled to the mine. Good milling ore is being taken out from what appears to be a "blow out" from the main ledge. The property is owned by a stock company, of which Ballard of the Rawhide mine in Tuolumne county, Dyer of San Francisco, Budd, Thompson and McDougald of Stockton are the principal stockholders.

Kern.

The Rand group employs thirty men. The Garlock mill is crushing ore therefrom. The Wedge and Kinyon mines are still milling good ore.

A coal mine four miles northwest from Garlock, with a vein about 18 inches thick, has been sold for $15,000.

Randsburg *Miner*: There are ten tons of coal on the dump at the coal mine, the vein is growing thicker and the coal better as depth is attained.

The last fifty-six tons of Kinyon ore milled produced $8445.21, and the tailings, which assayed $19 per ton, were sold for $600, making a total of $9045.21. G. B. Kinyon & Sons shipped out thirty-eight and one-half pounds of gold bullion last Sunday as the result of a recent run. This makes the product of the mine $15,000 for the month.

The Little Butte No. 1 shaft is now down about 280 feet and the ore averages clear across the ledge, at the foot of the shaft, a little more than $43 per ton.

Los Angeles.

In the northern part of Los Angeles county there is a good gold section. The Red Rover mine, near Acton, has the deepest shaft in the county, work having been extended to about 600 feet. A 10-stamp mill is running rock.

Mariposa.

(Special Correspondence).—It is announced that the Merced Co. will abandon the Malvina mine on August 1st, and the work of stripping the lower levels of everything movable has already begun. This mine has been considered the best of the Cook properties, and a large amount has been expended on it in exploration work with indifferent results. The development includes a three-compartment shaft 1000 feet deep, crosscutting the ledge at the 200, 400, 600, 900 and 1000 levels, with more or less drifting on all but the latter level. A winze also extends to the 600 level, and a tunnel 3000 feet long connects the workings with the mill. A great deal of stoping has been done from the 600 level up, large quantities of the broken ore still lying where it fell. The shafthouse of iron is the largest in the State and the engine one of the finest. While the vein, which has ranged from 3 to 20 feet in width, carries streaks of rich rock, it has thus far not been possible to mill it at a profit, one month's run under Capt. Couch running as low as $1.65 per ton, according to published reports. The closing of this mine, following closely that of the Louisa, leaves only the Mary Harrison mine in commission. Some exploration work is to be done on the Dahlia, adjoining the Mary Harrison, in the hope that a body of good ore may be uncovered. Though few people believe either the Malvina or Louisa has been thoroughly tested, it is not thought the present company will make any further attempts to develop them. The history of the company for the two and one-half years of its existence has been a remarkable one, and the gossip over its peculiarities of management has discredited every legitimate mining enterprise in Mariposa county until recently. The statement of one of the purchasing syndicate, made at the time to a San Francisco reporter, that "they would show the California people some things about mining," was not an empty boast.

Coulterville, July 27th, '97.

Nevada.

Fifty pounds of quartz taken from the Plumbago mine, above Moore's Flat, was pounded out in a hand mortar this week and yielded $5800.

Dana Harmon, superintendent of the California mine, God's country, has a tunnel which taps the ledge at a depth of about 800 feet and gives nearly 1000 feet of backs. One hundred tons of rock crushed averages from $10 to $15 per ton, some of the ore going as high as $45. A new 20-stamp mill will be erected, with provision for adding twenty more later on. It will be the deepest working ever done in that section.

Union: In the 500-foot level of the Reward a ledge is being stripped which averages 9 inches in thickness. There is a streak running fully 60 per cent sulphurets, and which will yield about $225 per ton. Superintendent Gribble has nearly 200 sacks of this ore sacked up, and will ship it to the smelter. On the 400 level, which is their drain tunnel, they had this same ore, so that in striking it in the 500 they are sure of 100 feet of backs.

Transcript: Ore recently taken from the Montana mine in Willow Valley district assayed $274.61 per ton. The work of sinking the shaft is going ahead.

Placer.

The Pioneer mine produced $14,156.08 in June; expenses $5,100, net earnings $9,056; 650 tons were crushed, average yield per ton $21.77; nine tons of sulphurets were saved, not included, which will mill from $85 to $90 per ton gross. The company has lately purchased 160 acres of timber land, paying $3.25 per acre.

Plumas.

The *National-Bulletin* reports that the water has been pumped out of the Thistle Shaft mine, but that the mouth of the tunnel is nearly filled with sand and timbers. It is estimated that two months' time will be required to put the mine in shape for active work. Men are being put on.

Sacramento.

The report from Folsom regarding the striking of a rich pocket in which thirty-one ounces of gold was taken out in one panful or less of dirt, is corrected by the statement that the gold weighed thirty-three ounces, and was taken out in Sacramento county, nine miles south of Folsom, at what was known in early days as Wall Town. It sold for $575; very good pay for a half day's work.

Shasta.

The new strike near the Gladstone mine, French Gulch, is described by the *Free Press* as lying 150 feet east of the Giant tunnel and 150 feet east of and parallel with the Bull ledge, upon which most of the work in the Gladstone has been done. A layer of black soil about a foot deep covers a layer of decomposed quartz and earth 3 feet in thickness and very rich. Underneath this lies the main ledge, which is 4 feet wide and well defined. Its course is east and west, and has been uncovered a distance of 75 feet along the surface, but neither end of it has yet been found. The top soil carries no value, but the decomposition material yields $15 per ton in gold. A tramway has been built along the side of the mountain, and the decomposed ledge matter will be carried to and worked in the mill. The new discovery will be prospected at various depths by running tunnels from the old workings, and, if the ledge carries sufficient values, it will be crosscut at a depth of 450 feet by a tunnel 250 feet in length. It is expected that the mill will be in operation by August 10th, at which date it is expected that there will be 300 tons of ore on the dump.

A. B. Paul, manager for Dr. W. H. Garlick, the Ohio capitalist, has ordered the employes of the Garlic electric plant at Bull's Bar, near Copley, to go to the site of the Brumfield dam on Spring creek and rebuild the dam, it having been recently destroyed by the employes of the Mountain Copper Company during a squabble over the water rights leased by the company from Garlick. The rebuilding of the dam will mean the resumption of operations at the power plant, and, consequently, at the Hart mill and mine in Old Diggings, which have been compelled to lie idle ever since the power plant was closed down, as they were entirely dependent upon that source for motive power.

The London Gold Tunnel Company, operating at Mule mountain, seven miles from Redding, claims to have cut through four well-defined fissure veins, all of which made a creditable showing, as most of the vein matter runs high in gold. The veins thus far encountered are from 4 feet in width and upward. The tunnel is now passing through a large ledge of gold-bearing quartz, which is said to be over 100 feet in width. This company is running a crosscut tunnel to cut the whole formation of Mule mountain upon which the mines are located.

The gasoline hoisting plant at the Evening Star mine, in Old Diggings, was placed in operation Thursday. The ledge is 2 feet in width and carries rich gold ore, which is being hauled on wagons to Redding and then shipped by rail to the smelter of the Mountain Copper Company at Keswick. Wm. M. Fitzhugh is the owner of the property. He proposes to sink the shaft to a depth of 300 feet.

Miner: The Mountain Copper Company have engineers surveying for a railroad to their Windy Camp properties. The company is now experimenting with a new furnace for roasting powdered ore. They have a great deal of this ore on hand, and if it proves successful they will erect a great many more. They are also hauling down about eight trains loaded with ore a day, which is more than they have ever brought here in the past. Last week the *Miner* noted that the Mountain Copper had fired up a third furnace, giving employment to about sixty more men. It ran just one week, when the company was compelled to close it down for want of men. This occurred Thursday night, but Friday morning a sufficient force was secured to start up again. Hardly a day passes that the company is not seeking help, and there is not an idle man in the camp, except from choice. Men who are willing to work, and will stay with the job, find no trouble securing employment in and about the smelter. There are no soft berths, however, but the pay is good and the employment steady, so there is no excuse for idle men in this vicinity.

Searchlight: The Niagara mine, of which R. E. Henley is superintendent, has undergone complete reorganization, and is starting up with good prospects, with about twelve men employed.

Sierra.

The Craycroft hydraulic cleanup for a short run this season was $11,519.60.

Siskiyou.

Reports from the Lower Klamath to the *Journal* state that that section of Siskiyou presents a lively appearance at present, owing to the large number of men who are employed in the mines in that section. The Minetta B. mine employs quite a force on Thompson creek, in operating the plant at that property, and the Klamath Flume and Mining Co. also have a number at work in their mill, and will employ many more during the summer and fall months, in completing their ditch and flume, and in getting their mine in shape for work. The new deal which has just been consummated, about twenty miles below Happy Camp, whereby a Chicago capitalist secured a large tract of mining ground, and which will be developed on an extensive scale, will also be the means of employing a good force.

The mines in the Salmon river country this season are producing well, and that section will no doubt contribute its usual amount of gold to the product of the county, which will probably reach over a $1,000,000 this year. While many of our miners are ready to rush off to Alaska, where prices are high and hardships of all kinds have to be endured, there are still large tracts of mining ground in Siskiyou county, which will yield handsomely if worked in a systematic and faithful manner.

The Distlehorst dredger is now at work at the lower end of W. D. Walker's place, Klamath river.

The Katie May mine on Greenhorn will soon be in shape to take out a large quantity of ore, which it is expected will be even richer than what has been taken out previously, and that was in the neighborhood of $100 a ton. The running of the tunnel which has occupied their time for a number of weeks will tap the ledge lower down.

There are still numerous good placer mining claims on the rivers in this county, as is shown by the successful operations of the claims on the Klamath. A great deal of ground that was worked in early days was gone over in such a superficial manner that it pays to work it again. Some of the old claims on the flats west of Yreka have been worked over several times.

Trinity.

The Altoona mine has finally been unwatered. Last April miners working in the lower tunnel struck water, which rose several hundred feet in the shaft. For nearly four months pumping machinery was kept working constantly, and the mine is now again in condition for work, which will be resumed at once. The property is one of the best quicksilver mines in the State.

The Brown Bear mine near Deadwood has 150 tons of sulphurets awaiting shipment to the Selby Refining Works. The large freighters who are busily engaged in hauling in the LaGrange piping are also employed to bring out the sulphurets, thus given an opportunity to realize on both trips.

Hall City, where the recent mining discovery was made, reports an assay representing 200 feet across the vein, with an average return of between $4 and $5 per ton. The ore is free milling and could, it is figured, be handled at $1 a ton.

Journal: The mine of J. A. Koons of Lower Trinity, will be fitted up with a hydraulic and all modern improvements and will be operated next winter.

It is reported that in taking up the sluice boxes in the Bussell mine preparatory to deepening the bedrock cut and the placing of new sluices, some $600 was obtained in amalgam, which had leaked out of the old sluices and was a loss to former proprietors, who had no idea of it being there.

Tuolumne.

The Providence mine, on the north fork of the Tuolumne river, fifteen miles from Sonora, has been bonded. The shaft is down 140 feet.

West and Richards have re-named the Easton mine as the Yellow Jacket. Drifting is being prosecuted north and south at the 200-level. The Sonora *Democrat* reports that the rock mills $30 per ton.

At the Grizzly a hoist is being placed over the new shaft, now down 400 feet, to the bottom of the old workings. From this point on operations will be in virgin ground. The vein, cased in by metallic slate, carries a width of from 3 to 10 feet. The mill clean up shows from $8 to $12 per ton of ore run through.

At the Tarantula the compartment shaft is down 170 feet. J. D. Redding is shortly expected at the mine, when arrangements will at once be completed for the erection of a steam hoist.

At the Black Oak the main shaft is near the 700-level, and three shifts sinking as rapidly as possible. Two new cyanide plants will shortly be added to the one already in operation, one of which will be on the agitation plan and the other leeching. This will give large cyanide works and insure a saving of 90 per cent. Another six drill air compressor is being put in and will be at work next week. The 200 tons of ore shipped monthly to Selby's for reduction give returns of from $88 to $100 per ton. The mine is looking better than ever before, and the ledge shows a strong and solid 12 feet of quartz from wall to wall.

The Arbona has just completed its new 10-stamp mill.

Superintendent Johns of the Continental is having the site for a 5-stamp mill graded out.

The Porto Fino, owned by William Sharwood, shows a vein of from 10 to 12 inches that mills from $25 to $50 per ton in free gold; the sulphurets give an average return of $150 per ton.

The Seminole group of mines, comprising ten locations, in the East Belt, will shortly be operated. The mine is being managed by Col. J. L. Coles.

Independent: The Mustang mine near Summersville has been bonded. A 10-stamp mill will be erected on the property within sixty days.

At the Trio improvements continue. The foundation for the big engine has been laid. The large air compressor will soon be placed in position.

G. Stayton is arranging to have the Badger mine near Rawhide reopened and work pushed.

At Arrastraville Cullers & Rozier crushed twenty-four tons of ore taken from the Little Beauty mine that showed up $1800.

At Tuttletown the mines continue to show up well and more men find employment. Part of the Churchill mine has been sold to the McGinn Bros. The mine will now be systematically developed.

Yuba.

G. W. Smethurst of Brown's Valley has finished crushing a trial lot of ore from his mine, "The 78," which yielded a return of about $50 per ton. The Webb mine is running

wenty stamps. On the Pennsylvania the water is out below the 600-foot level and work s rapidly progressing downward.

NEVADA.

The Dexter Mining Company has about concluded to put in a new mill at its mine at Tuscarora.

The White Pine *News* says F. Paul has shipped another carload of silver-lead ore from the Ontario mine to the Selby Works.

From Alum creek, ten miles from Hawthorne, is reported the discovery of a ledge assaying $16 to the ton. S. A. Knapp and J. W. Yerington, the principal owners are making a mill test to ascertain the importance of the find.

The sheriff has attached the property of the Gold Creek, Nev., Mining Company, including the sluice-boxes containing gold just ready to be cleaned up, to cover an indebtedness claimed of $3900 by Correy Bros. A bond was subsequently furnished and the attachment released.

Eureka *Sentinel*: Messrs. Carr and Rader, who represent heavy capital in Kentucky and Indiana, made an examination of several of our mines during their visit last week and found them to be all that had been represented. Their interest at present centers mainly in the Barton, Altoona, and the Oriental and Belmont Consolidated. They do not wish to undertake further developments alone, but desire the co-operation of the present owners. They will take the majority portion, however, of those mines, agreeing to put up hoisting works and necessary machinery, and will sink 500 feet on some one of the mines, running levels at every 100 feet, so as to prospect thoroughly. This is the most important part of the arrangement now being crystallized, and if all parties can agree work will be commenced within sixty days.

STOREY COUNTY.

The new strike in the Sierra Nevada mine shows a vein of ore assaying, $40 per ton in gold, has been found in east crosscut 5, started from the northeast drift at a point 444 feet north from the Layton tunnel. The crosscut is into the ore about 8 feet and samples gave the above assays. New discovery is regarded as important, not only because of its gold ore, but occurring in unexplored ground.

Carson *News*: The V. & T. is putting in a sidetrack to the old Nevada mill tailings. As soon as the the track is completed the work of hauling the tailings to the Empire cyanide plant will be commenced.

OREGON.

The Black Butte mine, the heaviest quartz mine in Grant county, has closed down for the season on account of the mill failing to work satisfactorily. The mill was hauled a hundred miles last year from Heppner over mountains at big expense.

The Virtue mine, near Baker City, is now producing $20,000 monthly.

Capt. Nash has bonded the Golden Standard mine in Galls Creek district, owned by H. D. Kubli and Hon. E. B. Watson, for $125,000. John Daggett of San Francisco and other California capitalists are interested in the bond.

Superintendent Meizer of the North Pole mine has brought to Baker City seventy-five pounds of gold, equal to $18,000. This is the heaviest cleanup of that mine thus far, and it was made in about three weeks' time, says a Baker City dispatch. The burning up of the boarding house hampered mining operations there somewhat. The gold bricks will be held for Alexander Baring's inspection. He is the London owner, and is expected here early next week.

The *Times* says there is renewed activity in mining in southern Oregon, due perhaps to the abundant water supply of the past season. The annual cleanup season holds surprises for the most sanguine owners, and all who own mining property in southern Oregon look upon it as decidedly more valuable then it was considered in past seasons. The result is a boom in mining locations, and numerous prospective sales of valuable properties.

Journal: W. S. James of Gold Hill, Nev., has bonded the Albany group of mines of eight claims, Mt. Reuben district, for $25,000 within one year from August 1st. Mr. James will do considerable development work.

The Horn-Silsby-Tucker mine, on the Illinois, is sold to Mrs. Wilder and S. F. Hayward for $20,000. The new owners will extend and enlarge the ditch.

WASHINGTON.

The Methow Mountain Mining Company, owning the Anchor group of claims on Squaw creek, has a letter from W. J. Moore, foreman of the works, with forty pounds samples from the tunnel being driven directly under the ledge, showing values in copper 6.5, 5.3 and 4.6 per cent to the ton.

The discoveries of ore in Washington capable of reduction by the cyanide process has caused the representatives of several different processes to send represensatives here to investigate, says the Spokane *Review*. One of these is Thomas Hart of Montana, who has returned from the reservation, where he went under instructions from Prof. J. E. Clennell, who is in charge of Charles Bros.' cyanide plant at Salt Lake City. "I believe the mines at Eureka will be a great success under the cyanide treatment of the ores," he says. "The rock is nearly pure silica. I brought out a ton of samples mostly from the workings of the Republic, for treatment by the Siemens-Halske process at Salt Lake, and the ore was shipped from here this morning."

BRITISH COLUMBIA.

The Pilot Bay smelter has been bought by the Omaha & Grant Smelter Company of Denver, Colo., and Omaha, Neb. Its capacity will be increased by two stacks, and the company will operate it as a custom smelter for treating Slocan and Rossland ores. The plant of the Pilot Bay smelter consists of two 80-ton stacks and a concentrator, with a capacity of from 300 to 500 tons per day. The concentrating machinery was brought from Butte, where it had served in the old Butte smelter. At one time 120 men were employed in the plant, but at the time it closed down only 65 men were working. The original company erected a brick building 60x120 feet, in which it was intended to place refining machinery, but the machinery was never installed. There are several fine residences on the smelter company's ground, which in all includes 140 acres on Pilot bay, about midway between the upper and lower ends of Kootenay lake and opposite the outlet. Considerable money was lost by the company that attempted to operate the smelter, owing to the low grade of the ore of the Blue Bell mine, which is about all it ever treated. On June 19th, '96, the smelter shut down, and since then not a wheel has turned.

(Special Correspondence).—Vancouver aldermen are very timid in considering the numerous smelter schemes laid before them. The statement is made that the promoters of some schemes advanced have been cold blooded bonus hunters whose aim is to secure valuable rights that they might sell them to the highest bidders in England or the United States. The last man who asked for a bonus was Mr. Symons, representing Rothschild and others in England. On being refused he said that his company meant business. They were going to build in September a smelter costing $600,000. There are half a dozen firms figuring on a smelter, but there is little hope of one being built this year.

The Boundary Falls mine will be worked all summer, high values being obtained, but the ore is getting harder and a mill will not be erected. When the railroad being promoted from Columbia river to Penticton goes through the company will be almost able to load ore on to the cars from their dump direct.

The Alpha Bell, adjoining the Golden Cache and containing the same ledge, has struck free milling rock with visible gold on this extension.

On the Surprise claim belonging to this company free milling rock of good quality has also been struck.

The last shipment from the Providence mine, Westminster district, on the edge of Harrison lake, close to Westminster City, yielded returns from the smelter which place the mine on a paying basis at once.

The stock of the Athabasca of Nelson has doubled in value of late owing to the excellent reports received. Eighteen men are working in on the property. Buildings have been erected to accommodate thirty men.

On the northern coast the Blue Bells mine is attracting attention. A shipment was recently made to the smelter which went well in gold and copper. This is good news for the Phillips Arm district where the mine is situated, as the ledge of the property is over 90 feet wide and there is an apparently huge body of ore in sight.

(Special Correspondence).—Rossland is improving in production. Five mines are making shipments—Le Roi, War Eagle, Center Star, Iron Mask and Kootenay & Columbia. This, together with recent transfers, tends towards a firmer feeling. There are plenty of paper companies whose treasury stock has not succeeded in placing their properties on a shipping basis, but their failure is not extraordinary, considering the surface indications.

In Nelson division there has been wonderful activity. The newly recorded locations of this one division amount to over 100 a week. There is a distinct advance in the matter of development and shipment. Heretofore the great and almost solitary mining feature of this division was the Hall mines and their smelter. Trial shipments are beginning to come in from the smaller properties, with fair results, and the common siliceous ores of this section are very acceptable to the local smelter, which is now refining its matte to a value of about 97 per cent copper and a total value of between $500 and $600 per ton. A train load of this product, consisting of 160 tons, went eastwards to England recently.

There is also an increased activity in Ainsworth, owing partially to the closing down of the neighboring Pilot Bay smelter last year.

The divisions of Nelson and Ainsworth adjoin that of Slocan. The mineral bearing country continues without much partiality over the borders of each division, and the rich silver finds of the Kokanee and the gold of the Alpine are on the boundary lines of these divisions along the summit between Kootenay and Slocan lakes.

Concerning the Slocan division, it may be said that there was a slight tendency towards booming it last winter and spring. Prices have been paid too high for legitimate mining. A good deal of property changed hands whilst under the snow. The properties bonded at high figures have in a few cases been dropped. This has left a bad impression with outside investors. The Slocan will continue its course as aforetime after this little adventure, packing out its richest ore in small lots and paving the way towards the time when wagon roads will become a necessity.

A great deal of interest is being taken in the Lardeau country, both from the east by way of Kootenay lake and Duncan river and by way of Arrow lakes and Trout lake from the west. This is a country of great ore bodies and will be a flourishing camp when transportation facilities are much improved. The chief agents of development in this section are the Horne-Payne Company, who are now developing the Broadview, Silver Cup, True Fissure, Old Sonoma and Sunshine, and constructing concentrators at the town of Ferguson, near the junction of the north and south forks of the Lardo.

In Cariboo creek section there is a fair amount of interest and some considerable amount of development going on. Prospectors are working through this range between Slocan and Arrow lakes, but without much result so far.

Several of the old-time Slocan prospectors have returned from Fort Steele and East Kootenay country, stating their preference for the more limited field at home. The ranks of the prospector are grown very large this season. The whole Province promises to be overrun by them; but so far no new fields of especial merit have come into view. However, the rainy weather has almost totally blocked prospecting for the past six weeks.

IDAHO.

G. W. Ruckman has men operating at the Ruckman mine, twenty-nine miles from Huntington, Or., with 7-inch pipe and a hydraulic giant No. 1. He has a current wheel of 12 feet diameter in the Snake river. There is a reservoir 650 feet from the river at an elevation of 100 feet.

Hailey *Times*: Messrs. Anderson and Wickham, chemists of the American Cyanide Company, are at the Camas No. 2 mine to make ready for the new machinery that is coming from California and from Denver. This consists mainly of new bottoms for the tanks and of assay furnaces. To put this machinery in place and to make other preparations will probably take thirty days. The works will continue in operation until freezing weather, as the cyanide solutions freeze at the same temperature as water.

UTAH.

Mercur *Mercury*: Actual work has been commenced on the grade for the Golden Gate mill and the fact has enthused the whole camp. Everything is bustle and activity, the population is increasing by jumps every day, and if there is an idle man in camp it is from choice and not necessity. The *Mercury* last week gave a list of the contracts awarded to that date for the great Golden Gate mill. Since then a number of other important awards have been made, among them one for electricity for motive power, lighting, etc., which goes to Nunn Bros. of the Telluride Transmission Company of Colorado. This company contracts to deliver 300 H. P. by December 1st, and 800 H. P. if desired by Capt. De Lamar. It is understood that the company, which is well heeled financially, will construct a large power plant at the mouth of Provo canyon, and bring in enough electricity over a steel wire or cable to supply not only the large quantity contracted for by Capt. De Lamar, but all the other mines and mills in the district as well, and to furnish light, heat and power for the town also. According to the contract the plant must be in operation by December 1st, otherwise the electric company is to forfeit a large cash deposit. The Messrs. Nunn left for the East at once upon the securing of the contract in order to arrange the preliminaries prior to the commencement of actual work. The contract for the excavation for the mill and the stone work has been let to Rhodes & Thompson, who are to have the site excavated and the masonry ready to support the steel structure in forty-five days from the letting of the contract, and they are to forfeit $250 per day for every day it takes them to do the work beyond that limit. Work was commenced on this contract Sunday, and over 100 men are now at work thereon. The contract for the extension of the railroad was also let to the same parties. The extension starts just this side of the divide and the terminus is at the millsite, above the east shaft. Work was commenced on the grading last Friday, and the branch is to be completed in twenty days from date. From sixty to seventy-five men and twenty teams are employed at present. The mill will be 300 feet wide and 390 feet long. It commences just above the east shaft and continues almost up to the first summit. It will be the biggest mill of the kind in the world, and its construction will alter the looks of all that part of the camp.

MONTANA.

Old-timers say Alder gulch produced $100-000,000 in gold. Virginia City, the old capital of Montana, was located there. It was discovered in 1863, and $30,000,000 in gold was taken out of the sand the first year the mines were worked. In 1866 the Archie McGregor Company secured $2,000,000 in ninety days off of Montana gulch. They bought all the beer kegs there were in the country, put the gold in the kegs, hired twenty men with Henry rifles, built Mackinaw boats and floated down the Missouri river. Last Chance gulch, where Helena is situated, for many years never failed to take out as much wealth as the entire Alaska country has so far taken.

The *Inter-Mountain* says the Gold Ring claim at Butte, adjoining the Mayflower on the northwest, has been leased and bonded to M. Wetzstein and Lee Eisenberg of Livingston for $150,000, of which it is said $2000 was paid down. It is supposed that the deal was made in the interest of W. A. G. Berkin and other English capitalists who recently took a lease and bond on the Sunrise and Celebration claims for $100,000.

The *Miner*, referring to the Blue Bird property, says it is rapidly being dismantled and everything of value that is portable is being carted away. The Boston & Montana Co. recently purchased the immense gallows frame and an agent of the concern has been busy for several months disposing of all machinery and loose material about the plant.

The Boston & Montana Co. has a force of about eighty men employed at the Anderson mine and some extensive drifting is being done along an ore body which was exposed before the bond and lease was secured.

At a depth of 1500 feet in the Bell shaft of the Anaconda mine, the miners are engaged in breaking down ore from a ledge of copper glance running as high as 75 per cent in copper and very high in gold. It is said that a great deal of this ore is sacked and shipped direct to the Eastern refineries.

SOUTH DAKOTA.

Rapid *Journal*: A rich pocket was struck in the bottom of the main shaft in the Keystone mine Friday, about 2 feet thick and the ore, it is claimed, was fully one-half gold.

COLORADO.

A stamp mill with 100 tons capacity is to be built in High Park, four miles from Cripple Creek, by a Chicago syndicate. B. I. Brooks will be in charge. There is supposed to be an immense amount of low-grade ore there.

The Consol company at Summitville has the machinery for the mills. The *Prospector* is told by Superintendent Kirby that it will take $100,000 to put the property in shape.

Republican: The expenditure of $1,000,000 in the construction of new railroads for the Cripple Creek district is in these days of general stagnation in railroad building a sign of the times that indicates the confidence the camp has won among capitalists. The Cripple Creek District Electric Railroad has placed its $500,000 bonds, which guarantee its completion, and the work of grading and track laying is already well under way. The girders are circling Gold hill from Poverty gulch at a rate that promises that cars will be run before the end of the year. A contract for a large section of the electric railway from Canyon City has been let, and those familiar with the business arrangements of the promoters say that the money necessary for its construction and equipment has been raised. In addition to these surface roads, the announcement by the projectors of the Pike's Peak mining and railway tunnel that they have raised a guarantee of $12,000,000 in London for their enterprise seems to indicate that the fame of Cripple Creek is sufficient to draw capital from its hiding.

The district in and around Georgetown and Silver Plume is showing up well in gold. In the celebrated Griffith mine, the workings of which are almost within the corporate limits of Georgetown, lessees are working on a vein of solid iron and copper pyrites 15 inches in thickness. A mill return of two carload lots of twenty-four tons each returned as follows: One carload returned 3¾ ounces gold, 58 ounces silver, 6½ per cent copper and 18 per cent lead to the ton; the other carload, which was taken from another portion of the vein, returned 2¾ ounces gold, 61 ounces silver, 7 per cent copper and 20 per cent lead to the ton. On the Georgetown tunnel level there is a large body of ore disclosed for several hundred feet, which runs well in gold. As depth is obtained on this famous property the gold values seem to increase. On the Hood, which is a continuation of the Griffith, a mill run was had that returned 8 9-10 ounces gold to the ton.

At Silverton Grabowsky, who purchased the Fisher mill, will have the necessary machinery to put the mill on a modern working basis and has men clearing out the flume and putting the buildings in repair. The old overshot wheel is to be supplanted by a turbine motor, which is expected to double the power and afford sufficient power should Cement creek get low in the fall. The mill is situated about two miles from Mr. Grabowsky's mines, but as it is a down hill pull the quartz can be delivered for $1 per ton. The Gold Tunnel & Railway people have ordered their plant of drilling machinery and ground is being excavated for the tunnel buildings. The Sampson has repaired the old Huson tramway and the management declares it to be as good as new. The boarding house and mill buildings, that during years of idleness had become very dilapidated, have been repaired and everything is ready for new machinery. A force of men has started a shaft in the lower level of the mine, and will push it down 100 feet. The ore taken out will be stored at the mill until it is ready to run. It is not known whether the mill will be started this season or not, as the company propose to spend their money first on development. The smelter, which has been shut down for repairs for the last two weeks, will blow in next Monday. During the interval many train loads of sulphide ore have arrived from Red mountain, and all the bins are choked with mineral.

NEW MEXICO.

The Mills Tunnel Company has incorporated in Santa Fe; T. B. Mills, Las Vegas; G. A. Rothgeb, Elizabethtown; D. B. Merry, Victor, Colorado; J. H. Thompson, Bucyrus, Ohio; O. B. Steen, Denver, Colorado; to do a general business in mining and milling ores and buying and selling mines and smelting, operating the same, etc.; capital stock, $1,000,000; principal office, Elizabethtown, Colfax county.

It has been definitely decided that an ore purchasing and sampling works will be established at Algodones, and the cash for this enterprise has been deposited. The capacity of the works is to be 100 tons a day, and the machinery and lumber for the same are to be on the ground within ten days, providing accommodations can be had from the railroad company. The sampling works will turn the line of travel and ore to Algodones, so that when a smelter is established the first 100 tons or so of ore can be supplied from the sampler.

New Mexican: Since the sale of the placers between Hillsboro and Kingston there has been a noticeable increase in the operations in that district. Prospectors are finding their way into the hills and are working with good results. The deposits in the Mimbres mountains are an immense fissure in a porphyry formation, the ores bearing gold, silver and copper, the greater part being free milling.

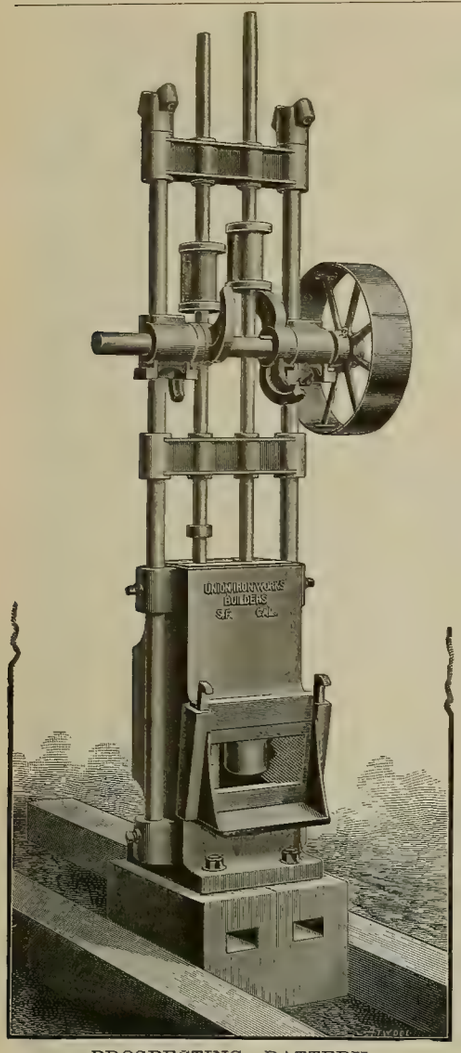
Near Grafton considerable development work has been done, the ores found in that vicinity being in a lime quartz and are free milling. The principal properties in this district are the Great Republic group, Emporia and Ivanhoe, all patented and having from 500 to 1000 feet of work done on each. The ores are rich in gold and easily treated.

ARIZONA.

Four gold quartz claims in Peoples Valley, thirty miles from Prescott, have been sold by Sinclair and Walloth to Dr. Underwork of San Francisco for $20,000.

MEXICO.

Pittsburg capitalists have organized the Mexican Sulphur Co. and under a concession from the Mexican Government will develop sulphur deposits in the Cocopah country and ship the product to the United States.



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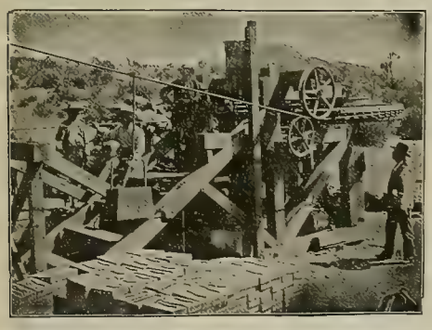
Expressly for Prospecting Work.

It was awarded First Prize at the recent Mechanics' and Manufacturers' Fair, where it was in daily operation, crushing ores from various mines throughout the State.

Weight of stamps, 275 pounds each; capacity of battery, determined by actual work, 200 pounds per hour, through a No. 7 slot-punched screen.

Entire battery weighs about 3000 pounds; heaviest piece, mortar, weighing 1200 pounds.

Can be taken apart and transported to any locality.



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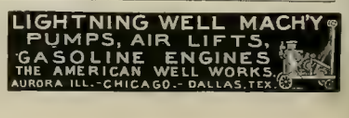


Coast Industrial Notes.

—Numbers of four-legged mules are being shipped to the Klondyke from California.

—Fontana & Son of San Francisco are this week canning cabbage for the Uitlanders in Alaska.

—About 250 shingle mills in the State of Washington are working at full capacity to fill Eastern orders.

—There is now long distance telephone communication between San Francisco and San Diego, Cal., over 600 miles.

—The California Asphaltum Company at Ventura made its first shipment of asphaltum last week to Alleghany, Pa.

—The salmon run in the Fraser river is phenomenal. Canners are refusing to accept salmon offered at 3 cents each.

—The Alaska Development Company has been organized at Seattle, Wash., to develop the coal and oil fields lately discovered in southeastern Alaska.

—The India Rubber Comany of Mexico, an English corporation capitalized at $2,000,000, is planting 5,000,000 rubber trees on its property at Pochutta, Mexico.

—Statistics compiled by the Mexican Government show that foreign capital invested in Mexico in the last four years amounts to 1,000,000,000 Mexican dollars.

—The Klondyke craze has sent up the local prices of provisions and created a "boom" in all manner of transportation to go north and freeze up with the country.

—Eastern Oregon, it is estimated, will this year produce 11,500,000 bushels of wheat, western Oregon about 6,500,000, a total of 18,000,000 bushels for that State.

—The Sumpter & Bourne Railway Company, $100,000, has incorporated to build a railway in Baker county, Oregon, having terminals at Sumpter, Bourne and Cable Cove.

—Only thirty Victoria, B. C., sealing schooners will go to Behring sea this season, compared with sixty-four last year. The low prices for last year's catch is the cause.

—Twenty-three miles of the Sierra Railroad from Oakdale toward Angels, Calaveras county, Cal., are finished. The road is to be 124 miles long and is bonded for $3,720,000.

—The Carson and Colorado railroad is 307 miles long. In 1896 the only portion earning anything was that part of the line in Nevada. The net earnings last year were $17,187.32.

—Fifteen hundred and twenty-five men working fifty-five hours a week, with a payroll of about $75,000 a month, is the showing made by the Santa Fe shops in Topeka at the present time.

—At the S. P. Co.'s Sacramento shops are being built sixty-four vestibule passenger cars, sixty-four vestibule baggage cars, 150 standard box cars and thirty thirty-ton hopper bottom coal cars.

—The Los Angeles City Water Company has offered to sell its plant to the city for $3,000,000. The city engineer reports that the value is $1,190,000, which sum will be offered by the city for the plant.

—During the first half of 1897 ninety-two miles of new railroad track were laid in California, this State standing second among the States in this regard. The estimated total mileage of new road constructed in this country during 1897 is 2000 miles.

—The Klondyke boom has been of value to all dealers in supplies. More especially is it noticeable in the hunting up of every old and new water craft along the coast. Vessels idle for years are being put in more or less seaworthy trim for the Alaska trip.

—The Comliebank, 2,719 tons register, and the Cressington, 2,660 tons, will carry wheat from San Francisco to Brazil, the first time in history that a cargo of this kind has gone from here to that part, Brazil having always depended upon Argentine for its wheat supplies heretofore.

—P. L. Packard and William A. Pratt of Wilmington, Delaware, have gone to Juneau, Alaska, where they head a party which will survey a pass from Taku Inlet on the Alaska coast to Testin lake as a railroad route for transporting miners and supplies into the Yukon territory.

—J. E. Terry, the recent purchaser of the Shasta Lumber Company's property in Shasta county, Cal., says the works are in active operation. The mill at Round mountain and the lumber camps supplying it employ about 125 men. On the twenty-seven miles of flume and at Bella Vista sixty more men are at work. The mill will cut 50 M feet daily.

—The Atchison Railroad Company will construct two 50,000,000-gallon reservoirs by damming canyons in the Arizona desert twelve or eighteen miles distant from the railroad, at a cost of $290,000. The water will be piped to the railroad. The interest on the cost of the reservoirs will be about a third of the present cost of hauling water to the tanks which they will supply.

—The Mexico, Cuernavaca and Pacific railroad construction work is being pushed. The road will be completed and in operation to the City of Mexico within three months. Nearly 5000 men are at work in the different construction camps. This will be the first transcontinental railroad in Mexico north of the isthmus of Tehuantepec. Its objective terminus on the Pacific coast is the port of Acapulco.

—The contract for the work of excavation and putting in the sub-foundation for the postoffice building at San Francisco goes to the San Francisco Bridge Company. The bids received and opened in Washington were as follows: San Francisco—Matt McGowan, $37,900; George Goodman, $41,277; J. W. McKay, $46,400; Thomas Butler, $38,898; R. A. E. Building and Construction Company, $39,990; Warren & Malley, $38,792; San Francisco Bridge Company, $36,830. Oakland—Cotton Bros. & Co., $41,998; Warren B. English, $48,868; California Bridge and Construction Company, $57,273. Chicago—L. L. Leach & Sons, $47,985. The successful bidder is to complete the work in four months.

—A. A. Dougherty has returned to Los Angeles from New York, where he delivered $250,000 worth of bonds of the Randsburg railway to the Rochester Trust Company and secured therefor the necessary funds to build the line. The work of construction will begin at once at Kramer, a station on the Santa Fe & Pacific, and will be completed to Randsburg in ninety days. Traffic arrangements have been completed with the Santa Fe.

—The Los Angeles *Times* reports the local fuel oil market showing some improvement. During last week 10,000 barrels were shipped to San Francisco, and it is claimed that this shipment will soon be followed by an equal amount. Prices are advancing toward the dollar mark, and producers claim that they will soon be receiving this price for their output. A few of the heavier producers depreciated the shipment of any oil to San Francisco, declaring that it will all be needed at home. Nobody has taken hold of the matter, but they favor the storage of from 50,000 to 100,000 barrels in iron tankage, and assert that had they this amount in such tankage at the present time the Southern Pacific railroad would take the entire amount off their hands at $1 per barrel. They add the interesting information that just prior to the recent heavy advance in oil that company was getting ready to use crude petroleum and had, in fact, changed one of its locomotives to an oil burner, and asserted that it was willing to pay $1 per barrel for oil in large quantities, but when the price was advanced to points ranging from $1.40 to $1.60 per barrel, orders were issued from headquarters to change no more engines and return to the use of coal, which was done. The sugar factories at Alamitos and Chino are beginning to draw upon the southern California oil fields for fuel supplies. It is said these factories will consume from 140,000 to 150,000 barrels during the next four months, a considerable quantity of which is suitable for refining purposes. Through the operations of leading oil men and the increase of production, refineries, distillating plants and asphaltum works have been established, and the users of motive power have been won over to the superiority of oil as a fuel, thus opening up along these lines a broad field for its consumption.

—The Dingley tariff bill passed the Senate last Saturday, has been signed by the President and is now a law. At no point in the measure is California forgotten or forced to be content with less protection than the industries deserve. Throughout the bill there is a spirit of protection to American industries, and the Pacific coast shares as it should in every point. No more favorable point was made than the placing of citrus fruits at 1 cent a pound, though the victory in the classification of Zante currants at 2 cents a pound will work almost as great good to the State's interest. On nuts there was a general advance made in the conference report. Almonds are placed at 6 and 4 cents for shelled and unshelled, and filberts and walnuts at 5 cents and 3 cents in the same condition. On apples and other deciduous fruits, 25 cents a bushel is the duty rated, with 2 cents a pound when dried. On still wines, the figures are a compromise, 40 cents a gallon being settled upon. Brandy was put at $2.25 a gallon. On olive oil there was a decided victory when 50 cents a gallon was secured, as was the gaining of 10 cents a pound on mustard. The jute schedule was one on which there was a great fight, and while the rates of the House bill were reduced 5⅞ cents a pound and 15 per cent ad valorem on both burlaps and grain bags, these are considered sufficient to guarantee the continuance of both manufacturing interests on the coast. The restoration of a $2 rate on white pine means much for the sugar-pine producers, while the duty on borax and quicksilver will give new life to them. The rebates granted on the tin manufactured into cans for fruits and salmon, and the rebate on coal used in ships in the foreign trade or plying between the Atlantic and Pacific coasts, will have a beneficial effect on the shipping interests. The sugar schedule is considered by those interested in the development of the beet-sugar industry as most favorable, and should the Senate do as it promised—give a bounty of one-quarter of a cent in winter—the conditions will be right for a great impulse being given to the interest.

Recently Declared Mining Dividends.

Kearsarge, Mich., Copper M. Co., $1 per share; payable August 10.

Homestake Mining Co., South Dakota, 25 cents per share, $37,500; July 26th.

Central Lead Co., $4000; July 31st.

Mercur, Utah, mine, $25,000; July 21st; $750,000 to date.

Portland, Cripple Creek, Col., $30,000; July 15th.

Gold Coin, Colorado, 5 cents per share, $10,000; payable Aug. 2nd: $150,000 to date.

Personal.

E. W. FOX has been appointed Land Office Registrar at Clayton, N. M.

THOS. COUCH has left Coulterville, Cal., and is at present in Salt Lake City, Utah.

A. CRISMON of Salt Lake is the new assayer at the Mammoth mill, Mammoth, Utah.

R. H. POSTLETHWAITE is superintending the construction of a new style river dredger at Smartsville, Cal.

P. J. CIRKEL, superintendent of the Yellow Jacket, has returned to Salmon, Idaho, to reopen the mine.

WM. CRAIB of Oakland, Cal., has bonded the Kreger and Vaughn mine, Amador, Cal., and will work it.

M. C. IHLSENG of State College, Pa., who been examining the Tres Amigos mine, Oro Blanco, Arizona, has returned home.

JAS. O'BRIEN, of Smartsville, Cal., has been re-elected superintendent of the Marysville & Nevada Power & Water Company.

GEORGE W. DICKINSON, formerly general manager of the Northern Pacific railroad, has gone into mining, and is now one of the Clark syndicate of Spokane, Wash.

F. W. BRADLEY, superintendent Bunker Hill and Sullivan, Idaho, mines, is visiting San Francisco. He has been examining some mining property in Placer county.

J. E. POINGDESTRE, manager Good Title mine, at Dobbins Ranch, Yuba county, Cal., is in the city to buy a 10-stamp mill. H. Pengelly succeeds J. J. Dailey as superintendent.

CAPTAIN J. R. DELAMAR and Manager H. A. Cohen arrived at DeLamar, Nevada, one night last week, having made the drive from Milford, Utah, a distance of 160 miles, in fourteen and three-quarter hours.

MESSRS. HUGHES, Mumford, VanDye and Professor Price of San Francisco are visiting the Garnett Consolidated mine, Plumas county, Cal. Mr. Hughes is president of the Garnett Company, and Mr. Mumford, secretary.

BENJ. J. HALL, one of the proprietors of the Pioneer Reduction Works, Nevada City, Cal., goes to Douglas island, Alaska, where he will relieve Emile Ott, in charge of the chlorination works of the Treadwell mine, who takes a ninety days' vacation.

THE position of assistant general freight and passenger agent of the Santa Fe Pacific Railroad at San Francisco is abolished. H. C. Bush is appointed general agent, freight department, and John L. Truslow general agent, passenger department, with headquarters in San Francisco.

JNO. D. MCGILLIVRAY of the MINING AND SCIENTIFIC PRESS goes to Alaska to report on the Klondyke mines under the auspices of the New York *Herald* at a princely salary. And this little personal calls to mind how many clever men have gone out of the editorial rooms of the MINING AND SCIENTIFIC PRESS as mining authority to all parts of the world. Indeed, it has come to be recognized that one of the certainties of an editorial position on this paper is a speedy selection to do expert work at a fee enormously in advance of what can be afforded in the ordinary daily humdrum routine of journalistic work. A year ago the then editor of this paper was offered and accepted, with the consent of the proprietors, a very large sum to make expert report on the Siberian placers, and now his successor goes to Alaska at an equally remunerative rate. And so it has been through the years. Scattered everywhere that gold is mined all over the world are men who once worked in this office, and the writer is glad to say that with one and all are maintained towards this paper friendly feelings and kindly relations undimmed by the passing years.

Recent California Mining Incorporations.

White Peak Group M. Co., Los Angeles; J. W. Wenzel, M. L. Wicks, R. H. Bradley, C. McComas, J. J. Smiley; capital stock, $1,000,000; $500 subscribed.

Naples M. Co., Santa Barbara; H. W. Mazzall, E. W. Hayward, H. C. Booth, J. R. Thermond; capital stock, $50,000; $6000 subscribed.

Franco-American M. Co., Los Angeles; F. Colas, A. L. Appfel, E. E. Lefebre, W. F. Botsford, A. B. Dessevy, W. Declez; capital stock, $100,000; $68,780 subscribed.

The Red Fox M. Co., S. F.; C. W. Mariatt, E. L. Snell, J. O. Weinstrom and A. Lind. Capital stock, $30,000; $85 subscribed.

El Dorado Con. G. M. Co., Angel's Camp, Cal.; M. Arendt, P. Johnson, D. C. Demarest, E. F. Hubler, G. F. Pasha, W. A. Bisben. Capital stock, $200,000; subscribed, $1700.

Commercial Paragraphs.

THE Mine and Smelter Supply Company of Denver, Colorado, have a contract for a double tramway 8500 feet long for the Montezuma Mining Company, nine miles from Kaslo Creek, B. C. The E. P. Allis Co. have a contract for a 100-ton concentrator. The cost of the whole will be $46,000.

JAMES LEFFEL & Co., Springfield, Ohio, have issued a neat, new Pamphlet "D," replete with numerous illustrations and descriptions of the throttling and automatic engines, with portable and stationary boilers, which they are building in a variety of sizes and styles. A copy is sent free to parties interested on application to the company.

THE Central London Underground railway has recently contracted with the Edward P. Allis Company of Milwaukee, Wis., for six cross-compound condensing Reynolds-Corliss engines, each of 1300 nominal horse power. Each engine is to have cylinders of 23 and 46 x48 inches, and will make 100 revolutions per minute. The shipping weight of each is about 300,000 pounds. They will be directly coupled to electric generators. Four similar engines are to be sent to the Government tramways of Sydney, N. S. W.

Valuable Silver and Lead Mining Property for Sale.

The property is known as the **Montezuma Silver Mining Co. of Utah;** is situated on the Little Cottonwood, Alta, Utah, comprising the "Montezuma," "Savage," "Hiawatha" and "Last Chance" locations, also the "Buckland" tunnel, 1500 feet long, and over it the "Savage" tunnel, 800 feet long, with openings connecting the tunnels. The mine is in good working order, with considerable ore in sight. The ore is rich in lead and in good demand by the smelters. For terms and any other information, address David R. Pierce, Sec'y and Treas., 210 West Larned St., Detroit, Mich.

WANTED.

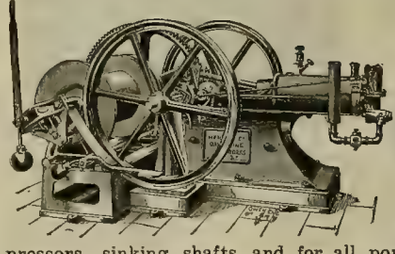
Able, rugged man, as Roaster, thoroughly familiar with oxidizing dead roast of gold concentrates in Bruckner furnace. None other need apply. Address quickly, stating experience and qualifications.

JACKSON & LAKEVIEW MINING CO.,
LUNDY, CAL.

WANTED.—A Second-Hand
5 OR 10 STAMP MILL.
Address, stating particulars, price, etc., A. B., this office.

YOUNG MAN with knowledge of metallurgical chemistry, assaying, cyanide process, etc.; thoroughly competent silver plater, is looking for position. Willing to make himself generally useful. First-class references. Address C. D., Mining and Scientific Press Office.

Hercules Hoisting Engines



Solve the difficulty of fuel, and make mining profitable where steam power is too expensive. Over 3000 Hercules Gas and Gasoline Engines are in use, giving entire satisfaction. Fully guaranteed. Requires no engineer. No smoke, no dirt. No danger.

We build engines from 2 to 200 h. p. for pumping, hoisting, running air compressors, sinking shafts and for all power purposes. Used in mines throughout the coast.

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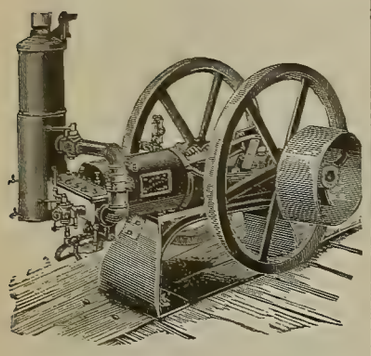

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California Crude Oil,	40 grav.,	7⅛ galls. at	5c..	$.37½
Distillate	40 "	7⅛ "	5c.,	.80
Domestic Coal Oil	40 "	7⅛ "	12½c.	.83¾
Gasoline	74 "	8¾ "	15c.,	1.31¼
City Gas		1000 feet.		2.00

We manufacture all sizes from two-horse power up, and will guarantee that our Engines will run cheaper and are more simple in construction, have fewer parts and hence are more durable than any other Gas Engines on the market. Seeing is believing; don't take our word for it, but come and investigate for yourselves. You can always see one in operation at our works. We will be pleased to see you and will at all times take pleasure in showing them up. Our Engines are specially adapted for running well and mining machinery—in fact, for any kind of power desired. We are the pioneers and first inventors of Crude Oil and Distillate Engines. **We always lead and never follow.** Send for Catalogue and Price List of the only genuine Crude Oil and Distillate Engine made.

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In the Superior Court of the City and County of San Francisco, State of California, Department No. 8. John V. Kimball, plaintiff, vs. Mabel L. Kimball, defendant. Action brought in the Superior Court, City and County of San Francisco, State of California, and the complaint filed in said City and County of San Francisco, in the office of the clerk of said Superior Court. The people of the State of California send greeting to Mabel L. Kimball, defendant. You are hereby required to appear in an action brought against you by the above-named plaintiff in the Superior Court, City and County of San Francisco, State of California, and to answer the complaint filed therein within ten days (exclusive of the day of service) after the service on you of this summons, if served within this county; or, if served elsewhere, within thirty days. The said action is brought to dissolve the bands of matrimony now existing between yourself and plaintiff, on the ground of habitual intemperance on your part for more than one year past. All of which will more fully appear in the complaint on file herein to which you are hereby referred. And you are hereby notified that if you fail to appear and answer the said complaint, as above required, the said plaintiff will apply to the said Court for the relief prayed for in the complaint. Given under my hand and seal of said Superior Court at the City and County of San Francisco, State of California, this 9th day of April, in the year of our Lord, one thousand eight hundred and ninety-seven. C. F. Curry, Clerk. By Joseph Riordan, Deputy Clerk. R. Thompson, Attorney for Plaintiff.

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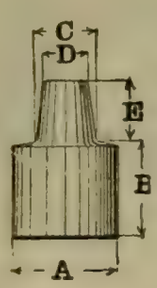

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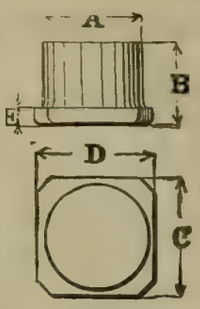

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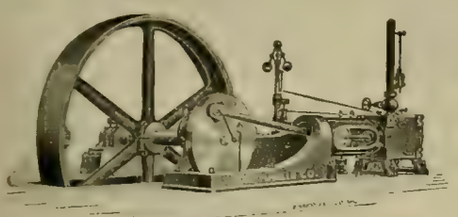

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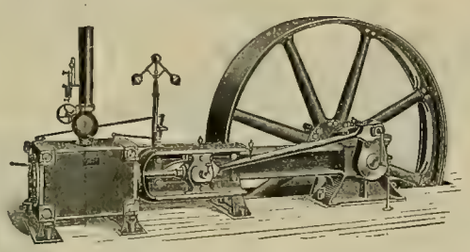

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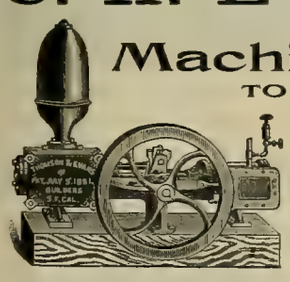

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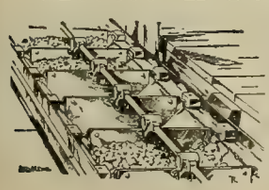

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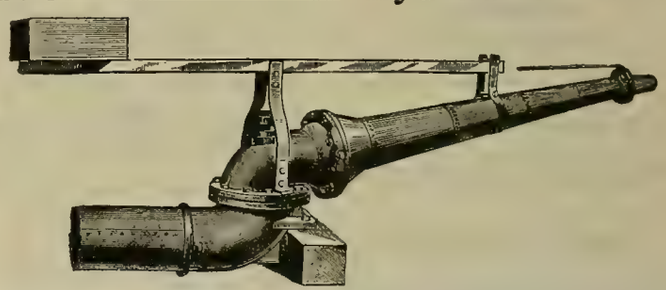

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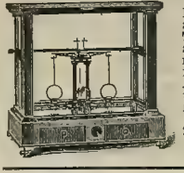

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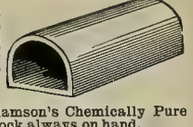

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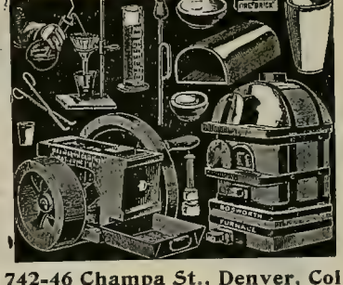

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Constantly on hand a full assortment of Manila Rope, Sisal Rope, Duplex Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc. ☞ Extra sizes and lengths made to order on short notice
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NEVADA METALLURGICAL WORKS,
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Assaying, Analyses, Sampling.
PRACTICAL WORKING TESTS OF ORE BY ALL PROCESSES.
STAMP MILL AND CONCENTRATOR IN OPERATION ON PREMISES.

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ENGINEERS AND MANUFACTURERS OF **MINING AND METALLURGICAL MACHINERY.**

Beg to announce that they now manufacture and control the sale of the unrivaled

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Over Seven Hundred lines in operation.

Spans up to Two Thousand feet and more.

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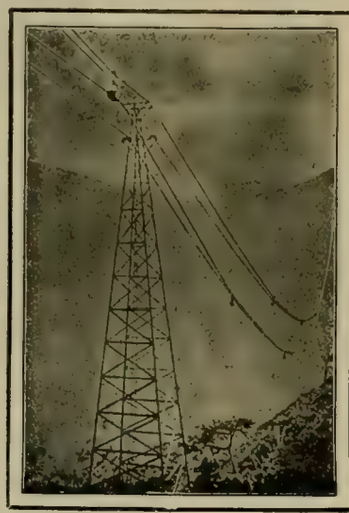

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Give the best working results in every case, and never-failing satisfaction.

All difficulties of transportation surmounted by an economical and effective carrier.

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IRON, STEEL, MINING AND MILL SUPPLIES.

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Write for Price and Particulars.

THE PELTON WATER WHEEL,

EMBRACING IN ITS VARIATIONS OF CONSTRUCTION AND APPLICATION

THE PELTON SYSTEM OF POWER.

In simplicity of construction, absence of wearing parts, high efficiency and facility of adaptation to varying conditions of service, the **PELTON** meets more fully all requirements than any other wheel on the market. Propositions given for the development of water powers based upon direct application, or

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Under any head and any requirement as to capacity.

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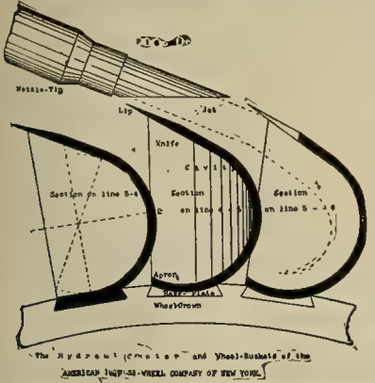

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Will furnish more power per cubic foot of water used than any other water wheel in the market.

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MOTORS AND ARMATURE WINDING.
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APPARATUS
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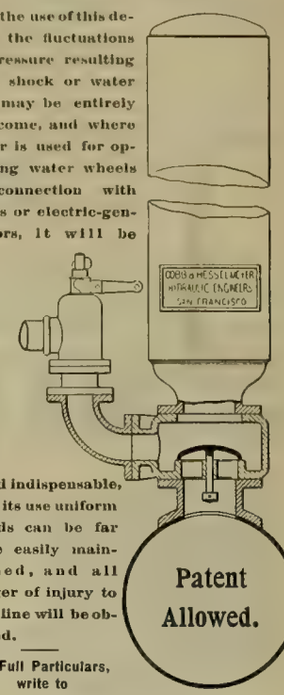
By the use of this device, the fluctuations of pressure resulting from shock or water ram may be entirely overcome, and where water is used for operating water wheels in connection with hoists or electric-generators, it will be found indispensable, as by its use uniform speeds can be far more easily maintained, and all danger of injury to pipe line will be obviated.



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THE EDISON GOLD SAVING MACHINE.

The Most Complete Machine in the World for GRAVEL WASHING.

Guaranteed to Save Every Particle of Flour and Flake Gold, and Floured Quicksilver.

WILL HANDLE 3 TONS OF GRAVEL PER HOUR.

Minimum power and water required. Requires but one handling of gravel. By motion of machine water is returned and used over and over again. Light, durable and easily transported. Simple in construction and inexpensive.

The EDISON MACHINE COMPANY,
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PACIFIC AMALGAMATOR

FOR QUARTZ MILLS,

Placer & Beach Sands.

Takes the place of plates. Will save the fine as well as the coarse gold. It has a large silver-plated amalgamating surface, constructed so as to produce a complete contact. Will save fine gold that cannot be saved on ordinary plates. No extra cost of operating. Cheap, durable and practical. Send for Catalogue. PACIFIC MINING MACHINERY CO., 127 First Street, San Francisco, California.

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SAN FRANCISCO NEWS COMPANY, 206 POST ST.

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Kansas City Smelting and Refining Co.

Incorporated Under The Laws of New York.

Capital paid in..... $2,700,000.

Buyers of All Classes of

GOLD, SILVER, LEAD AND COPPER ORES,

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GOLD BARS, SILVER BARS and MILL PRODUCTS.

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We use the following Cipher Codes at our Argentine Works: A. B. C. Code; Moreing & Neal's Code and Bedford McNeill's Code.

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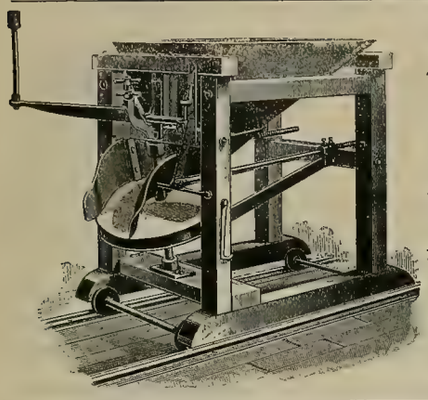

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POSITIVE FEED. MINIMUM POWER.

Bolthoff Improved Challenge Automatic Ore Feeder.

The only revolving disc feeder, made without gears or clutches. Feeds wet or dry ore; slow or fast. Is operated by a Friction Band. We have other valuable stamp mill improvements.

WHEN WRITING FOR CIRCULARS AND PRICES MENTION THIS PAPER.

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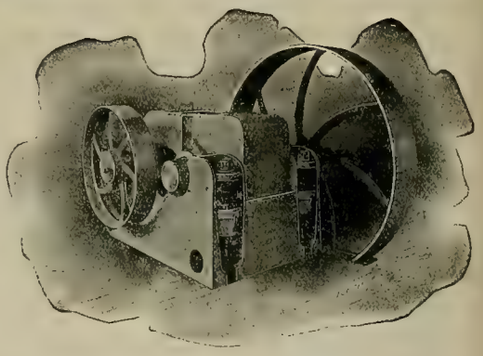
Constructed Upon New Principle!



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Few Parts. Easily Accessible.
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THE COLORADO IRON WORKS COMPANY, Denver, Colo.

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WE ARE MANUFACTURERS OF AND CONTRACTING ENGINEERS FOR Gold, Silver, Lead, Copper and Pyritic SMELTING FURNACES.

AMALGAMATION AND CONCENTRATION PLANTS.

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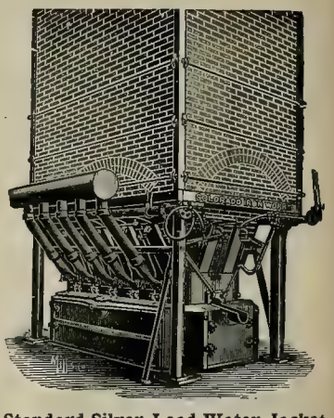
We Guarantee Capacity Per Day to Any Degree of Fineness.

Improved Black Hawk Ore Breaker.

OUR PATENT HOT BLAST APPARATUS for all Smelting Furnaces is a Success. A great economizer of fuel, and enlarges capacity of furnace.



Standard Silver-Lead Water Jacket Smelting Furnace.

Equipped with Arch-Bar System of Mantles, insuring rigid and strong walls. No Cracks.

ESTABLISHED 1849.

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Iron, Steel, Coal, Blacksmiths', Miners' and Mill Supplies,

413-415 MARKET ST., SAN FRANCISCO, CAL.

Daniel Best Crude Oil Engine,
Kinkead Quartz Mill,
Smith Striking Stamp Mill.

Springer Ore Concentrator,
Truax Ore Cars,
Rock Breakers, Hoists, Etc.

Why the Springer Concentrator is the Best:

It will do more and cleaner work than any rubber belt machine.
It weighs only one-half as much as some of the six-foot concentrators.
Is the most simple in its construction of any machine in the market, and only one-third as many pieces in it as in some of the others. Was invented by an old miner of forty years' experience handling every known concentrator on the market.
Should any piece need repairing, it can be removed without disturbing any other part of the machine.
Can be set up by any inexperienced miner.
Its distributor is perfection itself, distributing the pulp evenly over the entire surface of the belt.
Grade of shaking frame can be changed while the machine is running at full speed.
It is the strongest, lightest running and most inexpensive to keep in repair of any
Will save more of the fine slimes than any other machine.
Is cheaper than any other six-foot machine, costing only $350.00 f. o. b. cars or boat, San Francisco.
Will handle the pulp from five stamps better than any other Concentrator.
Has adjustable eccentrics, and any length of stroke can be had, thereby giving different speeds per minute.
The belt is very durable, being made of No. 3 Canvas, woven especially for the Springer concentrator.
This machine requires so little attention that one man will easily attend to a dozen of them.
It has a solid rubber flange, which no other canvas belt has.
Wear and tear upon this machine is not one-third as much as upon some of the other concentrators.

The Mine and Smelter Supply Co., Denver, Colo.

THE LARGEST STOCK OF MINING, MILLING AND SMELTING MACHINERY WEST OF CHICAGO.

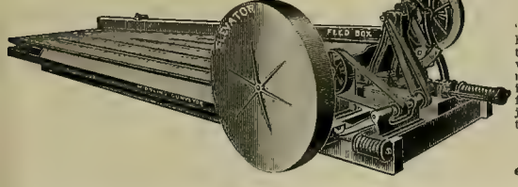
PIPE, PACKING, RUBBER BELTING, AND SUPPLIES OF ALL KINDS.

SOLE AGENTS FOR **WILFLEY CONCENTRATING TABLE,**

And claim for it BETTER work than any Concentrator made, with a capacity of from 15 to 25 tons per day of 24 hours. It is simplicity itself. No moving belts or intricate parts. Any one can learn to operate in an hour.

For confirmation of all of the above we refer to Henry Lowe, Puzzle Mine, Breckenridge, Col.; Mary Murphy Mine, St. Elmo, Col.; W. E. Renshaw, Mayflower Mill, Idaho Springs, Col.; H. E. Woods, Denver, Col.

WILFLEY CONCENTRATOR.



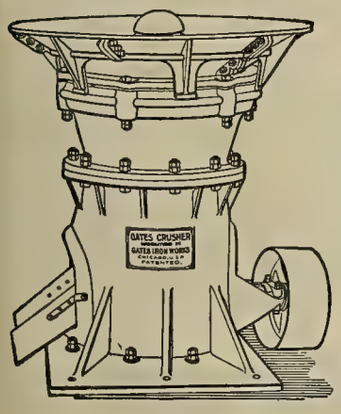
Office of— Milwaukee Mining Co., Standard Mining Co., Cœur d'Alene Mining and Concentrating Co., Galena Mining Co., Hecla Mining Co., Phœnix Mining Co. Lead-Silver Mines located in the Cœur d'Alene Mining District, Northern Idaho.
FINCH & CAMPBELL, GENERAL MANAGERS. WALLACE, IDAHO, June 18, 1897.

The Mine and Smelter Supply Co., Denver, Colo.—GENTLEMEN: Replying to your favor of the 8th inst., regarding my experience with the "Wilfley Concentrating Table," will state that in February last I placed in the vanner room of the Standard mill one of your tables, which has been in constant use every day since. It has been operated by the usual attendant of the vanners and has been given no special attention, and has been supplied with the same "feed" as the Frue vanners and at the end of each day's run has shown lower tailings than the vanners and produced from three to four times the quantity of concentrates of the same value per ton as any of the Frues. We have three more of the Wilfleys in the same mill, which are all doing splendid work and handling fully twenty tons each per day of silicious ore carrying about 10 per cent lead and 12 ounces silver. They are all making a remarkably close saving of values and giving the most perfect satisfaction. A very fair opportunity is offered in this mill for comparing the work of different concentrators, as we are using Harz jigs, Collom jigs, round buddles, Frue vanners, and Wilfley tables, and handling nearly 500 tons of crude ore per day, and all of the machines are given the class of work for which they are best adapted. I can heartily recommend the Wilfley to any one needing a concentrator for fine ores.
Yours very truly, EMERSON GEE, Manager Standard Mining Co.

These Tables have displaced belt tables of almost every make, as is shown by letters in our possession.

PRICE, $450.00.

GATES ROCK AND ORE BREAKER



still leads the world. It has greatly cheapened the cost of macadam and ballast, and made low grade ores profitable 180 large sizes shipped to South Africa.

General Mining Machinery

of improved designs. Nothing equal to

High Grade Cornish Rolls,

Stamps, Concentrators, Connersville Blowers, High Speed Engines,

Cyanide and Clorinating Equipments.

The Gates Improved Vanner Concentrators.

Every appliance for the mining and milling of ores.

Agent for Gates Breakers in California,
PELTON WATER WHEEL CO.,
121 Main St., San Francisco.

GATES IRON WORKS,
650 Elston Avenue, Dept. UU, CHICAGO.

Market Reports.

The Markets.

SAN FRANCISCO, July 29, 1897.

The rush of goods to Alaska has been something phenomenal, particularly the kinds suitable for prospectors who are seeking that country by thousands. The regular fall trade has not set in yet, but it is expected to begin within a fortnight. The general belief is that there will be a larger volume of goods going out than for several years past. Manufacturers report active work, with orders ahead. There is an improved inquiry for mining machinery, with figures being made on several. A 250-stamp mill is to be erected at or near Juneau. Whether the contract for the plant will be let here or at the East is not as yet decided. It is stated that other mining machinery will be required for Alaska next year, including that for a copper mine. The tariff bill becoming law is a source of satisfaction, owing to the uncertainty giving place to the certainty.

The local money market is still working easy, with the tendency in favor of borrowers. The banks do not appear to be so exacting in securities. This change has been brought about by a higher and active market for farm products, an improving market for fruits, and the gold mining industry still forging ahead. The mines in this State are giving employment to a very large increase in the number of hands, while the output is considerably in excess of last year. The demand for funds shows a steady increase. It is for crop-moving purposes. Freer advances are being made on grain than had been looked for, owing to farmers not being disposed to let go much as yet. New York advices state that the heavy demand for money with which to pay duties has not had any influence on that market, owing to the very heavy supply of available funds. The banks and trust companies were making call loans at the rate of 1 to 1¼ per cent per annum, and even at these exceptional low rates the demand was light. With the movement of crops, grain, cotton, etc., an increased call is looked for. Some gold has been exported to Europe. It is believed that more will follow.

New York Silver Prices.

NEW YORK, July 29.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	27 5-16	59¾
Saturday	27½	59⅛
Monday	27 3-16	59
Tuesday	26⅞	58¾
Wednesday	26⅜	57¾
Thursday	26 7-16	57⅛

	Copper.	Lead.	Iron.	Tin.
Fri.	11 00 @11 20	3 85	10 00@12 00	13 80
Sat.	11 00 @11 20	3 85	10 00@12 00	13 75
Mon.	11 00 @11 20	3 82½	10 00@12 00	13 75
Tue.	11 00 @11 20	3 85	10 00@12 00	13 70
Wed.	11 00 @11 20	3 80	10 00@12 00	13 70
Thur.	11 00 @11 20	3 80	10 00@12 00	13 70

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	12½c Prem
New York Telegraphic Transfer	15c Prem
London Bankers' 60 days	$4.87
London Merchants	$4.85
London Sight Bankers	$4.88
Refined Silver, per oz., 1000 fine	57½
Mexican Dollars	46½

SILVER.—The market broke the past week 15-16d in London and 2 cents in New York—carrying prices to the lowest figure on record. In 1894 it sold at 27d in London, but recovered and sold at quite an advance on this figure. At this writing it is hard to get accurate information on the situation, but from all that can be learned it looks very much as if India's wants are being met largely from China. It is quite possible that Russia is back of it, and while China gets the name Russia is playing the game. The low prices have not so far had any appreciable effect on the export movement from New York, for it holds as strong as ever.

The steamer Doric, hence July 27, took out $137,000 of silver for Bombay, but none for China.

MEXICAN DOLLARS.—The market has been somewhat demoralized, falling to 46½ cents, but at the close it is stronger. It is said that at the lower prices there was considerable buying. The steamer Doric, hence July 27, took out 257,146 for China. Eastern advices report free shipments from New York

QUICKSILVER.—The market is steady, with only a fair call reported.

Our market is quoted at $40 for domestic consumption.

COPPER.—The market has held to steady figures throughout the week. At the close our advices from New York report a strong market there and in Europe.

Lewis & Sons of Liverpool, in their last circular received, report: For refined copper, especially high conductivity wire bars, there has been considerable inquiry from the Continent, where the consumption continues very large. Trade is improving in the United States, and should this lead to an increased home consumption of copper, as is expected, exports may fall off materially. The increased American production of 3700 tons for the five months ending May has been exported, showing no increase in American consumption, which last year was about 11,000 tons less than during 1895. Even with these increased receipts from the United States English and French stocks have decreased 3240 tons during the past half year. Imports are 8251 tons greater, and deliveries 696 tons less, to date than during the same period last year. The total arrivals in England and France for the month have been 11,134 tons, and the deliveries 12,270 tons fine. Stocks have decreased 1251 tons, and the visible supply 1076 tons.

The local market is quoted as follows:

Ingot casting, jobbing	13@—
Ingot " wholesale	12½@—
Sheet copper	—@16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½

TIN.—The market for pig at the East is weaker towards the close, but this was looked for owing to a falling off in the demand. Our market is unchanged, with the tone easier.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

LEAD.—The market has held fairly steady at the East, owing to refiners' indifference as sellers. It is quite evident that the tariff of 1½c, instead of ¾c, per pound on all lead in silver ore has not had any effect. It must have been discounted.

Our market is quoted in jobbing lots as follows:

Pig	— @ 4 50
Bar	— @ 4 60
Sheet	5 75 @ 6 00
Pipe	5 00 @ 5 25

SHOT.—The market is steady to firm. Sales are increasing.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 35
Drop, B and larger sizes, " "	1 60
Buck, Balls and Chilled, do, " "	1 60

POWDER.—The market is steady.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17½c, according to strength and quantity; No. 2, from 9c to 11c, according to strength and quantity.

IRON.—Imports have been quite heavy, but stocks do not show any increase owing to heavy consumption. The East reports large consumption and a free export movement, but liberal supplies keep prices steady.

AMERICAN.

	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

COAL.—The market seems to have a slightly firmer tone owing to the increased duties—now 67½ cents a ton on bituminous—being in effect. Collector of the Port Jackson issued the following letter to the deputy collector July 27: "In view of the standard fixed by the new tariff of 92 per cent of fixed carbon as the line of demarkation between anthracite and bituminous coal, you will exact a deposit on all cargoes hereafter passed as anthracite from Swansea."

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$8 00@— —
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 50@ 6 00
Coos Bay	— —@ 4 75
Cannel	8 00@— —
Egg, hard	12 00@13 00
Wallsend	6 50@— —

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	— —
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	9 50	@	— —
" spot, in bulk	10 00	@	— —
" in sacks	11 00	@	12 00
Cumberland	— —	@	— —

ANTIMONY.—The market is steady.

Our market is quoted at 7⅛@8¼c in a jobbing way. New York mail advices quote 7½c for Cookson's, 6⅞@7⅛c for Hallett's and 6⅞@7c for Japanese.

NAILS.—The market is lower and active.

Wire, carloads, basis per keg	
" jobbing, " "	$2 15
Cut, carloads, " "	
" jobbing, " "	2 05

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4¼

PLATINUM.—The market is quiet.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is steady.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

Chemicals.

With the tariff bill law, there seems to be more disposition on the part of importers to advance prices, but liberal stocks here and dealers carrying good lines are against it at this writing. It is expected that changes in quotations will be made in a few days in chemicals most affected by the new tariff. The East does not report any material changes. One cargo of nitrate of soda has come to hand and two cargoes are on the way. It was sold for shipment to this port. Chlorate of potash is stronger at New York, as is brimstone.

SULPHURIC ACID.—The demand is fair.

We quote in a jobbing way at 1½c per lb for 66%.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported strong from store at 6¼@7c per pound in carboys.

BLUE VITRIOL.—Our market is firmer.

We quote in a jobbing way at 4½c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is firm.

Our market is quoted in a jobbing way at $1.50 a pound.

BONEASH.—The demand is stronger.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is firm.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firm at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is quiet at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—There is a fair demand at 2½c a pound from stores.

NITRATE OF SODA.—Market is steady.

Our market is quoted from store at 4c for 95%.

Mining Share Market.

SAN FRANCISCO, July 29, 1897.

The market advanced with higher prices recorded along the entire line, but towards the close a weaker tone prevailed. The action of the market indicates that it is being worked for better prices provided under assessment scores outside holders sell. Sierra Nevada has been the leader so far, but if shorts have filled and some outsiders gone long, then it is not at all unlikely something else will be taken up to advance prices to a still higher range. Sierra Nevada sold up to $1.50 on reports of an unexpected gold find on the Layton tunnel. It is needless to say that experienced miners and well-informed operators do not take any stock in the unexpected find, for its existence has been known for years. Not only has that, but still larger and higher grade has also been known. Paid writers and cappers may assert that the work is in virgin ground and that this and that was not looked for, but it is safe to affirm that every body of ore not yet developed on the Comstock is known to the money inside pool, but whether it is known to others or officials is an open question. In several of the mines large acres of ground have been blocked out, while there is not one of the mines but secret drills or secret prospecting drifts have been run, and some day the ore found in several will be uncovered for the public, provided it is not taken out before and in such a way as not to show its true value or extent. While attention is attracted to Sierra Nevada, work in several other mines is overlooked by the public. This work can at almost any time be made to strike ore which can be magnified or enlarged as best suits the purposes of the manipulator. While there is no denying that a strong and successful bull campaign can be carried out, yet it looks very much as if the moneyed pool is opposed to it at present, but what may follow later on it is hard to say, outside of stating that the market has every indication of being worked for a small sized deal, notwithstanding the very low price of silver.

Letters filed the past week from Comstock mine superintendents do not vary to any great extent from previously received letters. The work in several is being pushed in the right direction and as fast as possible, all things considered. In Utah they are still pushing north from the main west tunnel. Nothing of importance is reported. In Sierra Nevada they are going west in crossdrift No. 3, 900-foot level. They ought to be in more favorable material soon. On the Layton Tunnel level they are at work in the north drift. Semi-official advices report having passed through 9 feet of ore, assaying from $15 to $45 a ton gold. This find, it is said, is to be prospected before long. The work is practically unchanged since our last issue. Nothing of much interest is looked for yet awhile. As was expected, the southwest drift in Mexican on the 1000-foot level has been stopped, for if continued the west lode would have been struck. When stopped the face was in a favorable formation. They are stripping the drift. In Ophir they are driving ahead west crossdrift No. 3 on the 1000-foot level and the south drift on Central tunnel level. They have found $1 ore up there and will soon find an assessment down here. The latter will give the best returns. Interest in Con. Virginia is still on the wane, although many think manipulators for high prices cannot do much until this mine shows an improvement on which to advance prices for its shares. Active work is reported on the 1000-foot, 1550-foot and 1650-foot levels. There has not been any change in the character of the work or of the material encountered. There were extracted the past week thirty-one tons of ore, assaying about $35 to the ton. The joint work in Best & Belcher and Gould & Curry is the same as given last week. Nothing new comes from Savage. No work is reported in Hale & Norcross. The delinquent assessment sale lists published by the contestants for Hale & Norcross have been postponed again. The shareholders will have to foot several good-sized bills, regardless of who wins. No work is reported in Chollar. The work in Potosi has run into old grounds at one point and into old fillings at another point. They have started a north drift from the top of the raise from No. 2 west crossdrift. They may be

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Alpha Con M & M Co, Nev.	19	10c	July 8.	Aug 12..Sept 2	C E Elliott, 309 Montgomery
Belcher S M Co, Nev.	55	10c	July 19.	Aug 23. Sept 13	C L Perkins, Mills Bldg
Best & Belcher M Co, Nev.	62	25c	July 1.	Aug 5. Aug 26	M Jaffe, 309 Montgomery
Brunswick Con G M Co, Cal.	12	3c	June 22.	July 22..Aug 14	J Stadtfeld, 309 Montgomery
Bullion Con G M Co, Cal.	11	22c	June 22.	Aug 2..Aug 23	C A Grow, Mills Bldg
Crown Point G & S Co, Nev.	71	10c	July 27.	Aug 31..Sept 21	Jas Newlands, Mills Building
Eureka Con D M Co, Cal.	9	2c	June 30.	Aug 7..Aug 28	D M Keat, 330 Pine
Gold Hill M Co, Cal.	12	25c	June 16.	July 26..Aug 12	C A Grow, Mills Building
Horseshoe M Co, Cal.	3	40c	July 12.	Aug 23..Sept 20	C E Green, 532 Market
Inyo Marble Co, Cal.	30	10c	July 27.	Aug 28..Sept 20	M A Cahn, 323 Phelan Bldg, S F
Jamison M Co, Cal.	9	5c	Nov 27.	June 23..Aug 18	Sam W Cheyney, 120 Sutter
Marguerite G M & M Co, Cal.	7	10c	July 28.	Sept 10..Oct 11	F Mettman, 237 Twelfth
Mexican G & S M Co, Nev.	57	20c	July 28.	Sept 1..Sept 23	C E Elliot, 309 Montgomery
North San Juan G M Co, Cal.	3	7c	July 16.	Sept 8..Oct 4	H W Morris, 141 First St
Nth G & C G & S M Co, Nev.	18	10c	June 26.	July 28..Aug 14	E W Sichel, 337 Pine
Osceola Con M Co, Cal.	6	1c	June 30.	Aug 2..Aug 21	Holland Smith, 307 Montgomery
Pine Hill G & S M Co, Cal.	10	5c	May 10.	July 1..July 22	Chas A Hare, 1003 Railroad Ave
Rose Creek M Co, Cal.	1	15c	June 28.	July 28..Aug 30	J M Wilmans, Crocker Bldg
Thorpe M Co, Cal.	7	2½c	June 9	July 31..Aug 21	A F Frey, Phelan Building
Utah Con M Co, Nev.	25	5c	July 6.	Aug 9..Aug 30	A W Havens, 309 Montgomery

WILL NEGOTIATE with owners or their duly authorized agents only.

WILL INVESTIGATE only thoroughly bona-fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

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Who Sees Your Advertisement?

Is an important question. When asked for an "ad" demand proof of extensive circulation among probable purchasers.

going north to freeze shareholders out of their holdings. There is nothing new from Bullion. In Alpha they are repairing the shaft. When work is resumed, it is reported, it will not be for the purpose of prospecting the ore found on the 500-foot level. Slow work is being done in the long west crossdrift that is being run jointly by Con. Imperial, Challenge and Confidence. Nothing new is reported from it. No ore was extracted the past week by Confidence. Nothing comes to hand from Yellow Jacket regarding work in the mine, but a large number of bull points have been put out. Informed miners are watching the work in Kentuck that is being done jointly by that company, Crown Point and Yellow Jacket. From Crown Point nothing of interest comes to hand through official sources. Work in Belcher will be resumed next Monday. It is to be hoped that the short rest will put new life into the management and result in showing up the ore struck several years ago.

From the Brunswick lode our advices are practically unchanged. The joint work on Con. Virginia, Best & Belcher and Gould & Curry is on the 300-foot level. The station on the 600-foot level, No. 2 shaft, has been completed. If the work is properly done on this level mining men say that better results will follow than has the work at any other point on the lode. In Chollar extensive repairing is being done. Work is being done on the 300-foot, 400-foot, 500-foot and 600-foot levels, without any material change reported. Nearly 200 tons were extracted and milled the past week. The battery sample assay was $17.28 gold and 17.24 ounces fine silver. The usual dead and prospecting work is being done in Occidental on the 550-foot and 650-foot levels.

The market opened steady this morning, but after Call Sierra Nevada showed strength under a freer demand. Large transactions were recorded which soon sent the shares to $1.75—selling higher than Con. Virginia. The demand for the shares is said to be due to a report that on the 900-foot level west crossdrift No. 3 had struck the east clay wall of the ledge. This information imparted more strength to Union. As it has been known for years that there is rich ore to the west, advices from the crossdrift will be closely watched. It may be that the work will not be pushed far enough west to get best results, yet enough may be done to cause shares of Sierra Nevada, Union, and also Mexican to sell higher. Reports are right for the first named to sell at from $3.50 to $4.00 a share. At the 2:30 o'clock session, Sierra Nevada sold at $1.75, but the others were slightly stronger. After Call the market was a shade weaker.

The following illustrates the changes of the week:

MINES.	July 23.	July 29.
Alpha	$ 14	.....
Alta Consolidated	06	$ 07
Andes	16	16
Belcher	24	28
Best & Belcher	42	50
Bodie	.....	.....
Bullion	.....	.....
Challenge	41	.....
Chollar	80	80
Confidence	.....	.....
Consolidated California and Virginia	1 45	1 50
Consolidated New York	03	.....
Crown Point	21	24
Exchequer	.....	.....
Gould & Curry	44	56
Hale & Norcross	.....	.....
Justice	.....	.....
Mexican	38	38
Ophir	72	83
Overman	03	09
Potosi	50	47
Savage	28	40
Sierra Nevada	1 10	1 75
Union	47	60
Utah	06	08
Yellow Jacket	53	.....

Of Colorado mining stocks F. H. Pettingell writes from Colorado Springs, Colorado: "There is one unfortunate fact prevailing among companies who have attained partial success, and that is the salary question. True, one cannot expect the affairs of a shipping proposition to be directed without compensation, but it does seem questionable for companies in debt that have been steadily shipping for a period of years to support luxurious offices and a large salary list. We have in mind a prominent company notoriously noisy regarding its most private affairs, and equally careless as to the truthfulness of the announcement of them, who are forever and eternally parading its never-realized brilliant prospects before the public, and apparently only accomplish the regular payment of liberal salaries to a line of officials that a most prosperous financial institution would consider the limit of extravagance, and as the company referred to has for several years gracefully supported a magnificent indebtedness, it seems hardly justice to the patient stockholders."

Regarding Utah stocks, Jas. A. Pollock of Salt Lake City, says: "A change in the management of the Ajax is very likely to occur within the next thirty days, one of the heavy holdings, that of Ryan and Nebeker, having just changed hands. Awaiting this prospective change, but little work is being done at the properties. Investors will probably look with more favor upon the stock should the management get into new hands, as all differences would then be settled. Already a better feeling has occurred in the stock. Anchor continues inactive. Somewhat increased inquiry for Bullion-Beck, evidently in anticipation of an early resumption of dividends, caused the stock to strengthen materially. The mines are looking and doing quite well. From the president of the company assurances of a dividend in August have been received, but it is sometimes best to await formal action by the board. Buckeye is prosecuting development work but the stock continues inactive and weak. Mercur has paid its July dividend and the stock sold up to and even above the $5 mark, closing strong and in fair demand. While the stock did not change materially, Mammoth held firm and was in some demand. Holders have evidently determined to play a waiting game. The mill is working to full capacity. Northern light was somewhat shaded. The mines are looking extremely well and the mill continues to do good work. Its new capacity should soon be completed. Ontario also lost some of its strength, but the labor troubles having been settled a reaction should come at once, although for some reason not given, the July dividend is being delayed. At local headquarters no opinion is expressed as to the delay. Omaha was not active and prices remained unchanged. This stock is looked upon with much favor as a long hold."

San Francisco Stock Board Sales.

SAN FRANCISCO, July 29, 1897.

9:30 A. M. SESSION.

100 Andes	15	200 Savage	32
100 Belcher	26	800 Sierra Nevada	1 35
150 Best & Belcher	44	300 Standard	1 60
100 Gould & Curry	43	350 Union	52
950 Mexican	31	250 Utah	07

SECOND SESSION—2:30 P. M.

200 Ophir	83	350 Sierra Nevada	1 75
900 Mexican	38	400 Utah	08
2700 Gould & Curry	56	400 Overman	09
1100 Best & Belcher	50	1000 Union	60
400 Con Cal & Va	1 50	300 Alta	07
1000 Savage	40	300 Occidental	11
900 Chollar	80	100 Andes	16
600 Potosi	47	50 Standard	1 55
250 Crown Point	24	50 N. G. & C	15
600 Belcher	28		

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JULY 20, 1897.

586,530.—TELEPHONE.—W. W. Beck, Sebastopol, Cal.

586,681.—BICYCLE HOLDER.—G. W. Douglas, S. F.

586,707.—OIL WELL PUMP.—F. A. Garbutt, Los Angeles, Cal.

586,843.—EGG CRATE.—J. J. Goldbaum, Tucson, A. T.

586,737.—HARROW.—G. E. Guerne, Santa Rosa, Cal.

586,727.—DENTAL TOOL.—J. W. Hard, Tacoma, Wash.

586,793.—TELEPHONE.—S. C. Houghton, S. F.

586,614.—GEARING.—W. A. McCollough, Pasadena, Cal.

586,826.—EXPLOSIVE ENGINE.—F. A. Redmon, S. F.

586,937.—MUSIC LEAF HOLDER.—O. Sell, Modesto, Cal.

586,938.—HYDRAULIC MINING GIANT.—J. P. Simmons, S. F.

586,831.—SCALE INDICATOR.—E. Stebinger, Portland, Or.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

EXPLOSIVE ENGINES.—Frederick A. Redmon, San Francisco, Cal., assignor to B. L. Ryder, same place. No. 586,826. Dated July 20, 1897. This invention relates to explosive engines of that class in which explosive gas or vapor is employed to impel the piston and produce its ultimate reciprocations from end to end. It consists in the combination of duplicate cylinders, the pistons of which are connected with a crank on a common shaft, a driven shaft operated from the crank shaft having its ends projecting directly into the explosion chambers, electrodes in these chambers and on the extremities of the driven shaft respectively so that the alternate making and breaking of contact will produce the spark for igniting the charge at the proper intervals. In connection with this is a means for opening the exhaust valves for the escape of the products of the explosion, the valve being operated from the driven shaft. The inlet or suction valves which open into the explosion chambers have spring-controlled stems and a sliding sleeve adapted by its position to limit at various points the movement of the inlet valve stem and the governor operated by the driven shaft with connections from the governor to operate the regulating sleeve.

Rainfall and Temperature.

The following data for the week ending 5 A. M., July 28, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

CALIFORNIA STATIONS.	Total Rainfall for the Week	Total Seasonal Rainfall to Date	Total Seasonal Rainfall Last Year to Same Date	Average Seasonal Rainfall to Date	Minimum Temperature for the Week	Maximum Temperature for the Week
Eureka	00	.03	00	.12	48	62
Red Bluff	00	00	00	.03	60	98
Sacramento	00	00	00	00	80	52
San Francisco	T	T	.04	.02	48	62
Fresno	00	00	00	.01	52	104
San Luis Obispo	00	00	.04	.....	48	86
Los Angeles	00	00	00	.02	58	82
San Diego	00	.01	00	.01	60	72
Yuma	00	T	00	.14	70	108

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Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced first-class agency. We have able and trustworthy associates and agents in Washington and the capital cities of the principal nations of the world. In connection with our scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us to give advice which will give inventors the expense of applying for patents upon inventions which are not new. Circulars and advice sent free on receipt of postage. Address **DEWEY, STRONG & CO., Patent Agents, 330 Market St., San Francisco, Cal.**

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The Following Machinery, Nearly New. Now Located in State Agricultural Exposition Building at Sacramento:

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Two Tubular Steam Boilers, 54 in. diameter, 16 ft. long, in good order, with Furnaces, Grate Bars and Settings complete; one Injector for each Boiler, and all the necessary Checks, Valves and Gauges.

One Stack, 48 in. diameter by 80 ft. long.

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WRITE FOR RATES TO

Pioneer Reduction Co.,

NEVADA CITY,.....CALIFORNIA.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from the May Flower Gravel Mining Co., in the May Flower Mine, near Forest Hill, Placer Co., to deposit tailings in Black Hawk Creek; from Dr. J. P. Welch, in the Pactolian Mine, near Genesee, Plumas Co., to deposit tailings in Grizzly Creek; from the Gold Bug Mining Co., in its mine near Georgetown, El Dorado Co., to deposit trilings in Canon Creek; and from E. D. Bowman et als., in the Eclipse and Boston Claims, near Onion Valley, Plumas Co., to deposit tailings in Poorman's Creek, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on August 2, 1897, at 1:30 P. M.

Skeleton Mining Report.

NEEDED BY EVERY MINING MAN.

FIFTY CENTS POSTPAID.

Mining and Scientific Press, 330 Market St., S. F.

Assessment Notices.

ROSE CREEK MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Star, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of June, 1897, an assessment (No. 1) of 15 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 163, Crocker building, junction Post, Montgomery and Market streets, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 21st day of August, 1897, will be delinquent, and advertised for sale at public auction: and unless payment is made before, will be sold on TUESDAY, the 14th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. M. WILMANS, Secretary.

Office—Room 163, Crocker building, San Francisco, California.

BEST & BELCHER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 1st day of July, 1897, an assessment (No. 62) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 4th day of August, 1897, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on THURSDAY, the 26th day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

M. JAFFE, Secretary.

Office—Room 33, Nevada block, 309 Montgomery street, San Francisco, California.

OSCEOLA CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Amador County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 30th day of June 1897, an assessment (No. 6) of 1 cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 307 Montgomery street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 2nd day of August, 1897, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on SATURDAY, the 21st day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

HOLLAND SMITH, Secretary.

Office—307 Montgomery street, San Francisco, Cal.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 9th day of June, 1897, an assessment (No. 7) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of July, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 9th day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors, the day of delinquency of the above assessment has been postponed to July 31st, 1897, and the day of sale to SATURDAY, August 21st, 1897.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

INYO MARBLE COMPANY.—Location of principal place of business, San Francisco, California; location of works, Inyo, Inyo County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of July, 1897, an assessment (No. 30) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 323 Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 28th day of August, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 20th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

M. A. CAHN, Secretary.

Office—Room 323 Phelan building, San Francisco, California.

MARGUERITE GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of July, 1896, an assessment (No. 7), of 10 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, 237 12th street, San Francisco, California.

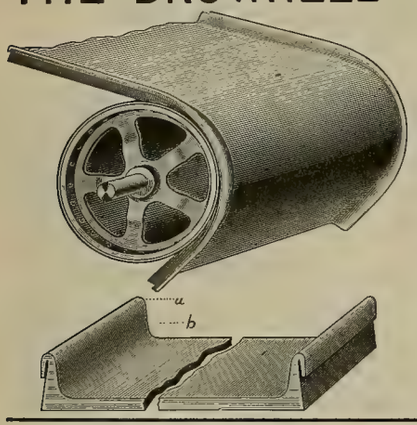
Any stock upon which this assessment shall remain unpaid on the 10th day of September, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 11th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

F. METTMANN, Secretary.

Office—237 12th street, San Francisco, California. The Secretary will also receive payments from 12 to 5 P. M. at his business office, 226 Sansome street.

THE BROWNELL "PATENT LIP" FLANGE FRUE VANNER BELTS.



It has taken years of ceaseless testing and experimenting to produce the superior belt which we now offer, with elastic flanges and pliable body reinforced with specially woven duck. Every belt is manufactured by experienced workmen, and carefully tested on machines especially built for that purpose; consequently we are to-day manufacturing the best belts that mechanical ingenuity, combined with honesty of construction, can possibly produce.

SUPT. OFFICE WILDMAN GOLD MINING COMPANY, SUTTER CREEK, AMADOR CO., CAL., Feb 22, 1897.

MR. JAS. S. BROWNELL, 132 Market St., San Francisco, Cal.—DEAR SIR: Replying to your favor of the 18th inst., will say that in the two mills operated by this company we have nineteen of your Patent Lip flange concentrator belts in use; some of them have been in constant use for the past two years and have given entire satisfaction. I know of no better flange for a side shake machine.

Yours truly, JOHN ROSS JR., Superintendent.

MEXICAN MILL, EMPIRE, NEV., March 28, 1897.

MR. J. S. BROWNELL, San Francisco, Cal.—DEAR SIR: For some years we have used three different styles of belts on our Frue vanner at the Mexican mill, and for smooth working and endurance the Brownell Patent Lip flange belt has proved its superiority over all others, and I unhesitatingly recommend it to all who are using Frue machines.

Yours truly, EUGENE MAY, Foreman.

For any information regarding Frue Vanner or Belts, call on or address

JAS. S. BROWNELL, Western Agent FRUE VANNING MACHINE CO.

(Successor to Adams & Carter.) 132 MARKET STREET, ROOM 15, SAN FRANCISCO.

RISDON IRON WORKS,

Office and Works: Cor. Beale and Howard Sts., San Francisco.

READ WHAT MINERS THINK OF THE BRYAN PATENT ROLLER QUARTZ MILL AND JOHNSTON CONCENTRATOR.

OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO., SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

RISDON IRON WORKS, San Francisco—Gentlemen: Our company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60 mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screens 12 tons in 24 hours; through 50-mesh, 15 tons; and through 40 mesh, 18 tons. This proportion has been continuous.

One set of dies will crush from 1500 to 1600 tons.
One set of tires will crush 1500 tons.
One ring plate will crush from 2200 to 2300 tons.

The mills require very little attention. At our mill an ordinary "peon," earning one dollar per day, has complete charge.

In regard to sliming, in comparison with stamps, by reason of the discharge surface and the continuous agitation by the scrapers, a MUCH less amount of slime is created. A three years' experience teaches me that, in every respect, the mills are a complete success, and of material benefit to the mining world. They can be set up and running in forty-eight hours and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator it is unequaled by any mill now in existence. Yours truly,

D. M. BURNS, Superintendent.

BULLION-BECK AND CHAMPION MINING COMPANY, EUREKA, UTAH, August 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz., capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK, Pres.

SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec't'y.

BULLION-BECK AND CHAMPION MINING COMPANY, EUREKA, UTAH, Aug. 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly, JOHN BECK. Pres.

SIMON BAMBERGER, Director. W. J. BEATIE, Sec't'y.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY, S. BAMBERGER, President and Manager, SALT LAKE CITY, UTAH, October 10, 1895.

B. R. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly,

[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO, C. C. McIVER, President; D. CUSHMAN, Secretary, MISSION SAN JOSE, CAL., Oct. 17th, 1895.

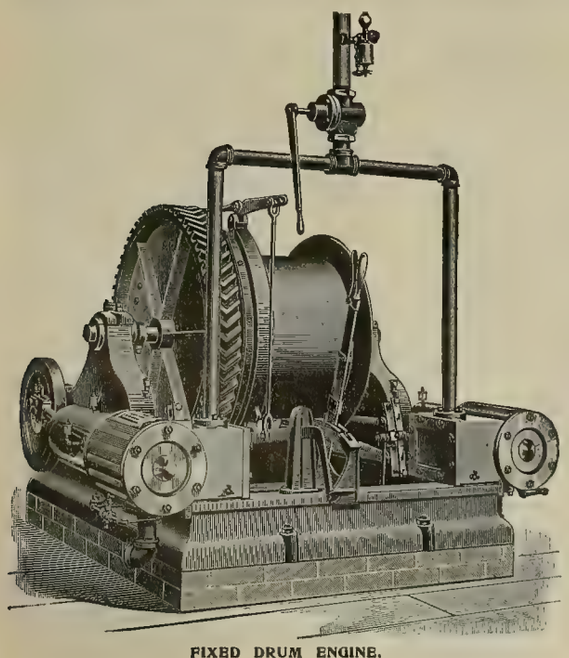
RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year. CHAS. C. McIVER, President.

Fulton Engineering and Shipbuilding Works.

Improved Mining and Milling Machinery

OFFICE AND BRANCH WORKS:

213 FIRST STREET, - - - - - - - - - SAN FRANCISCO, CAL.



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MINE PROSPECTING AND DEVELOPMENT.

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Ropp Straight Line Furnace for Roasting, Chlorinating and Desulphurizing Ores.

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Huntington Centrifugal Roller Quartz Mill.

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Horizontal, Vertical and Portable Engines, Boilers,
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MINING AND SCIENTIFIC PRESS.
AND PACIFIC ELECTRICAL REVIEW.

No. 1935.—VOLUME LXXV. Number 6. SAN FRANCISCO, SATURDAY, AUGUST 7, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Novel Method of Cable Carrying.

Some weeks ago appeared in the Telluride, Colorado, *Journal* an account of a novel method of moving a steel wire cable, which was deemed worthy of notice. Through the courtesy of Mr. H. L. Servis, the editor of the *Journal*, a photograph of the sight as seen in Telluride was secured from Moore Bros., the local photographers, from which the accompanying illustration was engraved. It gives a graphic idea of the difficulties often encountered and as often ingeniously solved by miners all over this west half of America. The accompanying account is clipped from the *Journal* of issue July 3rd, '97:

"A Big Undertaking—Twelve Thousand Feet of Tramway Cable Packed on Mules. Telluride witnessed a novel and interesting sight yesterday afternoon, when a pack train of sixty-five mules selected from D. Dimond's herd of pack animals, loaded with the new cable for the tramway between the Nellie mine and the Telluride Power Transmission Co.'s mill, up Bear creek, were grouped on Colorado avenue for the purpose of being photographed. It is believed this method of moving tramway cables from the railroad to their point of destination originated here, and it certainly obviates the almost impossible difficulties that attend the moving of great masses of material over our mountain trails. The cable in mention was manufactured for the company building the tramway and reached here Thursday, wound on a single spool containing 12,000 feet of ⅞ steel wire rope weighing nearly 15,000 pounds. The first step was to arrange the cable for packing, and this was done

TWELVE THOUSAND FEET WIRE ROPE PACKED ON SIXTY-FIVE MULES IN COLORADO.

TRANSPORTING AN 800-POUND CAM SHAFT THROUGH A TIMBERED COUNTRY TO AN OREGON GOLD MINE.

by unwinding from the spool and recoiling it into 130 small coils of some 3 or 4 feet in diameter. These coils were tied with wire and laid about 9 feet apart. When this was done the mules were brought down from the barns at Pandora and strung along the coiled cable that stretched out over two blocks of ground. Beginning at the lead mule the packers then raised each set of two of the small coils, placed them over the saddle, to which they were firmly lashed so as not to shift from an even balance while on the trail. The work of loading the cable was completed in less than three hours, and after posing for the photographer the train of sixty-five mules with its load started for its destination on the tramway line."

The inventive genius of the American miner is further shown by the subjoined; the cut alongside depicting the conveyance through dense spruce woods of a cam shaft to the Bohemia district, Lane county, Oregon.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

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J. F. HALLORAN.....General Manager

TO THE PUBLIC.

No one is authorized to solicit business for this paper unless in possession of proper credentials and regularly numbered and stamped blank subscription receipts.

San Francisco, August 7, 1897.

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The Canadian Royalty on Gold Mining in the Yukon.

The Canadian mining laws are in many respects very much superior to ours. Requiring miners to take out a license and to pay a registration fee on locating a claim, and another for each year that it is held, they in return practically guarantee a miner's title and mining litigation is as a consequence impossible there. In the settlement of disputes there is a final authority close at hand, and disputants are assured of justice or the other thing without vexatious delay. The miners have also the satisfaction and benefit resulting from the entire expenditure of the money taken from them in fees in the construction of roads and trails and other public utilities for their direct benefit. The last promulgated laws are, however, a most surprising and mischievous innovation which has no precedent in the action of any other Government toward gold mining. In addition to the fees and charges already imposed, the Government proposes to exact a royalty of 10 per cent of the gross product of claims producing less than $500 monthly and 20 per cent where the product is over $500 a month. It is also proposed that when new districts are discovered every alternate claim shall be reserved by the Government. This last proposition is practically the equivalent of saying to miners, "You must not find new mines, for if you do we will take one-half away from you." The attempt to apply it will inevitably result in stopping exploration by taking away its incentive. In the imposition of the royalty, it is charitable to believe that the Canadian Government is suffering from a temporary loss of intelligence. It has undoubtedly been made dizzy contemplating the large fortunes made so rapidly in the Klondyke placers. It has undoubtedly become possessed with the idea that all the placers of the Yukon in Canadian territory, particularly those yet to be discovered, are equally as rich, and that it ought to have a share of the gold that is so easily to be obtained. The most moderate reflection on the history of gold mining everywhere in the world should have precluded the Government from becoming possessed of this wild, crazy idea. Gold mining everywhere gives in the end, or through a number of years, just about the same average of reward. While some few individuals make riches, more make simply good wages, and the great mass barely make a living. There is no reason to suppose the Yukon, with its terrible climatic handicap, will do more than California, more than Australia, more than Russia, or more than South Africa. The average of profit in these has ultimately come to be the same, all things being considered, and that profit is less than the royalty proposed to be exacted by the Canadian Government. Not only is it less, considering the average, but it is only of the very richest mines that any profit margin would be left after deducting a royalty of 20 per cent of the gross. This will be clearly evident on examining the published balance sheets and reports of the Transvaal mines or of the gold mines owned by English capital the world over. It is only exceptionally that the dividend balance exceeds 20 per cent of the gross output. The inevitable effect of the persistence of the Canadian Government in its royalty policy will be the abandonment of mining and exploration in the Canadian portion of the Yukon basin.

How to Prospect in the Yukon Gold Fields.

The great majority of the men rushing to the Klondyke are "tenderfeet." They have never seen a gold mine, and their comprehension of what is a gold mine is derived from a perusal of the flotsam and jetsam of the daily press. Few of them go prepared to buy claims already opened, and must locate and prospect claims for themselves. Brain-laden with absurd ideas as to the origin of the gold, and ignorant of the natural laws of its distribution, confronted in the country with the severest physical conditions under which gold mining is followed anywhere, it is impossible but that there should be many disappointments before a sufficient number of successes shall have come to accumulate the needed experience. Elsewhere in this number of the PRESS is an article on "The Alaska Gold Fields," which will repay careful reading by those intending to mine in that country. Its discussion of the geology and topography of that mining locality is the basis of the suggestions here made.

The first thing that a "tenderfoot" miner going to the Yukon from this city should do is to visit the State Mining Bureau museum and acquire as far as possible an acquaintance with the appearance of the commoner varieties of the rocks. He should so familiarize himself as to be able to recognize granite, sandstone, limestone, slate, serpentine, schist, diorite, diabase, talc, trap, dolerite, dolomite and porphyry. It is not anticipated that he could become infallible in recognizing these rocks, but he should be able to successfully recognize them in the majority of instances. The ability to recognize gold, mica, pyrite, chalcopyrite and galena is also advantageous.

On the ground, and presuming all of the possible ground of the Klondyke placers already appropriated, the attention of the miner should be first given to unproven possible ground in the valleys of streams adjacent to those in which gold has already been found and to the valleys of streams which head in the same hills or mountains as do these known gold-bearing streams. It is possible for the lode system which has enriched one stream to have been cut by the drainage basin of another, so that it has enriched that as well. In the Yukon, as elsewhere, the mountain uplifts have resulted in forming fissured and fractured zones in the rocks which have filled with the gold ores. These, if on one side of a mountain, are apt to be duplicated on the other; and, though neither can be seen, both can be inferred from the discovery of gold on one side of the drainage. It is justified to look for gold on the other side as well. As an additional guide, the gravel rock fragments in the gold-bearing stream should be compared with that being prospected. If the two contain identical rocks, and particularly if they both contain quartz, diorite, diabase or porphyry pebbles, it is worth the chance to extend the prospecting, even if the first efforts disclose no gold. When gold is found in several claims in the same valley, the direction of the line of the deposit should be noted and the first prospecting should be done in that line as being the most probable one for the placer. The gold produced by the several claims going up stream should be compared both in total quantity and size of grains. With the data of this comparison it is possible to reason out the locus of the richest ground and also to know when the lode source of the gold is being approached. Coarse gold, gold with attached quartz fragments and rough gold all indicate that the source is comparatively close at hand—that a point is being reached beyond which there will be no placer. The Russians, in their mining of the Siberian placers, failed generally to recognize the lode sources of the gold, and in many instances carried their prospecting for placers miles up stream beyond the lodes from which the gold came. There is no reason for American miners making the same mistake. Another indication of nearness to lodes is the presence of rough fragments of pyrite, chalcopyrite or galena. Even if these last do not lead to gold-bearing lodes, they may lead to valuable lodes of copper or lead.

Generally, anything heavy that is found in the mining should be determined. Silver, quicksilver, tin and nickel ores and platinum are all worth considering even in Alaska. The possibility of their occurrence should not be lost sight of, the more particularly as their discovery is only to be made by following up the stream indications. The covering of snow over the surface for seven months of the year, the covering of moss for the other five months, precludes the possibility of prospecting by the ordinary surface methods.

Where it is necessary to prospect without the guide of discoveries already made adjacent, almost total dependence must be placed on the character of the pebbles in the gravels uncovered in prospecting. If much quartz be found, even though no gold at first, it is advisable to cover the possible ground for a placer pretty thoroughly before abandoning it finally.

As a general proposition it will prove very advantageous for a dozen or more miners to co-operate in making a systematic exploration of unknown ground. Work can be done cheaper, faster and surer than by the same men acting independently. Co-operation admits of increasing the tool outfit by a blacksmith shop and drill outfit. Powder can be used and the prospect holes sunk through the frozen ground much faster than by fire. Prospecting can be spread over a much larger area by co-operation than by the same men acting each for himself. Co-operating, once the gold lead is found, the whole company are in a position to intelligently secure a valuable claim for each member and to get the claims so connected that they can be economically exploited as one property. It must be remembered that the present cumbersome method of exploitation will soon be replaced by quicker and better ones, admitting of the profitable working of the ground now left unworked and distinctly advantageous to large claims compared with small ones.

A Free Tariff Zone in the Yukon.

Not content with taking 10 and 20 per cent royalties, not satisfied with reserving half of the gold mines that may be hereafter discovered to itself, the Canadian Government is taking heavy toll in the way of duties on the individual outfits of miners to the Yukon from the United States. Assuming that such mistaken policy will be abandoned before long, the question of duties may come under consideration on its merits. If it should, the suggestion is made that both countries, for an agreed term of years, make the Yukon basin a tariff-free zone. The conditions of life are hard enough there at the best, and Government policy should be directed to lightening the burdens of miners to the largest possible extent. Till the country builds up its industries the admission of Canadian goods to our portion of the Yukon basin, either overland or by the river, could be duty free, and the corresponding privilege could be extended to American goods in the Canadian portion of the Yukon basin. The conditions are such at the present time that Canadian goods to enter its own territory must cross our territory, and our goods for our section of the basin, except by the river route, must cross Canadian territory. These conditions create annoyances and vexatious charges that benefit neither Government, nor the citizens of either. The extraordinary conditions justify extraordinary action. It will be good business policy for the action to take the form suggested, the formation of the Yukon basin into a tariff-free zone for a term of years.

Concentrates.

GOLD from Riddle, Oregon, placer mines is 23.28 carats fine.

GEORGETOWN, Cal., is being rebuilt in a substantial manner.

ALL outfits imported into Klondyke are subject to Canadian duty.

LAST Saturday was shipped from New York to Europe $3,975,000 in gold.

A BRITISH COLUMBIA mining section has been opened in the London Exchange.

SO FAR about as much gold has been taken into the Klondyke as has been carried out.

TO JULY 1st there were 1770 mineral claims recorded in Fort Steele, B. C., mining district.

THE Methow Mining Co., near Ives, Wash., report a 24-inch ledge unusually rich in copper.

WHEN the Golden Gate mill is finished, Mercur, Utah, mills can daily handle 1000 tons of ore.

OLINGHOUSE CANYON, Nevada, reports "dirt $100 to the shovelful," thus discounting Klondyke.

THE first best evidence of an international bimetallic agreement will be a rise in the price of silver.

GOLD placers easily worked are reported forty miles east of White Hills, Arizona, on the Colorado river.

FROM January 1st to July 27, '97, there was exported from New York gold to the value of $25,518,713.

THE New Zealand courts have allowed an amendment of the patent of the Cassel Gold Extracting Company.

THE purchase of the Pilot Bay smelter by the Omaha and Grant Smelting Company gives Kootenay three smelters.

JAS. TAYLOR, superintendent Mammoth mine, Summit Flat, Idaho, is about to replace his 8-stamp mill with a larger one.

PRESIDENT MYERS of the Diamond R at Neibart, Montana, is planning to build a 100-ton concentrator and two-mile flume.

THE election of officers of the California State Miners' Association will be at the annual convention in this city on Oct. 18, '97.

DURING July, 5,824,950 ounces of silver were exported to Europe from New York. Present quotations are lowest on record—55⅛ cents.

"I am going to the Klondyke to make money to develop my California property," is what three miners told "Concentrates" last week.

ASSESSMENT WORK is now in order. In case of joint ownership of adjacent claims work done upon one tending to development of all suffices.

THE old theory that Arizona gold mines didn't "go down" is being abundantly disproved in Prescott and elsewhere through the Territory.

IN the next two or three years prospectors will drift south from the Klondyke and north from Cariboo, going over that entire northern country.

THE present depreciated price of silver calls strongly to mind the conditions of '76, when for a $20 gold piece in this city, one got $19.75 in silver.

BATTLE MOUNTAIN, Nev., reports the discovery of recent copper properties there by Salt Lake men that are considered worth extensive development.

INCLUDING '97 Boston figures that copper mine dividends paid in that city aggregate over $82,500,000, approximating the Comstock twenty years ago.

DRIFT MINING constitutes one of the most promising of returns in California, as where rightly started the proportion of profit to the investment is unusually great.

NOW is the time of year when papers that do their little best or worst to discredit mining all the remainder of the year get up a "special mining edition."

THE Mountain Copper Company, Shasta Co., Cal., have relinquished the bond on the Windy Camp mines to Alex Hill. They spent considerable money in development work.

THE Gold Creek Mining Company of Nevada have, in the current issue of the Gold Creek *News*, twenty-nine notices of applications for patents. This is declared to be only a part of the company's holdings.

FROM Milford, Utah, comes a report of something new in that locality—the bed of an ancient lake to be drilled in various places to a depth of 40 feet, on the assumption that beneath the hardpan gold will be found.

THE case of Silver Peak Mining Company of Esmeralda county, Nevada, vs. L. J. Hanchett is on trial in the U. S. Circuit Court at Carson. The case is one to break a contract of the sale of the property and to recover $201,000.

THE Klondyke craze, unfortunately, adds to the already too large list of those who assume to add "Mining Engineer" after their names without possession of the necessary qualifications, striving to better themselves and best others.

EMULATING the Sutro tunnel, the proposed Pike's Peak tunnel and other gigantic bores, Florence, Idaho, proposes a tunnel to tap that camp at a depth of 3500 feet. The capital stock is $25,000,000. A special act of Congress will be sought.

SUPERINTENDENT CHAMBERS of the Ontario and Daly, Utah, mines, says regarding the low price of silver, that a drop in wages there is inevitable: "it is necessary that the miner share the distress to which the companies are subjected," he says.

A REVIVAL in nickel mining is reported in New Caledonia, Australia. Contracts for the supply of 20,000 tons of ore have been made. John Higginson and Earl Dunmore have engineers opening up copper, gold and nickel properties at the north end of the island.

A BOSTON dispatch says "fourteen workmen out of employment, led by a socialistic politician, have started to walk to the rich mines of Klondyke," which painfully illustrates the resultant inconvenience of being destitute of brains in Boston or elsewhere.

DYNAMITE is 75% nitro-glycerine, 25% infusorial earth; dualine 80 parts nitro-glycerine, 20 nitro-cellulose (gun cotton); rend-rock 40 nitro-glycerine, 40 nitrate of potash, 13 cellulose, 7 paraffine; giant powder 36 nitro-glycerine, 48 nitrate of potash, 8 sulphur, 8 resin or charcoal.

THE Le Roi Company has let the contract for the erection of its smelter at Northport. According to British Columbia papers, there is considerable indignation over the action of the Spokane company, and the belief is expressed there that the Dominion Government will put an export duty on ore. The Le Roi Company is charged with having failed to show that smelting at Northport will be cheaper than at any British Columbia site offered them. The papers accused the company of double-dealing and bad faith.

THERE is a present deplorable waste of effort in the energetic impulse to boom the British Northwest Territory. One-fifth of the free advertising and money spent in the last three weeks would be of incalculable benefit to the mining industry of the State.

BESIDES the present Alaska "rush," there is also a stampede in Peru to recently discovered gold fields in the Andes foothills and to the mainland of New Guinea. Enthusiastic British scientists assert there is also gold in the stars, but travel in that direction is necessarily limited.

THE San Francisco Mint reopened for business last Monday after six weeks' close for the annual recounting, etc. The gold accumulations at the Mint during the six weeks was $4,000,000. Of this about $800,000 was from Klondyke; the remaining $3,200,000 represented the usual receipts.

IN the case of the water dispute in Shasta Co., Cal., between the Mountain Copper Co. and Messrs. Paul and Garlick, the U. S. District Court decrees that Paul and Garlick shall have the right to divert fifty miners' inches of water from Spring creek and the Copper Company 340 inches.

W. J. ARKELL, proprietor of a New York City illustrated paper, is not wholly devoid of nerve. On the strength of an alleged "expedition" to Alaska in '90, he lays claim to 4400 square miles of "gold fields" on the Yukon and now announces that he will "enforce" his claim. He will have a happy time of it.

THE Teagarden mill at Magnolia, Colorado, owned by the Buckeye Company, is to be changed to a concentrating mill. This was a chemical process of which great things were claimed for a number of years, but was productive of no tangible results. The inventor still claims that it was a success if it had been fairly tried.

ACCORDING to the Marysville, Cal., *Appeal*, J. Hibbert of Brown's Valley, Yuba county, Cal., this week refused an offer to go to Klondyke for Eastern people of $15,000 for the first, $25,000 for the second year's expenses, a year's supplies to await him at Dawson City, and ten per cent interest in any discoveries he might make.

IN California, Colorado, New York, Ohio and Pennsylvania have already been organized Klondyke mining companies, with stock for sale, the intent being to thus secure sufficient funds to send a corporation representative. Beyond the speculative feature of the proposition, the main point for such a company is to be sure of its man.

"A TECHNICAL JOURNAL with a thousand subscribers has a greater number of readers of the sort the advertiser wishes to appeal to than the daily paper circulating a hundred thousand copies." And a technical journal with 6000 intelligent subscribers offers better inducements to the advertiser in that line than ordinary others circulating half a million daily.

REGULATIONS respecting the issue of leases to dredge for minerals in the submerged beds of rivers in Manitoba and the Northwest Territory have been made by the Ottawa council. A twenty-year lease may be given by the Minister of the Interior for the exclusive right to subaqueous mining and dredging for minerals, with the exception of coal, for an unbroken extent of five miles of the river.

THE 20-stamp mill at the English Mountain mine, Graniteville, Nevada county, Cal., was burned to the ground last week. It is thought the fire caught from a spark from the blacksmith shop. It was erected two years ago by the English company which then operated the mine, and it is thought by the *Union* to have cost $40,000. The property was uninsured and is a total loss to J. Holdsworth, the owner. The mine is under bond to San Franciscans.

ALMOST daily passenger steamers are leaving San Francisco for the Klondyke, while the number of smaller craft headed northward is increasing. The same statement applies to northern ports. Four steamers left Seattle, Wash., this week with 1200 passengers and about 700 horses. The crush will make terrible hardship for thousands this fall and winter, but it appears of little use to point out the inevitable result to those afflicted with the present craze.

"THE Alaska Cynite Co." is sending letters to California men claiming to control an "equanomical system of placer mining," having three of the best mines in Klondyke, with expectations to "mine one million in gold by Sept. 1, '98, at which time there will be a hansome dividend." Suggestion is made that a club be informed in each "vacinity" and stock purchased. The alluring document should be circulated in darkest Indiana or Ohio and allied with Hartzfeldt, Pearce and other fakirs.

MANY California miners remember Dr. Noble Martin, "Old Grizzly," whose recent demise was a matter of personal regret to many. O. K. Cloudman of You Bet, Nevada county, Cal., has taken up the idea of a suitable monument to his memory. Hon. J. H. Neff, president of the California State Miners' Association, has consented to act as treasurer, and it is unnecessary to say that the efforts in life of Dr. Martin deserve the fullest recognition at the hands of those whose principles he so ably defended.

THE salient points of the recent Colorado Supreme Court tunnel decision are that the owner of a tunnel site is entitled to blind lodes discovered in running the tunnel, providing, they were not discovered on the surface prior to the tunnel location; that he has prosecuted work in the tunnel with reasonable diligence; he has no right to run the tunnel through a previously located lode without permission; the law having been complied with, he is entitled to 1500 feet on any lode discovered in the tunnel, the same as if discovered on the surface.

IF copper ore, in carbonate form, happens to be in the gold or silver ores treated, it will require sixty pounds of cyanide solution to each per cent of copper it contains. Sulphuret of zinc in ore always causes trouble, and antimony, if alloyed with gold prevents the extraction of the latter metal. If one-tenth of one per cent of antimony is taken up by the solution it at once becomes worthless. Pyritic ores, if free, will work raw, otherwise they must be roasted. The solution has great affinity for chloride of silver.

CONGRESSMAN BELL of Colorado has introduced a bill in Congress amending the tunnel site act, to provide that if the tunnel owner wants to claim and hold a tract 1500 feet wide by 3000 feet on the tunnel he must keep two shifts of miners at work all the time. Failing to do this, he can only hold the width of the tunnel for prospecting purposes, depending upon the discovery of lodes not discovered on the surface for his labor. The recent decision of the United States Supreme Court says, in effect, that so long as a tunnel owner works with reasonable diligence he can reserve the larger tract for prospecting.

THE mining plan adopted last winter at the Klondyke was to burn wood to thaw out the ground, but this method is slow and expensive, as wood costs from $8 to $15 a cord, and the heat caused by the burning wood made it difficult to keep the fires going, as water from the melting snow kept pouring down. A new device is proposed, a sort of improvised blast furnace, which can be operated with wood, charcoal or petroleum, by which it is hoped that three men with a machine can thaw out 10 to 30 feet of frozen ground per day. The miners' ingenuity can be depended on to solve the problem. One sanguine inventor has devised a small high pressure boiler with steam hose attachments and an iron nozzle, to be driven into the frozen ground and the steam turned on, when he expects rapid and effective work to be done.

THE latest obtainable authentic reports regarding the production of gold and platinum in Russia say: In the gold beds under the management of the Department of Mines 2372 poods (86,357 pounds) of gold were found in 1895. Over half this amount came from the territory of Irkoutsk, about one-fourth from the Ural, and the remainder from Tomsk. From the gold beds belonging to the Czar 137 poods (5017 pounds) were taken. Of this amount the larger part came from the district of Jourguine. About 10 pounds were found in Finland. It appears from these figures that the total production was 108 poods (3800 pounds) less than the production for the preceding year. Platinum is found in the Ural, in the districts of Perm, and in the mountainous regions of Verkhoutorski. Nearly 270 poods (9735 pounds) were extracted during 1895, more than 1750 pounds less than during 1894. This decrease was due to the rainy summer. Eleven pounds of iridium were found in the district of Orenburg.

IN its recent session in Denver the International Mining Congress named a committee of five to revise the United States mining laws and report its results to Congress, and subsequently authorized the president to increase the committee by adding one representative from each of the mining States not originally represented on the committee. Accordingly President L. B. Prince has named the following: W. S. Keyes, California; F. J. Newlands, Nevada; W. S. Haskins, Idaho; W. A. Clark, Montana; G. B. Dennis, Washington; W. B. Potter, Missouri. The original members of the committee are: J. E. Todd, South Dakota; G. J. Moore, Colorado; R. A. F. Penrose, Arizona; F. A. Reynolds, New Mexico; Lamar Cobb, Georgia. The committee will meet at Denver, September 7th.

DR. KEITH, formerly of this city, now of London, claims to have invented a new cyanide process, in which in the dissolving process he adds to the solution of potassium cyanide a certain amount of cyanide of mercury. He states that he finds the best results obtained when the solvent contains 0.05 per cent of potassium cyanide and 0.025 per cent cyanide of mercury. This mixture of cyanides, he claims, operates faster than the simple potassium cyanide. The process for the recovery of the gold from the solution is an electrolytic one. The gold and the mercury are deposited together upon amalgamated copper plates. The amalgam so deposited is scraped off and the gold recovered by distilling off the mercury in the usual way. The anode is not allowed to dip in the cyanide solution, but is placed in a separate compartment and surrounded with a solution of an alkaline salt, so that the cyanide does not become decomposed. The electro-motive force of the current need not be more than half volt, and the current density on the depositing surface may be as low as 0.06 ampere per square foot.

A GOOD anti-friction and preserving compound for mine cables is as follows: Soft tallow, seven parts; plumbago, three parts; mix thoroughly; make a long, hollow box or trough; gouge out a 4x6 piece of scantling about two feet long; saw it down lengthwise and hollow out the box or trough enough to hold several pounds of the compound, making a hole lengthwise of the trough for the cable to run through. Affix to rope and clamp securely; have the box or trough so fixed that it cannot play, and let the cable pass through it while going up or down, so that it will get a thorough coating. This will preserve a round cable very well, and can be used at least once a week. For a flat steel cable raw linseed oil can be used instead of the tallow, in about the proportion of six parts of oil to three of plumbago. When tar is used, linseed oil should be added to keep the tar from adhering, both ingredients to be mixed while warm.

IN the Beam process, now occasioning considerable notice in Colorado, the furnace consists of a series of muffles, constructed of firebrick and tiling. The ore is first crushed to a forty-mesh and then put in the muffles, from which the air has been excluded. The roasting is then begun and is kept up until the chemical combustion takes place when hot air, or oxygen, is introduced, which changes the sulphides to sulphates and thus saves the value. The time of the roast runs from one to three hours, and the cost is claimed to be less than 50 cents a ton. A low degree of heat—not more than 400 to 500 degrees Fahr.—is required. After the roast the ore is pulverized to a 70 or 80 mesh and is then treated by pan amalgamation. The owners' claim for the process is that the ordinary fire assay does not show the value of the ore, while the Beam process prevents loss by volatilization.

AN important case is that of the Union Oil Co. of California, now before the Interior Department. It was heard last fall by Secretary Hoke Smith, and it is now before Secretary Bliss on review. The question involved is as to whether oil lands are mineral under the United States statutes. In this case the lands are a part of those patented to the Atlantic and Pacific Railroad Company, the statute granting them excepting in terms "mineral lands." Sixty oil land patents were issued on these lands, and on the last day Secretary Smith was in office he decided that this exception only embraced metalliferous minerals, and that oil lands therefore belonged to the railroad company and were not subject to patent. This decision embraces not only oil, but alum, asphaltum, borax, marble, kaolin, coal and similar minerals. The oil companies have already expended considerable money, and the other minerals included within the terms of the decision will make the amount involved reach into hundreds of thousands of dollars in Western railroads. The attorneys for the oil company feel confident of securing a reversal of Secretary Smith's ruling. The decision will be of great importance throughout the State.

A Sample Warehouse for American Goods in Caracas, Venezuela.

Plans for the establishment of an exhibition warehouse in the city of Caracas, Venezuela, have been matured, and the National Association of Manufacturers is now ready to receive applications for space in the building which has been secured for the purpose. The warehouse is designed to serve as a permanent exposition of American goods and as a headquarters for salesmen visiting Venezuela in the interest of exhibitors. The aim of the Association in establishing this warehouse is to stimulate trade between the United States and Venezuela by familiarizing the merchants of Venezuela with the American goods which they can purchase to advantage. This warehouse is being established under the terms of a special concession granted to the National Association of Manufacturers by the Government of Venezuela. This concession gives the privilege of entering goods free of duty when intended for exhibition in the warehouses of the Association in Venezuela, duty to be paid only in case of the actual sale of the goods. This privilege, the high favor with which all things American are regarded in Venezuela, and the large variety of American-made goods which are salable in that country, make the conditions exceptionally favorable for the inauguration of such an enterprise. Prominent business men in Caracas have taken active part in the preliminary work of establishing this warehouse, and the Venezuelan Government has manifested a lively interest in the project and has indicated a disposition to aid in every practicable manner in making the enterprise a complete success. As this is the first of an extensive system of similar depots which the National Association of Manufacturers contemplates establishing in various foreign trade centers, it is desired that this warehouse shall be in every way a model institution of its kind. The plans for its organization and management have been carefully formulated, and the exhibits will be confined to those lines of goods for which there is a known market in Venezuela. There are many articles of American manufacture which it would be useless to attempt to sell in Venezuela, and exhibits of such goods as these are not desired. The entire enterprise is planned upon a basis of practical benefit to its participants, and it is believed that any manufacturer who shall make judicious use of the advantages afforded will be abundantly compensated for the expenditures of money and effort.

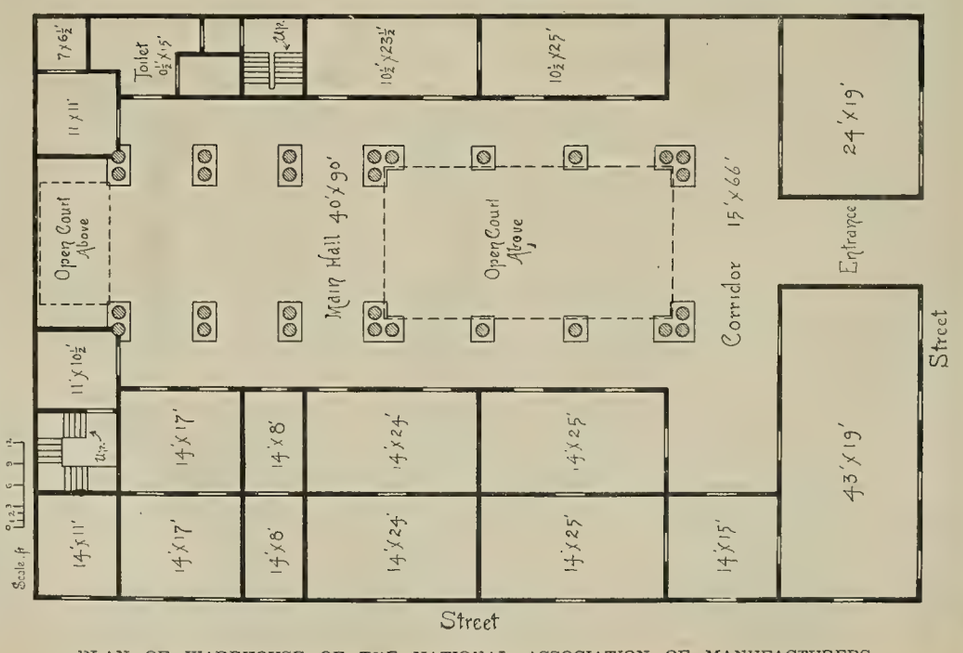
THE CARACAS WAREHOUSE OF THE NATIONAL ASSOCIATION OF MANUFACTURERS.

INTERIOR VIEW OF WAREHOUSE OF THE NATIONAL ASSOCIATION OF MANUFACTURERS.

The warehouse will enable intending buyers to examine under favorable conditions the various lines of American goods for which Venezuela affords a market. They will be able to examine actual merchandise—not illustrations or models. Buyers will be able to obtain all desired information about the goods, their cost, manner of sale, etc., and they may also compare them with other similar goods with which they are more familiar. While the actual sale of goods is not contemplated as one of the functions of the warehouse, buyers will be assisted to reach the manufacturers through the recognized channels of the importing and commission houses. Buyers will have access to the catalogues of many manufacturers not represented in the exhibit and will be placed in communication with the makers of any particular article which they may desire to obtain.

For the exhibiting manufacturer it will afford a continuous display of samples under conditions which will ensure careful attention from intending purchasers. It will serve as headquarters for representatives of the exhibitors who may visit Venezuela for the purpose of selling goods or investigating the market. To such representatives the facilities of the warehouse will render invaluable assistance in the shape of information and advice concerning trade matters. The warehouse may be made to serve as a bonded storehouse for the storage at reasonable cost of goods intended for sale in Venezuela, and can act as forwarding agent for goods held in bond, attending to the entry, payment of freights, duties, etc. For the training of salesmen for work in Venezela or any other of the South American Republics, the warehouse will prove an admirable school, as it will afford an excellent opportunity for the study of Spanish-American trade conditions and methods of doing business. In the collection of information of value to those who desire to do business in Venezuela the warehouse will be able to render service of much importance. It will be within the province of the warehouse management to gather complete and reliable data upon such lines as selling price of various articles, cost of these goods, where they are purchased, their quality as compared with American goods, import duties in Venezuela, freight rates to Venezuelan ports, how goods should be packed, quantities imported annually into Venezuela, the extent of the possible trade, etc.

It is not intended that this exhibition warehouse shall be operated with any view to profit by the National Association of Manufacturers. It is designed to be only self-sustaining. The charges for space range from $5 down to $2 per square foot, the price being based upon the amount of space used by the exhibition, with a minimum charge of $25 per annum for the smallest amount of space taken. Each exhibitor will be entitled to free use of the facilities of the warehouse, in addition to the mere privileges of exhibition, in proportion to the amount of space used.



PLAN OF WAREHOUSE OF THE NATIONAL ASSOCIATION OF MANUFACTURERS.

The Alaska Gold Fields.

By RUSSELL L. DUNN, Mining Engineer.

The placer gold deposits of the Klondyke and Yukon river basin, generally, are similar in origin, in the conditions under which the gold is found and in largeness of yield, to the placers which have been mined in the Amoor and Lena river basins in Siberia for fifty and more years past. In all, except as to the perpetually frozen condition of the auriferous sands and barren overburden, these Arctic placers are similar to the Australian placers, are similar to the Idaho and Montana placers, such as the famous Alder Gulch, near Helena, and to some of the gulch and ravine placers of California—for example, Rich Gulch in Calaveras county, Auburn Ravine in Placer county and Greenhorn and Humbug creeks in Siskiyou county. Everywhere the origin of the placer gold is the same. It is gold liberated by the erosive agencies of frost and running water from its rock matrix in the lodes, principally quartz, which have been formed by the chemical action of mineral-laden water ascending from the heated interior of the earth through fissures and fractured zones of the outer crust. The action of frost is principally in breaking the lodes in place into fragments, which are then moved away by running water, thus exposing fresh rock surfaces to the frost. In running water in the stream channels the grinding together of the rock fragments gradually wears away and liberates the gold. In accomplishing this, the brittleness of the rock matrix, the toughness of the gold resisting abrasion, and the surfaces of structural weakness where the gold and rock come together, all facilitate the freeing of the gold, which, once freed, works its way downward toward the underlying rock, and, once there, stops at the first inequality in the surface. Its movement then is very little, for very small particles of gold cannot be moved by quite strong currents of water over the slightest obstruction. It only moves and changes position, always downward, as the bedrock of the stream channel wears slowly deeper till it reaches a level where it no longer cuts the rock deeper, but spends its erosive energy in widening the channel portion of its basin. Thus are made flat valleys of erosion many times wider than the flowing stream. Gold does not flow or float, excepting only very thin, light scales, and what is known as flour gold. Even these will settle in such moderately strong currents as will wash coarse sand away. Gold grains and nuggets are only moved by running water while they are portions of comparatively large rock fragments, pebbles or boulders. Just as soon as the rock fragment becomes so diminished in volume by abrasion that its normal specific gravity becomes increased by the higher specific gravity of the attached gold particle, its movement by the running water becomes more and more retarded, until the gold particle, finally liberated, stops and joins the slowly growing accumulation at the bottom of the stream channel, while its once matrix is swept onward as sand to the sea.

Glaciers have had comparatively little to do with the liberation of gold from its rock matrix. The glacial epoch in all the noted placer gold localities takes in but an insignificant fraction of the time that has been occupied in the formation of the placers from the lodes. In California the evidence of the placers themselves is conclusive as to their almost exclusive formation by frost and stream erosion alone. The California placers commenced to form as early as what geologists term the Cretaceous period and their formation was continuous through the enormous intervals of time represented by the Eocene, Miocene, Pliocene, and throughout the much shorter interval elapsing since the close of the Pliocene down to and including the present time. Of all these enormous time intervals of gold accumulation, glacial action has only covered a small fraction of the last and shortest—the Postpliocene period. It only covered a small portion of the territory of the placers, contributing possibly an insignificant fraction of the gold that has since been mined out. Siberia and Alaska present precisely the same relative glacial phenomena. The placers were practically all formed before the age of glacial action, precisely as the California placers were formed, by the action of frost and running water. The Glacial age has followed this enormously long period of placer formation, and holding on in both countries, but more particularly Alaska, down into the present time, has merely acted to conserve the already formed placers in unaltered form, structurally and topographically. Glacial action has added no more to them than it did in California. The beginning of the glacial epoch in all three localities was in the age of the mastodon and mammoth, as may very surely be inferred from the perfect frozen bodies of the latter which have been discovered in Siberia during the last century. These locked up in the ice at the beginning of the epoch only now gradually reappear with the slow retreat of the ice sheet northward. The period of placer formation practically ended in Siberia and Alaska with the beginning of the glacial epoch in age of the mastodon and mammoth, for we find the fossil bones of these animals in the placers which frozen then are only now being thawed out in mining operations. In California we find fossil remains of the mastodon in the placer deposits of the old buried rivers, but the long-ago northern retreat of the ice has given the time period during which the living rivers and streams have made additional placers, both indirectly from portions of the old buried river placers and directly from the breaking down of fresh portions of the gold-bearing lodes.

California placers, too, have had an accelerated energy of formation by reason of enormous uplifts of the gold-bearing mountain ranges during and since the glacial epoch, thus increasing the fall per miles of the streams from their source to their discharge. In the great auriferous basins of the Lena and Amoor rivers in Siberia and in the Yukon basin of our own country, there is conclusive evidence that the stream flow and the topography is now just what it was before the glacial epoch. There is, too, equally conclusive evidence that during the far longer interval of time covered by the formation of the placers in Siberia and the Yukon, there was a less intense erosive energy than in California, despite identical climatic conditions, for certainly the last portion of the period. The cause of this less intense erosive energy is in the much lighter grade per mile of the drainage from the watersheds. In California the drainage has been normally torrential; in the Arctic river basins torrential drainage has been an exceptional condition. The proof of this in these latter regions is in the character of the gold and locus of the placers. The placer gold of the Klondyke and Yukon basin generally contains a very considerable proportion of coarse nuggets and grains still attached to pebbles of the quartz matrix, showing that the gold has not moved very far from its source. The placers are in valleys of considerable width relatively to their length and to the size of the living streams that have made them. These valleys have very slight falls and the streams that flow in them have even less, as they meander from side to side of the valley in downward course. These living streams have, by reason of diminished grade, lost their erosive power and now flow on beds of their own detrital accumulations, which is more often silt than the harder and coarser sand and gravel. These detrital accumulations, in depth from 8 to 20 feet, rest on the surface of an eroded bedrock which has an approximate parallelism in grade to the surface of the detrital accumulations above. On this eroded bedrock surface, under the silt which contains no gold, is the placer, which will be found linearly continuous with the valley, as a rule several times wider than the stream now flowing overhead, as a rule several times narrower than the valley overhead, and as compared with the overhead stream, having a much shorter and more direct course through the length of the valley and necessarily a less flat grade than living stream. There is nothing novel or exceptional in the phenomena described. They are precisely identical with the phenomena presented by the Siberian placers and as well by most placers the world over. The placers in the Klondyke and Yukon region are just what they are in the other localities, the old stream beds of a living stream above or adjacent. Not necessarily only one of its successive beds, made in eroding the valley, but several of them. Not necessarily, or even rarely, all of the beds, but in all probability the oldest one or several of them, for only so long as the grade remained sufficient would the stream bring gold-bearing rocks to its bed and liberate the gold there. Naturally, as the stream successively cut new beds its grade diminished with the greater length of these channels in the widening valley. The typical Klondyke and Yukon placer is thus one or more old stream beds so situated as to indicate that it is not the result of a torrential erosion nor likely of a very deep erosion of the earth's surface nor of a very distant erosion. The contrary conditions of all of these can be safely assumed in the consideration of these placers.

If accurate records of the yields of the placers should be kept (it may be safely assumed that no records at all will be kept), other phenomena, of great value to the gold miners, would be observed. It would be found in any system of placers taking in an entire valley and its branches, in which the typical placer described was practically continuous, that, commencing at the lower end, there was a gradual increase of the gold values going up the stream, till in some section nearer the upper than the lower end the maximum was reached, from which, continuing up stream, a gradual decrease of values and their final sharp disappearance would be noted. Below the lower end of the placer, if prospecting be done, values would be found to tail out and gradually and finally disappear. Above the upper end the disappearance of value is much more abrupt, and it is at this point of disappearance that the lode source of the gold is to be looked for. It would be found, on examining a map of the valley and branches and of the placer, that the latter would extend into some of the branches, but not all of them. And if those into which it does not extend be prospected, they will be found barren of gold, from which it can safely be inferred that in them it is useless to search for a gold-bearing lode.

It will be found, if the placers of several adjacent systems in the Yukon region could be platted after being mined out, that the upstream end of the placers would very largely group themselves into definable relations with each other. This relation is due to the fact that gold-bearing lodes occur in groups or systems, often of very considerable linear extent—for example, the mother lode of California, which is a group or system of lodes seventy miles long. One system or group of lodes may thus feed the placers of several streams which, widely separated in their flow, yet head so that they have eroded the same lode system.

There is nothing phenomenal in the yield of the Klondyke placers. California, Australia, Montana, Idaho and Siberia have all had as extensive and rich placers as the Klondyke. In fact, there have been numbers of richer ones. These, long since worked out, excepting in Siberia, are for the moment being forgotten in the hopes and anticipations from the one, hitherto unknown, now in public view. It does not require any heretofore unknown sources of gold to have made the Klondyke placers. It does not require any heretofore unknown richness of known sources to have made them. Just as everywhere else, lode deposits of gold ores, probably quartz no richer than those known and mined elsewhere, have made these Klondyke placers the El Dorado of the present. The Idaho quartz mine at Grass Valley, in California, has yielded from a vertical depth of 1700 feet, and a length of about 1000 feet, $17,000,000 of gold. The natural erosion of one such lode would produce a placer as rich as the Klondyke. In California, Montana, Idaho, Colorado, Nevada and Mexico, and even on the coast in Alaska itself, lodes that have produced from $1,000,000 upward for the mining of the upper 1000 feet of depth can be named by the hundred. It goes without argument that the Yukon region can reasonably be inferred to have its pro rata of lodes equally rich in gold contents, as well as the thousands not so rich individually, but which aggregate a gold content many times more. It is from the natural erosion of these lodes to moderate depths, at a maximum not going very far beyond the first thousand feet, that the Klondyke and Yukon placers have come. From the industrial and economic point of view, while forty years have been taken laboriously to secure the gold of one Idaho lode in place, the same amount of gold, released from the lode into placers by Nature's hundred thousand years or more of slow-moving but irresistible force, can be secured by man in a tenth part of the time and with a tenth part of the labor. This craft of Nature put more than a thousand millions of gold into California placers, and there is, in my opinion, reason in the anticipation that in the Yukon placers another thousand million will be found, all things considered, as easily and even quicker to be secured than was the thousand millions of the California placers.

Recapitulating the preceding discussion, the essential conclusions on the Yukon gold fields are:

1. The placers are derived from the direct erosion of gold-bearing lodes in place by frost and flowing water.

2. The placers are the beds of the first few cutting channels that the living streams made in eroding the flat valleys they now flow in. These old beds, lying side by side, aggregate a width several times the living river, but at the same time have several times less width than the valleys. The old beds preserve an approximately direct course through the linear extent of the valleys and have the same grade as the valleys. The old beds are not exposed at the surface, but are covered with from 8 to 20 feet of silt, so that there is no surface indication of their locus beneath the silt. (This is the type of placer—there are, of course, modifications of it likely to be found.)

3. The richness of the Klondyke placer discovery is likely to be equaled by many discoveries yet to be made and is possible of being exceeded in richness by some of them.

4. The lodes from which the gold of the placers has come are for the greater number at or about the up-stream end of the placers. The lesser number of them may be, however, considerably farther down stream, and some even exist wholly within the placers. These lodes have not been eroded very deeply, and so closely are they connected with the placers, that richness in the latter furnishes a presumption of richness in the former.

5. Certain popular opinions, and some so-called expert ones as well, are absolutely to be rejected as erroneous. The gold was not broken out of the rock and distributed by glaciers. If it was in Alaska one would naturally search for gold in moraines and not in flat valleys, far away from them. Gold does not "flow" now and never did; otherwise it would be in the living rivers as much as in the others. Every valley and flat in the auriferous region does not contain placers. All of the bedrock underlying a valley in which a placer has been found is not a "placer;" it is not possible to find gold everywhere in such valleys as the Klondyke, for example. The entire length of a placer is not of possible equal richness nor is the locus of the portion of greater richness an uncertain or indeterminate fact.

6. To the preceding add that the surface of the country, valley and mountain is covered with a deep,

strong growth of moss ; that the silt and auriferous sand of the valleys beneath the moss is perpetually frozen to the bedrock; that from these physical conditions, the methods of prospecting for placers and lodes employed elsewhere are impossible of application here; and one has clearly in view the special and in part unique mining conditions of the Yukon gold fields.

Like California in the early days, these new gold fields are called "poor man's diggings." In the respect that labor commands very high wages and that for some few of the men who work to discover for themselves there is a quickly made fortune, this is true. In the sense that the chance of rich discoveries is equal to all, or as possible for all, as in California in early days, it is not "poor men's diggings." In California in early days all the capital a man required was his ability and willingness to work, and all were on an equality as regards knowledge of and skill in mining. In the Yukon even a poor man must be a small capitalist to have even an opportunity to mine for himself, and the equality of knowledge of mining no longer exists. Yet, despite the disadvantage of the comparison, the country is far more desirable for poor men in search of fortune than South Africa or Western Australia. It is as well more desirable to capital seeking investment than either of these.

Technical knowledge of the occurrence and distribution of placer gold is reasonably exact and comprehensive. It is not now in this time necessary to depend on blind luck for discoveries. It is possible now with our accumulated experience to explore for gold placers without the expenditure of the enormous amount of waste work formerly an unavoidable incident of the business. Some profitless work is inevitable, but the amount of this can be brought to its economic minimum as it never has been brought before in a new district. The intelligence exists, and can be made use of, to keep the exploration for gold limited to localities where it is possible for the gold to be found. Systematic placer prospecting, certain in the accuracy of the results it gives, can be done in these gold fields. The placers, first found, are practically the guides to lodes, some idea of the probable values of which can be formed from the placers, and risk and uncertainty in quartz mining brought to a minimum.

The present method of exploitation of the placers is slow and expensive, as fire must be employed to thaw the frozen ground a few inches depth at a time. This is not, however, the only practicable or economic method. It is possible to modify methods in use elsewhere so that the summer heat can be utilized for thawing, and the summer water flow utilized for a large part of the pick and shovel work now necessary. The exploitation of the quartz, when discovered, requires but slight modifications from common practice, and should be but little more costly than in California, and certainly considerably less costly than in the Transvaal and West Australia. There is no special industrial or economic reason why the exploitation of the Yukon gold fields should not be highly profitable to both labor and capital, with less of risk of the failures of individual enterprises, part of the history of gold mining elsewhere.

A CURIOUS state of things was recently observed in the tunnel of the underground railway of Budapest on account of lack of ventilation. For a stretch of more than two miles there is only a single ventilator, which is entirely insufficient, and the trains running through the tunnel compress the air within like that in the gun barrel of a Zalinski dynamite gun. It is stated that on several occasions the cars were raised bodily from the tracks by the pressure of air and gas, and the passengers were almost suffocated. Steps have been taken to increase the number of air shafts, so that there will be at least ten of these in each mile, and very large exhaust fans will do away with the danger of insufficient ventilation, which now renders the employment at the same time of the two tracks in the tunnel absolutely dangerous.

A NEW process for closing up the pores of aluminum and brass casting, to prevent sweating under water or steam pressure, is as follows : First melt some paraffine wax, contained at a temperature of about 168° to 183° Fahr., then add pure black rubber, which is cut in small pieces and stirred into the wax in the proportion of about 10 to 20 per cent. Leave this to boil for about twenty-four hours, taking care not to heat the wax to a temperature which will burn the rubber. The castings are then put into the hot mixture and left for about twenty-four hours. The exact temperature to which this wax should be heated is greatly a matter of experiment, and cannot be definitely stated.

THE current issue of the London *National Review* has a long article upon the success of the American Bimetallic Commission. The article confirms what has already been cabled on this subject and says: "It is now generally recognized by all except ostriches that Great Britain's chief contribution will be the reopening of the Indian mints, which all who appreciate the question must regard as a splendid subscription to the common pool."

A Yukon Miner's Outfit.

Written for the MINING AND SCIENTIFIC PRESS.

The would-be miner of the Yukon gold fields, should he follow all the instructions and advice so freely published in the dailies concerning what his outfit should be, could not help discovering in the event of his survival despite it, that he might have been saved much needless trouble, expense and suffering. Writing from a personal knowledge of the mining and climatic conditions, it is suggested to those proposing to go to the Yukon region at the present time to consider carefully the outfit described in this article. It is assumed in preparing it, that for the next year it would be exceedingly unwise to go there placing any dependence on a certainty of obtaining what was required from the trading houses in the country. The demand on their supplies is sure to be more than can be satisfied from them, so that the wise gold seeker will go prepared to be independent for a year. For convenience in considering, the outfit is divided into three parts, clothing, subsistence and tools and micellaneous.

Clothing.—Those who have never wintered in the Arctic regions have no conception of the intense cold it is necessary to protect against. This lack of realization is doubtless responsible for the absolute insufficiency and uselessness of what is offered as a Klondyke clothing outfit by San Francisco clothiers. Most of it is for service just about as useful as mosquito-bar netting would be, as I have seen it somewhere described by one who, like myself, has known what the icy blast of the far north does when it comes. It is winter that one must think of in preparing, not summer. For clothing, then, take the following:

3 Suits moderately heavy wool underwear.
3 Heavy wool overshirts.
9 Pairs heavy wool socks.
1 Heavy wool sweater.
2 Pairs pantaloons (one of stout, moderately heavy cloth for summer wear, the other of a lighter, close-woven cloth, which should be quilted with cotton batting a half inch thick in the seat and over the thighs and knees for winter use).
2 Pairs stout overalls; one felt-lined.
2 Vests.
1 Cloth sack coat.
2 Jumpers.
1 Coat of wool cloth.
1 Coat made of skin dressed with the hair on. The latter should be turned inside. For material, short hair, coarse wool or sheepskin is excellent, and should not be expensive. For those who desire it, this coat can be made of deerskin with the hair outside and lining of squirrel or cat skins.
1 Wide brim felt hat for summer.
1 Fur cap, hair outside, large enough to pull well down over the head and with fur-lined ear flaps.
1 Wool neck scarf.
1 Scarf or belt to draw coat tight around waist in cold weather.
1 Pair heavy leather boots with nail protected soles for summer.
1 Pair rubber boots, leather soles, nail-protected for summer work in water.
2 Pairs boots made of deerskin, hair outside, reinforced leather sole sewed or pegged on, not nailed. The tops should extend above the knee and be laced tight there. They should be large enough to take in the foot covered with two pairs of socks or with one pair and felt moccasins and to take in the legs of the quilted pantaloons. The top of the boot need not be lined with fur.
3 Pairs seamless felt ankle moccasins.
1 Pair light shoes or boots for indoor wear; while not necessary, is desirable. Leather is useless for winter footwear, as the intensely cold air goes through it as readily as water through a sieve.
4 Towels.
2 Pairs heavy wool blankets.
1 Fur robe for sled travel and sleeping outdoors; should be six feet square and outside cloth covered. Coyote or fox fur will answer, and, equally well and less expensive, sheepskin such as suggested as material for the coat.
20 Yards mosquito-bar netting for veiling to protect face and neck from mosquitos in summer.
1 Sheet light-weight rubber waterproof cloth 12 feet square.
2 Leather or deer-hide packing cases for portion of outfit not in use and for small articles; size 9x28x38 inches.

In addition, there should be a small lot of repair materials—needles, thread, buttons, buckskin, shoemakers' awl and wax, boot-sole nails, etc. If good material and good workmanship be put in this clothing outfit, only a small part of it will require replacement for the second year's stay.

Subsistence. — Naturally, individual tastes make wide differences of opinion as to what should constitute the supply of provisions, and the range of selection is much wider than with the clothing. Life in the Yukon is not at all a picnic. One going there eats to live, not lives to eat. The list suggested, it is believed, will answer excellently for the necessaries :

300 lbs flour.
70 lbs germea.
20 lbs rice.
150 lbs bacon, boneless, sliced, packed in tin.
100 lbs Bayo beans.
80 lbs potatoes, peeled, evaporated.
70 lbs dried soup vegetables.
100 lbs dried fruit, stoned and peeled, and seedless raisins.
25 lbs dried beef, chipped, in tin.
25 lbs tea.
80 lbs sugar.
5 lbs coffee extract.
20 lbs condensed milk.
40 lbs butter.
40 lbs lard.
20 lbs salt.
5 lbs beef extract.
2 lbs pepper.
10 lbs baking powder.

Germea is selected in preference to oatmeal because containing nutriment in a more condensed form, and because it is a very quickly prepared dish. Avoid carrying waste—for example, the bones and rind of bacon, the stones of fruit, etc. All the articles which are compressible have compressed. Have, as far as practicable, all packed in sealed rectangular tin cans of a uniform, convenient size for use and packing. The main considerations are to reduce bulk and weight.

Tea is far preferable in the winter cold to coffee, and can be taken in the Russian way, without milk. From the dried soup vegetables and beef extract a considerable quantity of soup can be made at one time, frozen in cakes, and then used as needed. To prepare it, thaw and heat over fire, adding water to thin to taste.

The weight of the preceding is 1162 pounds net ; with cases it will amount to about 1250 pounds. For convenience in handling the packages should, as far as practicable, be of uniform size and weigh from 50 to 70 pounds.

The necessary utensils for kitchen service are the following :

1 Stove and pipe, the latter in flat sheets, with seam edge crimped for joining.
1 Fry pan, with folding handle.
2 Pots, with cover and bail, sizes so as to nest.
1 Kettle.
1 Small teapot, to prepare tea the Russian way, using the kettle as a samovar.
3 Pans for bread baking, sizes to nest together.
3 Soup plates, blue or granite ware.
2 Cups, blue or granite ware.
1 Can opener, table knife, fork, tea and soup spoons.

To save weight and for ease in cleaning, aluminum ware is very much to be preferred for the cooking utensils. To keep the bulk down, care should be taken in selecting the several articles so that they nest together.

Tools—

1 Gold pan.
2 3½-lb. picks, with large eye.
3 Handles for same.
1 Shovel.
1 American ax.
1 Hatchet, hammer-head, claw.
1 Blacksmith hammer.
1 Flat file.
1 Timber saw, for getting out lumber.
1 Crosscut hand-saw.
1 Rip hand-saw.
1 Brace and bits.
1 Drawknife.
1 Saw set and file.
1 Square.
1 Jackplane.
30 Pounds 12-penny nails.
20 Pounds spikes.
2 Pair 8-inch strap-butts.

Miscellaneous—

60 Pounds candles.
10 Pounds soap.
1 Pound listerene. This the writer has found particularly valuable in the cold North for medicinal use. It does not freeze, so is always ready for application. It is particularly efficacious in curing cuts, bruises and the effects of frost on the nose and ears. Externally applied, it is a remedy for sore throat, and, internally, for bowel troubles. A small roll of surgeon's plaster, antiseptic gauze dressing for wounds, and an assortment of medicines in the form of pellets and capsules, particularly laxatives and remedies for dysentery.
A combined rifle and shotgun and ammunition.
Fishing tackle and hooks.
100 feet of ¾-inch hemp rope.

The list looks long and the bulk very considerable, yet there is not an unnecessary article in it. If, however, several men propose to travel together and work in partnership, only a small portion of the kitchen outfit and tools require duplication. Some game and fish may be taken, so that the use of the full quantity of subsistence suggested may not be required; but it is far safer to provide the full amount than to chance success in getting game.

It is a noticeable fact that the great majority of the people rushing northward not only are without experience in mining, but are without experience in outdoor life. It is difficult for them to realize the significance of a list of requirements such as the preceding. It will hardly deter any of them from going; yet the mere contemplation of it will be sufficient to the informed miner, accustomed to prospect and mine in California, Colorado and elsewhere in the States. Here his outfit at the most only requires a burro or horse to pack it, and he does not have to "put money in his pocket." To some of those who go now in the search for gold in the icy North the reward in the end will prove to have justified their action; but will it to the many? Anyway, if you must go, go prepared to preserve life and health and to mine without unnecessary useless waste of time, which in the Yukon is both valuable and costly. To accomplish these things, be sure in preparing to have as efficient an outfit as money will buy. An injudicious economy in it is liable to be costly in its results, and dependence on what is being offered as an outfit by most of the advertisers is only a form of premeditated suicide.

IN 1803 Tasmania's native population was 7000 ; today there is not a single representative left. In 1842 the Maoris of New Zealand numbered 140,000 ; today there are less than 30,000. When Macaulay's New Zealander gazes on the ruins of London there will be no New Zealander ; the name "Maori," even, will be as unfamiliar then as is now the name of some obscure Germanic tribes of the times of Tacitus. What is true of New Zealand is rapidly becoming true of all the islands of the Pacific ; it is true of nearly all the North American continent and of large areas of the Southern.

NICOLA TESLA this week says he has reached a solution of an electrical problem on which he has been working for a lifetime—the simultaneous transmission of messages by means of the earth's electrical currents to as many scattered points on the surface of the globe as may be desired. Tesla gave last Tuesday an exhibition in miniature to a few friends, which he regards as satisfactory. He will soon write of his discovery in technical terms for the benefit of science.

Reduction of Zinc-Gold Slimes.

At a recent meeting of the Chemical and Metallurgical Society of South Africa the following notes on the reduction of zinc-gold slimes were presented by E. H. Johnson:

Reference has frequently been made by different members of this society to the losses that occur in the reduction of the gold from the precipitate obtained in the zinc process, and to the unsatisfactory grade of bullion produced. Although some rather severe criticisms have been passed, up to the present little or nothing has been said how these alleged losses are to be avoided. Much of this criticism has, I think, been based on somewhat ancient history, and scarcely bears on modern practice. I have an impression that the reputed auriferous wealth of smokestacks and the El Dorados of ash heaps would require a great deal of patience to discover. It must be admitted, however, that the methods of "cleaning-up" and subsequent reduction varies so much in different works, that a discussion on the subject might lead to more uniformity of method, and possibly to some improvement in this portion of the work. It would be well, also, if from the various methods now in use a system could be evolved which might be generally adopted. If this could be done, all works—whether large or small—would be more likely to be fitted with the full equipment necessary for carrying on this operation. As a case in point, frequent reference has been made to the necessity of filter presses, yet how few works, even now, possess them. I do not propose in this little paper to introduce anything novel, but rather, by describing my own methods to induce criticism and consequent discussion, and thereby succeed in throwing more light on this much maligned subject. As the Princess works does not possess the luxury of a filter press, I have converted one of the two 6-feet diameter "cleanup" vats with which the works were originally supplied into a filter vat, by putting in a grating, having holes 1 inch square, covered with fine, closely woven canvas. Through the side of the vat below the filter bed a 1½-inch pipe is led, connected with a small suction pump bolted to the side of the vat. From the delivery of the pump, a light removable launder leads the fitered solution back to the top of the precipitation boxes. The zinc-gold slimes, including such small fine zinc as may have passed the grating which supports the zinc in the boxes, is bucketed direct into the filter vat, and as soon as one box is "cleaned up" and the washed zinc replaced, the pump is started and the solution returned by means of the launder back into the box. I may here remark that although the filtration is somewhat slow, a perfectly clear solution is returned to the boxes. I do not consider it advisable to hurry the pumping, as the partial vacuum formed below the filter cloth would be liable to burst it. The pump is kept going after the boxes are completely cleaned up, until only the slimes are left on the filter. A water wash is then added and pumped through until the slimes are free from cyanide. The gross weight of the slimes, including moisture, is then taken, by weighing the buckets of moist slime during transference to a large sheet iron tray placed alongside the acid tank. The object of weighing is to determine the amount of sulphuric acid necessary to destroy the zinc. The second of the two "cleanup" vats, before mentioned, is fitted with a wooden stirring apparatus and cover. The parts are made detachable, so that it can be easily removed when action has ceased. A 3 inch pipe leads the fumes outside the building. Having found the approximate weight of slimes to be treated, sufficient water is run into the acid vat to form, on the addition of the acid, a 10 per cent solution. I find using one pound of acid for every pound of moist slime gives good result. This would be equivalent to about one and a third pounds of acid to the pound of slimes, dry. Having the requisite amount of water in the vat, the weighed quantity of acid is then added and the vat closed down tightly. The stirring apparatus is kept continually moving during the time of feeding in the slimes, which are fed in gradually in the same condition in which they were taken from the filter vat. I find it beneficial to keep up a continual stirring for at least half an hour after the action has apparently ceased. The feed hopper has a slide door of sheet iron in addition to the closely fitting cover on the top, so that by keeping the slide closed a quantity of slime can be fed into the hopper and the cover closed before letting the slimes fall into the acid. This is to keep the fumes from the operator as far as possible, as the fumes are distinctly irritating. After all the slimes are in the acid, a jet of water is turned into the hopper to wash down any adherent slimes, and everything that had been used in the cleaning up of the boxes, etc., is well washed in the same jet. The stirring apparatus is then removed and well washed in the vat during the removal. The vat is then filled with water and allowed to settle. Working with dilute acid, and not heating, I find I can get a perfect settlement within an hour. When heating with a steam jet, settlement was much more difficult. The washing is done by syphoning off the clear liquor, and filling the vat repeatedly with water, until the solution is neutral to litmus paper—usually four or five washings. It is well stirred at each refilling by means of a long wooden paddle, a rotary motion being given to the water. This causes the slimes to collect in the middle of the vat and reduces the risk of loss during syphoning—the syphon being let down at the side. A sample of the washings taken continually during syphoning off, showed on careful assay of a large sample, to contain thirteen grains of gold per ton of solution. The drying of the resultant gold slime is conducted on an open drying hearth in large cast iron enamelled dishes. The cakes are subsequently broken up and transferred to small sheet iron trays in thin layers and subjected to an increased heat. When cool, the slimes are ground, fluxed and transferred to the crucible. It fuses quietly and with but little fume, and normally yields 50 per cent to 60 per cent of the weight of slime as bullion. The average fineness of last year's bullion was, according to my own assays, 821.9 and 819.6 according to London returns. As a deduction of 2 milliemes is made on 800 bullion, this leaves an actual difference with London of 0.3 milliemes. The slag assays, after panning out the prills (of which there is very little), 23 ounces per ton, and one ton of slag has been accumulated in two years, in producing 11,627 ounces of fine gold, which is equivalent to a little under 0.2 per cent of the total gold locked up in slags. The cost of reduction, including acid, is 6.7d per fine ounce, made up as follows—taking an actual "cleanup" as a basis:

Dry weight of zinc-gold slimes....504 lbs.			
Dry weight after acid treatment..100 lbs.			
672 lbs. of acid at 4¼d	£12	12	10
66 " " borax at 37s 6d cwt	1	2	1
9 " " carbonate soda at 2¼d lb	0	1	10
9 " " fluor spar at 4d lb	0	3	0
5 bags coke at 8s 6d per bag	2	2	6
1 No. 60 crucible	1	7	6
	£17	9	9

Yield—620 ozs fine gold.....6.7d per fine oz.

The advantages of this method over the old are: The elimination of the zinc without recourse to calcination—the loss from which is so difficult of determination; the handling, except in the final operation, being of wet slime and consequent immunity from "dusting"; the time between commencing "cleaning-up" the boxes and having the bar in the safe need not exceed three to three-and-a-half days. The cost of acid, perhaps, renders this method a little more expensive, but I consider the immunity from unaccountable losses and the small amount of gold left in slags more than compensates for the extra expense.

United States Mining Laws Applicable to Alaska.

Many recent inquiries have come to the Interior Department regarding United States mining laws applying to that part of the frozen north in United States limits, and numerous applications have been made for copies of the public land laws, which, however, do not apply to Alaska. The General Land Office has taken much interest in the reports that come from the gold belt, and investigated the laws that govern them. There is no question about which statutes extend to Alaska, and these laws are applicable:

1. The mineral land laws of the United States.

2. Townsite laws, which provide for the incorporation of townsites and acquirement of title thereto from the United States Government to the townsite trustees.

3. The law providing for trade and manufactures, giving each qualified person 160 acres of land in a square and compact form. The coal land regulations are distinct from the mineral regulations or laws, and the jurisdiction of neither coal laws nor public land laws extends to Alaska, the Territory being expressly excluded by the laws themselves from their operations. The act approved May 17, 1894, providing for civil government in Alaska, has this language as to mines and mining privileges:

"The laws of the United States relating to mining claims and rights incidental thereto shall on and after the passage of this act be in full force and effect in said district of Alaska, subject to such regulations as may be made by the Secretary of the Interior and approved by the President, 'and' parties who have located mines or mining privileges thereo, under the United States laws applicable to the public domain, or have occupied or improved or exercised acts of ownership over such claims, shall not be disturbed therein, but shall be allowed to perfect title by payments provided for."

There is still more general authority. Without the special authority the act of July 4, 1866, says:

"All valuable mineral deposits in lands belonging to the United States, both surveyed and unsurveyed, are hereby declared to be free and open to exploration and purchase, and lands in which they are found to occupation and purchase by citizens of the United States, and by those who have declared an intention to become such, under the rules prescribed by law and according to local customs or rules of miners in the several mining districts, so far as the same are applicable and not inconsistent with the laws of the United States."

The patenting of mineral lands in Alaska is not a new thing, for that work has been going on all the time.

In Plumas and Sierra Counties.

Writing of a recent trip through Plumas and Sierra counties, Cal., a traveling correspondent says:

"On every hand are deserted gravel beds, shut down by the farmers of the valleys, and who now, in consequence, have to scratch hard to pay interest on their mortgages. This scene of desertion is not only at La Porte, but at S. Louis, Port Wine, Howland's Flat, Grass Flat, Gardiner's Point, Mount Pleasant, Scales' Diggins, Poker Flat, Poormans' and Hopkins' creeks, and these only make a small part of the great gravel fields of Plumas and Sierra counties. In the idle camps of these sections, all the Alaska gold hunters could find employment, were they only permitted to wash for the gold. There seems to be an anomalous and senseless condition of things in all this. The whole country is crying for gold, thousands are rushing for the frozen north to get it, and where work can only be carried on for a few months in the year, while here, their labor would no doubt be far more certain of reward, and yet all must be idle. Thousands of men and women are suffering for work, and many the real comforts of life, while here in these gravel beds is a store of golden comfort, were only provisions made for restraining the debris, which the Government should do. The Government builds levies to save wealth, dredges rivers to advance commerce, and why not build restraining dams, when it would furnish employment for 50,000 workers, whose labors would pour millions of dollars of gold into the avenues of trade annually. Every Californian should lend his influence for bringing into renewed action this hydraulic industry, and none should be more active than the farmer. If needs be, let the Government put on the miner a percentage tax, that would ensure the return of outlays. This would be a safe business proposition. If the people do not wake up to the importance of the Government taking hold of this restraining dam question, through which only the hydraulic mines can or should be worked, California is going to lose a very large population, who will seek their fortunes in the north. Drift mining don't fill the bill among these heavy placers, except in a few instances.

"The quartz mining interest of Plumas is on the advance. The lodes of this county are on the average large, and consequently furnish a heavy output of ore. Water power is abundant and facilities for reducing ore cheaply are great. To get a clearer idea of the quartz interest of Plumas, I refer the reader to the report of the Mining Bureau, which minutely details it.

"When I see the great stir for the Klondyke, with its snowy, freezing, comfortless outlook for the adventurer, and review the vast wealth in the gravel beds, as we all know them, all lying idle, it seems a gigantic error that should be corrected."

Appreciated Compliments.

To quote the kind words and unsolicited compliments weekly received from competent mining sources all over the world would fill many a page of this journal. They are, however, none the less appreciated because only occasionally one is reproduced. The following is from the Black Hills *Mining Review*, Deadwood, South Dakota, of date July 26th:

One of the best papers that comes to the *Mining Review* is the MINING AND SCIENTIFIC PRESS of San Francisco, Cal. Its greatest merit is its reliability and undoubted correctness in all matters pertaining to mining. Read in that paper, an article can be depended upon as true. It secures a great deal of mining news which is interesting, and treats every section fairly and fearlessly. It is a paper which every person engaged in the mining business should read.

ON page 121 appears the first scientific discussion of the new Klondyke gold placers that has been published since the brief article in the issue of March 20, '97, and the other articles in July, '94. So much crude stuff has been published in the daily press about "glaciers," etc., that it was felt due to the mining and scientific world that the correct facts be intelligently discussed. It is of extreme probability that when, some months from now, the representatives of the great dailies send down their conclusions and descriptions, they will substantially agree with what appears in this issue. In the possession of this knowledge far ahead is the advantage of reading this paper. The chief scientific point is the clear setting forth of the fact that the Alaska placers were formed before the age of glacial action. The point of most present commercial interest is showing where the lode source of the Klondyke gold is to be looked for.

THE tenth annual report of the Interstate Commerce Commission, an advance copy of which has been received, for the year ending December 1, 1896, contains some valuable information. Sixteen pages of the report are devoted to the import rate case, and five pages to "Railway Associations and Traffic Agreements." According to the report, during the year ending June 30, 1895, 507,421,362 passengers were carried, and the gross earnings of the railways of the United States for the same period were $1,073,371,462.

Electrical Progress.

A New Electrical Invention Applied to Road Wagons.

For three years past M. G. Caffrey of Reno, Nev., has been at work upon a new form of trolley to convey electricity from overhead wires on a vertical plane down to the power to move vehicles along any ordinary road, the wires to be strung along any ordinary line of poles similar in construction to telegraph lines. Having faith in the success of the invention, patents were obtained upon the trolley and models made. Col. H. P. Maxson went to New York, had the necessary electrical machinery manufactured by the Westinghouse Company, and, upon arrival in Reno, a wagon was constructed on which to attach it. A line of ordinary poles were set up near the Reno foundry and the dynamo placed therein. A double line of wire was placed along the poles about 17 feet above the ground, the wires being about 18 inches apart and the trolley placed upon the wires, as shown by the accompanying cut.

The problem which the inventor claims to be solved by this trolley has interested a large number of investigators, owing to several apparent impossibilities. To accomplish the end sought, and which is claimed to be fully obtained by this invention, the following difficulties had to be overcome: First—A perfect circuit must be maintained between the source of power or, the generator in the station and the point of transmission or motor wagon. Second—The contact must be constant and subject to the will of the operator of the wagon at all times. Third—The contact must be flexible enough to allow a wide divergence from the regular road, if necessary. Fourth—This contact must be of a sufficient area to transmit the necessary power without appreciable loss from this point. Fifth—The cost of construction must be low enough to enable a small amount of freight to be handled cheaply. Sixth—The motor wagon must be adapted to haul as trailers the ordinary double farm wagon. Seventh—The entire system must be adapted to use the ordinary highways without interfering with the use now made of them. These points, the projectors assert, have been fully overcome by this invention.

NEW FORM OF TROLLEY AND ELECTRIC VEHICLE.

The poles are 24 feet long and 6 inches in diameter at the small end, and were set at intervals of 125 feet along one side of the road. On the road side of these poles two supports, or "passbys," of malleable iron were fastened about 18 inches apart, one above the other. To those supports two No. 0 bimetallic wires were stretched.

These wires are the two trolley wires connected to the two poles of the generators by means of feeders, and are divided into sections, controlled by fuses, in the ordinary street railway manner. Upon these two wires the trolley runs. This trolley consists of a metallic frame, having two overrunning wheels, and underneath these are two locking wheels, which effectually prevent the top wheels from leaving the wire and still allow the frame to pass the support holding the wire on the pole. On the lower wire a similar metal frame runs. These are connected together by an insulated pantograph, or lazy tongs, provided by suitable guides. This arrangement provides for unequal tension on the trolley wires. The cable is connected to both the wheel frames and runs to an automatic reel on the wagon, which permits it to run out 200 feet, if necessary, or wind up to a short length, thus allowing the wagon to follow the ordinary road, turning or doing anything required of it. The wagon appears very similar to ordinary wagons and does not in operation cause any unusual noise or scare horses. By use of this long cable, instead of the trolley pole, the wagon can be run to either side of the ordinary road, thus being able to pass or meet vehicles without any trouble. It also permits the movement of the wagon, not only to each side of the road, but allows backward and forward movements, necessary in turning the wagon around, without disturbing the trolley.

The wagon consists of two wheels 48 inches in diameter, fastened to a shaft, geared to a motor spring suspended from shaft. This motor is a 2 H. P., M. P., Westinghouse crane type. In front of this motor a commutator controller is suspended, the handle of which is within easy reach of person steering the wagon. The front axle is trussed and the spindles are pivoted immediately next to wheel hub, with an arm extending forward about 18 inches fastened rigidly to spindle. These two arms are connected together and the connecting bar again connected to steering bar. This gives quick turning qualities with easy manipulation. The generator used was a 5 H. P., M. P., compound wound Westinghouse 500-volt dynamo.

On the trial, as reported for this paper, "a speed of fifteen miles an hour was readily reached with a load of 2500 pounds on the wheels. Perfect control, both in power and steering, was had.

"The first test was made in the building, and the body of the wagon was raised, leaving the wheels clear of the floor. The dynamo was started and the motor received the current perfectly through the newly invented trolley, and the wheels flew around at a speed of twenty-five miles per hour. This test being over, the power was turned off and the wagon taken out in the road, where the next test would be to see how the wagon could be handled and how the trolley would move along the wires, and what effect the pass-bys would have on the trolley as it passed the poles. The power was again turned on, and the wagon moved along the road at first with a speed of twelve miles per hour, which speed was afterwards increased. Not a hitch occurred in any of the apparatus, and the wagon was run up and down along the line of wires, passing from one side of the road to the other; going both forward and backward, and also turning completely around at each end of the line.

"Mr. Caffrey is receiving many congratulations over the complete success of the first trial of his invention."

Col. H. B. Maxson, who is associated with Mr. Caffrey, will proceed at once upon a plan of organization to place the new invention in general use for public road travel and freight purposes.

According to the London *Daily Mail*, English firms are indignant that the contracts for the traction plant of the London Central railway, which is to be an underground electric line, amounting in value to hundreds of thousands of pounds, have been given to Americans. The secretary of the company explains that the contracts for carriages, locomotives and machinery were given to American firms on the advice of electrical experts, who represent that the greater use of electrical traction in the United States has brought its manufacture to a higher degree of perfection and made is far less expensive than in England. Lord George Hamilton, Secretary of State for India, in reply to a question in the British House of Commons the same day, why the East Indian railway, owned by the Government, had purchased 7708 tons of rails from the Maryland Steel Company of Baltimore, said the lowest British bid was £8675 higher than the American tender.

The Midland Railway Company at its Leicester station has an electric plant for lighting the station and surrounding yards driven by a gas engine with a total capacity of 250 H. P., of which 75 is held in reserve. The engines are supplied with Dowson generator gas, which is produced from an anthracite coal costing $3.30 per ton. The station gives satisfaction from an economical point of view.

In a new alarm system the current is constantly switched from one set of wires to another, so that one battery suffices for the protection of a large number of lines. When the current strength in any line is altered, either by the severing of the wires or other interference, an alarm is given.

Scientific Progress.

To Explore New Mexican Cliffs.

Professor Libby, of Princeton university, accompanied by several scientists of repute, begun an attempt last week to explore the famous Mesas cliffs in the United States Indian reservation of New Mexico. It is expected that the task will require many weeks for its completion, and the scientific world will watch with interest the results of the experiments which the Princeton professor will conduct. The Mesas cliffs occupy one-third of the territory of New Mexico to the west of the Sierra Madre mountains, and bear great resemblance to gigantic fortresses or castles. In reality they are ponderous heaps of rocks, 700 feet in height—detached ranges of mountains. From the plains below can be seen peaks of extinct volcanoes and the tops of fertile hills, but white men have never possessed the skill and ingenuity required to scale the lofty cliffs and penetrate the unexplored regions, which are thought to abound in valuable minerals and relics of prehistoric ages. Professor Libby is a geologist and an Arctic explorer. He conceived the idea of attempting to investigate this district years ago, but no means offered until W. J. Eddy, of New York, perfected his kite machines for aerial transportation. Mr. Eddy has built a contrivance formed of four huge kites arranged in a square 15 feet apart. These kites can be sent up in the air to a height of 800 feet. The apparatus has been sent by express to the scene, and an expert in their use has been sent by Mr. Eddy to fly them under Professor Libby's direction. The plans are to send the kites into the air above the cliffs and to make them stationary. To the contrivance will be fastened a pulley and an automatic arrangement that at a proper time will drop a weight and cord to the earth. By this cord will be drawn through the pulley a small sized rope, which will be succeeded by ropes of larger size until one of the size of a cable has been hoisted and thrown across the summit of the cliffs. Then the ascent will be a matter of ease. In case the kite contrivance fails to be of avail, recourse will be had to several large mortars borrowed from the United States Government, from which rockets will be propelled, with ropes attached.

Influence of Dissolved Metallic Salts.

The June Journal of the Chemical Society contains a paper by Dr. John Ball on the circumstances which affect the rate of solution of zinc in dilute acids, with especial reference to the influence of dissolved metallic salts. It is a familiar fact that the action of pure zinc on sulphuric acid is very slow, but may be greatly accelerated by the addition of certain metallic salts. Platinic chloride is generally used for this purpose, and less frequently a cobalt salt. Dr. Ball finds that with sulphuric acid, magnesium or aluminum sulphate have no accelerating influence, that of chromium, magnesium and iron is very slight, silver is greater, while cobalt, copper and nickel sulphates have great influence and in this order. The relative maximum velocity of solution, taking the velocity of pure sulphuric acid as unity, is for the addition of silver sulphate, 9; cobalt sulphate, 18; copper

sulphate, 21, and nickel sulphate, 38. In the case of solution in hydrochloric acid the addition of manganese, lead or tin chloride had but little influence, copper somewhat greater (11), while the relative velocities for cobalt, gold, platinum and nickel were respectively 31, 39, 42 and 45. It will be seen that with both acids the addition of a nickel salt causes the greatest acceleration, and the relative order of the different methods is approximately the same, except that copper has much less influence on the solution in hydrochloric acid. Dr. Ball presents no theory of the reaction, but it is a fact worthy of note that in the case of the two metals having most decided influence, nickel and cobalt, it could not be detected that any metal was deposited on the zinc, thus forming a couple.

The Compressibility of Quicksilver.

A. F. Palmer has been investigating the pressure coefficient of mercury resistance—a matter that has some bearing on the graduation of mercurial manometers and calls attention to the discrepancy existing between the only determinations of the pressure coefficient previously published, namely, those of Barus, who obtained .00003 for the commercial mercury up to 400 atmospheres, and Lenz, who found .0002 for pure mercury between one and sixty atmospheres. In the experiments now described the mercury was carefully purified and distilled in a vacuum, and the pressures were obtained by means of the "screw compressor" of Barus, which is capable of indicating pressures up to something over 2,000 atmospheres. The results of the experiments are contained in two extended tables, and are further tabulated in a special chart. Taking B as the increment to unit resistance of one atmosphere increase in pressure, the equation obtained is as follows:

$$B = -.0000332 - 5 \times 10^{-9} t.$$

where the last term, owing to its extreme smallness, is probably only approximately accurate. This result is very closely that of Barus, and the difference can be accounted for by the slight impurities in the commercial mercury used by him.

LIQUEFIED CARBONIC ACID is now produced so cheaply that its use for motive power for such purposes as driving light carriages is often considered. A difficulty encountered is the great absorption of heat, and consequently loss of efficiency through the refrigeration of the engine, as the liquid expands and returns to the gaseous state. A French inventor, M. E. Rassimier, seeks to avoid this difficulty by passing the carbonic acid through capillary tubes in a chamber heated to 120 degrees (248 degrees F.) by petroleum or coal-briquettes, the heated gas being then admitted to the engine cylinder, where it acts upon the piston, and is then led into a chamber or jacket surrounding the liquefied gas. The gaseous acid giving up the necessary heat to change the liquid acid to the gaseous form of 30 degrees C., a pressure of 75 atmospheres is developed. The final exhaust of the gas takes place from the jacket or chamber. The capillary heater ensures the first expansion of the gas, while the addition of pressure through the heating of the reservoir by the exhaust gas takes place only when the engine is working.

IN the minds of some students the question of migration of forms is frequently confounded with that of the migration of tribes. It must not be forgotten by those who are carefully studying the origin of industrial forms on the Western World that there were daily mails delivered on the American shore from the Eastern Continent from the remotest antiquity. The United States navy has been dropping bottles overboard in the Atlantic ocean, at the Azores, in deep water along the coast of Spain and from the Madeira and the Canaries southward along the coast of Africa. All of these bottles that have been recovered have been found on the coast of South America, on the Antilles, and some of them as far west as the mouth of the Rio Grande. It can be inferred from this, therefore, that every buoyant object which has been dropped into the ocean during the present geological epoch by prehistoric or historic Spaniards, Portuguese or Africans has found its way to America and been stranded somewhere between the 10th parallel south and the 30th parallel north. In the northern part of the Atlantic ocean the currents run the other way and the mails have been delivered from America to Europe. In the Pacific ocean the daily mails delivered on the west coast of America from Mount St. Elias southward have proceeded from about the 20th parallel north, in the vicinity of the Malay Peninsula and Archipelago, thence have traveled through the China sea and the Japanese sea to pick up objects designed for the Western Hemisphere. In the Southern Hemisphere the mails travel the other way, and materials consigned to the Ocean Current Company were taken from Chili and Peru to be delivered upon Easter island and the various groups of Polynesia, some of them reaching as far as Melanesia.

Mechanical Progress.

Water Power Under Pressure.

IN the MINING AND SCIENTIFIC PRESS of the issues of June 5 and June 26, '97, appeared an article by Mark Replogle on the limitations of the governor in water power plants, which has elicited considerable interest among engineers.

In this regard is noted in the issue of the *Engineering News* of July 8, '97, an article by John Richards of San Francisco on water-ram in the supply mains of hydraulic power plants, which is of cognate value.

On the Pacific coast, says Mr. Richards, where pipe lines under heavy pressure are often miles in length, and sustain pressures from 100 to 300 pounds per square inch, or even more, the subject of water-ram becomes of great importance, especially where the consumption and flow are variable.

The common conception of water is based upon its visible mobility, and it is hard to conceive of it as a solid, which, when confined, is as inelastic as steel, and whose momentum in a long pipe is the same as that of a bar of iron of the same length and weight.

These long pipes contain sometimes hundreds of tons of water, the movement of which is more difficult to control than that of a ship of equal weight moving in the water.

For constant supply there is but little difficulty from water-ram, but when a considerable part of the water under high heads is subject to sudden and extreme fluctuation, water-ram has become a serious fact, and gives rise to phenomena first made known to the world, in practical form, by Riedler's "Versuche auf Pumpen."

Observations made at the Comstock mines about sixteen years ago by Mr. William B. Eckart, and the expensive experiments of the Risdon Iron Works of San Francisco, in dealing with pressures of 600 to 700 pounds per square inch, would, if published, furnish some startling facts in respect to water-ram. At the Comstock mines in Nevada, where enormous heads of water were dealt with, 10-inch pipes with walls 2½ inches thick were torn to pieces as if made of paper, and the main uptakes became safe only when provided with a nearly continuous parallel line of air vessels. This experience preceded the work of Riedler, and except a paper of Mr. Joseph Moore, read before the Association of Engineers in Glasgow, a year or two later, no account of these experiments and work has found its way into hydraulic literature.

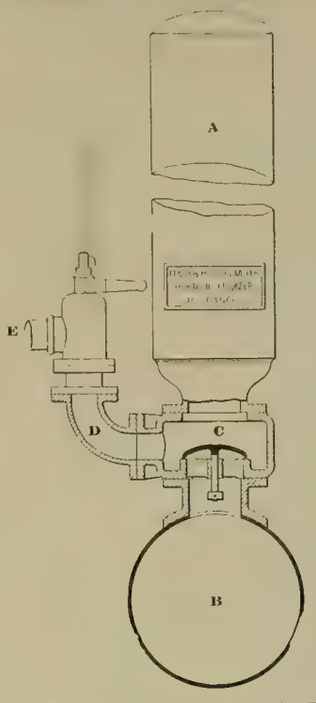
When the velocity of flow is even slightly checked in these long lines of high-pressure pipes provided with common air vessels, the rythmic pulsations of varying intensity are set up, producing variations of pressure in extraordinary amount. Thus the regulation of the speed of water wheels becomes impossible within the limits demanded in the generation of electric current. If the water is shut off in proportion to the changes of the load, pulsations are set up which produce periods of racing with the wheels, and abnormal strains in the pipes and connected vessels.

The expedients which have been adopted to obviate these troubles have been to deflect the jets of water, or a part of them, so as to miss the buckets or floats of the water wheels; to use large air vessels and to place numerous air vessels all along the supply pipe lines.

The deflection of nozzles from wheels, however, is wasteful of water, and the air vessels, while they may preserve the pipe line from rupture, are probably the cause of the pulsations of pressure referred to.

Mr. E. S. Cobb of the firm of Cobb & Hesselmeyer, engineers, of San Francisco, who in some recent practice found this difficulty of water-ram to contend with, has prepared a method of dealing with it that may interest the readers of *Engineering News*.

Mr. Cobb proposes the employment of what may be called single-acting air vessels, which are illustrated in the accompanying cut. A



A Non-Return Air Vessel for Hydraulic Power Conduits, Designed by E. S. Cobb, San Francisco, Cal.

is a common air vessel attached to the pipe line B, and provided with a valve C, opening freely inward, but closing by gravity as soon as there is an equilibrium of pressure between the pipe and the air vessel, thus preventing any return flow or resilient action of the compressed air in the vessel A.

Above the valve C is a discharge or waste pipe D, provided with a loaded valve E, that opens by the water pressure at some predetermined point and permits the escape of enough water to restore an equilibrium and permit the valve C to again open with a change of pressure.

Our New York contemporary devotes several columns to editorial comment on the subject in general, using Mr. Richards' article as a text, of value as illustrating the present wide interest in the use of water power under high heads and its development on this coast, the last notable instance being the plant of the Pioneer Electrical Co. of Ogden, Utah, fully described and illustrated in our columns last week.

What a Submarine Boat Can Do.

When engaged in harbor defense duty its position will be outside the outer line of harbor defense—that is, beyond the range of the guns defending the entrance. While performing this duty it will lie awash—that is, with only the top of its turret over the surface of the water. On the approach of an enemy's vessel the smokestack will be shipped and the aperture on top of the turret through which it passed will be quickly closed watertight. She will then run in a direction to intercept the enemy's ship, still remaining in the awash condition until she comes near enough to be discovered by the lookouts on the ship, when she will go from the awash to the entirely submerged condition. The distance from the ship at which she must dive will depend on the weather. In rough weather she can come quite close without being observed.

Having come within a distance that the operator estimates at two or three hundred yards from the ship, the diving rudders are manipulated so as to cause the top of the turret to come for a few seconds above the surface of the water. During this short exposure of the turret—much too short to give the enemy a chance to find its distance and train a gun on it capable of inflicting any injury—the pilot ascertains the bearing of the enemy's ship, alters his course or makes another dive if necessary. If he finds that the submarine boat is within safe striking distance, say 100 yards, a Whitehead torpedo is discharged at the ship. A heavy explosion within six seconds after the torpedo is expelled will notify the operator that his attack has been successful, and he may then devote his attention to the next enemy's ship that may be within reach.

When the boat is running on the surface of the water, with full steam power, and it becomes necessary to dive quickly, the pilot gives the order "Prepare to dive." The oil fuel is instantly shut off from the furnace, the valves are opened to admit water to the water ballast tanks, an electric engine draws down the smokestack and airshaft into the superstructure, and moves a large massive sliding valve over the aperture on the turret through which the smokestack passes. These operations will be completed in about thirty seconds, when the boat is in the awash condition and prepared to dive. In twenty seconds more it will be running horizontally at a depth of 20 feet below the surface of the water, and quite beyond the reach of the enemy's projectiles.—John P. Holland, in the Marine Number of Cassier's Magazine.

To Preserve Boilers.

For the preservation of boilers when not in use an order has been issued to the French navy, which is thus abstracted in the Journal of the American Society of Naval Engineers.

The boilers will be completely filled with fresh water. In the case of large boilers with large tubes, there will be added to the water a certain amount of milk of lime, or a solution of soda may be used instead. In the case of tubulous boilers with small tubes, milk of lime or soda will be added (but the solution will not be so strong as in the case of the larger tubes), so as to avoid any danger of contracting the effective area by deposit from the solution. The strength of the solution will be just sufficient to neutralize any acidity of the water. Care must also be taken to preserve the outside of the steel or iron tubes in the case of boilers, which are not to be used for long periods. To this end they will be painted with red lead or coal tar as far as it is possible to reach. For those places which are inaccessible, a protective coating will be obtained by burning under the tubes a certain amount of tar or coal tar, whose smoke will form a coating of soot and thus prevent the air from reaching the surface of the tubes. In addition, the boiler casing will be closed and kept air-tight after placing inside some quicklime. Periodical inspections of boilers thus treated will be made, to insure the complete filling of the tubes with water.

J. W. HALEY of Milford, Me., has invented a self-lubricating bearing that it is thought will prove useful. It consists of a compound of metal and graphite made in such a way as to hold the graphite in solution, which is said to have never been accomplished before. All the metals used will fuse at a much lower temperature than will vitrify glass, which requires 4000 degrees Fahr. These metals are thoroughly mixed while in a powdered form, and combine before the glass becomes liquid. They are then pressed into the journal, and make a hard and self-lubricating bearing, and one which cannot be melted out by any friction that could occur, as it will stand a red heat. glass alone makes a journal that will run with less oil than babbitt metal, but it is too brittle. Mr. Haley makes his journal of glass, lead and graphite, which renders it self-lubricating. For light shafting he uses a little antimony; for large shafting with its increased pressure he adds powdered brass and aluminum.—Chicago Journal of Commerce.

SOME workmen can distinguish iron from steel by the musical note emitted on striking. A more certain method, however, consists in using dilute nitric or sulphuric acid. If the surface remains unaltered or nearly so when touched with a drop of either acid, the metal is iron, but in the case of steel a black mark will be left, owing to the liberation of carbon.

Mining Summary.

CALIFORNIA.

Amador.

The management of the Amelia Mining Company, Jackson, have purchased a boiler and engine from the Ford mine near San Andreas, and are now putting it in place preparatory to sinking 500 feet.

Record: F. Sullivan and E. H. Young have made an agreement with Parker & Thomas of the Live Oak mine on Stony creek to work on that property. They are erecting an arrastra. They have about 2 feet of ledge which will produce about $100 per ton.

Republican: At the Zeila the chlorination works are in operation and the entire plant is again in operation after several months of enforced idleness caused by the necessity for repairs.

Good rock is coming from the Valparaiso mine constantly. One of the richest specimens of rock to be seen hereabouts is from this mine. It is an oblong piece worth $500.

The mortar blocks for the mill at the Argonaut will be put in place next week. The old tunnel has be cleaned out, bulkheaded and locked. The tunnel is about 800 feet long.

The shaft at the Oneida is now down over 1000 feet and will be continued to a depth of nearly 2000 feet.

At the Alma thousands of gallons of water are handled daily. Drifting is being prosecuted.

The Kennedy continues to turn out its regular quota, the clatter of its forty stamps never ceasing.

Water still interferes with sinking at the Anita mine.

Butte.

Five new stamps will be added to the Carlisle mine.

Good ore is being taken from the lower levels of the Golden Queen mine.

The Costa Company at Cherokee has received a permit to mine by hydraulic means provided they impound their debris.

Register: The Stow tunnel was run in 1900 feet and then they went back to the 1600-foot station and began an upraise, which is now up 450 feet. Mr. Stow has 550 feet more to go to tap the lower level in his mine. The upraise is going ahead about 100 feet a month, so that before the close of the year the upraise will be finished. One hundred and twenty-five men are employed.

The Missouri mine, owned by the Texas Company, is under the supervision of H. P. Stow and Henry Beik as foreman. They have fine rock in the ledge they are prospecting. The ledge is one mile north of Forbestown.

The Bank of England ledge is under the supervision of C. D. Antrin. There are two tunnels on the ledge and work will soon be resumed, which has for a time been suspended.

Mercury: Work was commenced earlier than in previous years in the river, and on account of improved elevators and the steel derricks used work was greatly facilitated and pumping was commenced in the beginning of March. In thirty-one days they pumped out the water, sunk the elevator to bedrock, and have washed 180 to 200 feet of bedrock, nearly as much work as has been accomplished in an entire season with the old appliances. They employ good labor and pay promptly and rustle all along the line.

Kern.

Placer diggings in the eastern regions of Kern county are being generally worked with dry washers.

A 10-stamp mill at Garlock is making a thirty-day run on ore from the Skookum at Randsburg. The Gold Bar and Hand Bower, near Johannesburg, have been bonded by Hollis and Curtis, and work begun.

Three mills are running on ore from the Wedge mine. The Wedge is now down 400 feet and the ore is richer than ever. At the 415-foot level the company will put in a gasoline hoist. The Wedge is the deepest developed mine in the Rand district.

F. E. Gladwyn, manager of the Three Chimneys mine at Keysville, has a gold brick valued at $1144, taken from four tons of rock from the mine, without the use of the concentrator, and says the mine shows a large body of ore of the same quality. The Three Chimneys mine is one of the group at Keysville, which was such a famous mining locality thirty-five years ago. Keysville is about seventy miles northeast of Bakersfield.

Nevada.

Last week, says the Grass Valley *Telegraph*, the Wisconsin mine had another rich cleanup, as it has been in the habit of doing for some months past. This time only twenty-six loads of ore were put through the Joe Southern mill and the result was a yield of $78 per load. This mine is looking better as underground developments proceed.

Placer.

Sentinel: Merrithew & Williams have commenced work on their river claim on the north fork of the American river, south of Gold Run.

The Hermit Con. M. Co. are working their mine near Michigan Bluff. Their main tunnel is 5x7 feet and is now in 1900 feet.

At the Paragon mine, at Bath, twenty-six men are now employed at the mine. The number of men working for the mine is sixteen. W. H. Grennell is superintendent. Ten men are working leased ground. The mill is running twelve hours per day.

At the Hidden Treasure mine, at Sunny South, the company is working at the Dam tunnel, the main tunnel being in over 7000 feet. Fifteen men are engaged at the new electric plant works, built in El Dorado canyon, 12,000 feet from the mouth of the Dam tunnel. Water for power will be taken from the Hidden Treasure tunnel at Sunny South, conveyed in a ditch one-half mile, where a pipe line, 1860 feet in length with 850 feet pressure, will run the 200 H. P. Pelton wheel. Two dynamos will be used to generate a current of 160 H. P. Two wires are used for the circuit to the mouth of the Dam tunnel, where a trolley line will propel trains of cars in and out of the main tunnel. The return current of electricity will be carried on the rails. A "rail-bond" makes this possible. Besides running the trains, power will be furnished for operating the blowers and a saw with which to frame timbers. There will be a surplus of power to run the pumps when the company sinks and commences to breast gravel on their lower blue channel. The new plant will compel additions to the boarding house and lodging house, as the company intend to employ a much larger force. The Hidden Treasure Company has over two miles of channel to work, and when the electric plant is in operation the mine will be operated upon an extensive scale.

At the Pioneer mine, eight miles south of Towle, the property of a Boston company, who purchased the mine from Fair & Davis of San Francisco, the new company will work the mine upon a large scale. After securing the mine, they commenced the work of driving tunnel No. 4 to strike the ledge and pay chute at the 1000-foot level, 500 feet below the former lowest working tunnel. Last May the pay chute was encountered in Lynn vein in the new No. 4 tunnel. The length of the pay chute is 160 feet. An average of $21.75 per ton was secured from all quartz crushed in June. Compressed air is conveyed by a pipe line of 1400 feet to the mouth of tunnel No. 4, and thence about 3000 feet into the mine, where stoping is in progress. Power drills are used to mine the quartz. The company has fifty-three men on the pay-roll; J. J. Sullivan is superintendent.

Tidings: Mr. Wiltse, who formerly superintended mines at Grass Valley, went to South Africa a few years ago and was fortunate enough to make a snug fortune. He returned to California about a year ago and has made several purchases of mines, mostly in Placer county. He bought a half interest in the Gold Blossom mine, at Ophir, from C. F. Reed, and the company are making extensive improvements there and have a paying mine. He also bonded the Drummond mine, near Forest Hill, owned by Mr. Reed. Recently he made a sale of the Gold Run, Limited, to a London syndicate, and the company are making preparations to work the property, which consists of a channel four miles in length, by both drifting and hydraulic process. Mr. Wiltse's operations have added a new impetus to mining in that county.

Riverside.

The *Recorder* says the work of installing the cyanide plant at Kenworthy mine in the Tanquitz district is nearly completed.

The Tin Mine Grant Syndicate in the Gavilan mining district, has erected a 20-stamp mill on its property and will have a syanide process plant in operation soon.

A new stamp mill is in operation near Perris, on the property of M. E. Bethurum. A 20-stamp mill is being arranged for by the Gavilan syndicate and the Riverside Gold Mining Company.

Sacramento.

Record-Union: The trouble of the Internal Improvement Company, which for the past three years has conducted the large placer mine at Michigan Bar in the eastern edge of Sacramento county, seems to have reached a climax. Besides a mortgage for $55,000 which has just been ordered to be foreclosed, a swarm of smaller claims have been filed including claims for wages, which have been placed in the form of attachments upon a string of sluices throught which the hillsides reach the river. The Michigan Bar or Hill Top property was formerly fabulously rich, and twenty years ago the monthly cleanups averaged $10,000. A great deal of pay dirt still remains, and in the future it may be made to pay, and the principal reason for the present failure is said to be that more money was expended in improvements than the output of dust warranted.

San Bernardino.

Twenty-five men are working on the Green Lead and the mill starts up this week.

San Diego.

U. S. G. Todd has organized a company to develop the Bay Horse and Irma gold mines in the Mesquite district, after having purchased the interests of various owners in the claims.

Los Angeles *Times*: The mines at Escondido, which hereafter will be known as the Rincon del Diablo mines, it is evident from present appearances, will be operated on latest improved methods and developed in a practical manner. Under the management of B. P. Little, active operations began some days ago, and twenty men are now employed retimbering shafts, erecting substantial hoisting works and placing a new mammoth boiler and engine in place. An assay office has been completed, also a tool house and shed for concentrators, which will be put in below the amalgamating tables. The old mill will be used for the present, having been repaired and improved. The first work will be to sink shafts to greater depths than the levels formerly worked.

Shasta.

There is a good deal of excitement over a strike just reported in Ellery Bros.' mine—the Three Sisters—in Dutch gulch, near French Gulch. Some time back the Ellerys took $40,000 out of one shaft; but the ledge pinched out and the property has been idle for a long time. Recently J. L. Cannon, formerly foreman at the Niagara mine, went to work at the property under a six months' lease. He went into the shaft and ran a drift east on the vein. He had drifted but 6 feet when he found pay ore. The ledge is 18 inches in width and is very rich in free gold.

The company owning the lime quarry on Little Backbone creek, near Kennet, has been selling and hauling lime rock by wagons to the Keswick smelter for fluxing. The wagon method of transporting the ore being too slow, a survey has been made with a view to putting in a wire ropeway. It will be about two miles in length and operated by gravity, as there is a fall of 1500 feet in two miles. The expense of construction is estimated at $10,000.

Dog Creek letter in Redding *Free Press*: T. E. Johnson of San Jose, who owns the Gold Hill property in Trinity, has bought a stamp mill. The ore assays from $20 to $200 per ton in free gold. The ledge has already been traced to a depth of 71 feet and has an average width of 4 feet on top.

Courier: The Ellery or Three Sisters mine, near French Gulch, which produced so well for a while, is coming to the front again. Since the ledge pinched it has been idle, until John Cannon began operations lately. He has struck ore said to be like that the mine formerly produced.

Siskiyou.

J. B. Tonkin has leased the R. S. Fagundies mine, mill and water right in Salmon River district for two years. Mr. Tonkin will open an unexplored portion of the ledge and expects the quartz to be fully as good and probably better than has already been extracted.

The Quartz Valley mill has been in operation lately under the management of Wm. Steele. Operation has been chiefly on custom work.

Yreka *Journal*: The American Bar mine on Klamath river made a good cleanup a few days ago, although not as good as they have done in the past. The Chinese claim near Hamburg Bar is one of the busiest on the Klamath, and it is believed the Chinamen have made it pay well, although they are very reticent. The mines on French creek and Sugar creek are said to be doing splendidly this season. Wm. Grider, who has a fine claim near Sciad, is doing some good work, and has taken out quite a lot of dust this season. It is the only hydraulic mine running in that section. The Chinese company working the claim above Calkins' place on Greenhorn, getting short of water, is now preparing for next season to be ready for the winter storms. This claim is reported as paying very well, and is worked in a good systematic manner by open cuts, with steam power to do the hoisting, pumping and other heavy work. The hydraulic mines on the lower Klamath have nearly all been closed down during the past two weeks, but several will again be in operation in a few days as soon as their machinery is repaired and other obstacles which prevent their operation are removed.

Sonoma.

A contract has been let for a road from Healdsburg, Cal., up Pena canyon to the Grizzly copper mine, recently located, and as soon as it is completed the ledge will be developed. The owners of the mine are satisfied that it can be profitably worked.

The Healdsburg Onyx Mining Company, capital stock $100,000, will develop the ledge located on Austin creek, ten miles from Healdsburg. A. B. Nally, one of the principal stockholders, says that $10,000 worth of the stock has been sold, and this sum will be expended in preliminary work.

Trinity.

The severe strain of the past four weeks has worn out the pumping plant of the Altoona quicksilver mine, and, although of sufficient capacity to keep the mine dry under ordinary circumstances, it is not large enough to rely upon in cases of emergency. "We have expended," said President Allenberg to the Redding *Free Press* last week, "$30,000 in pumping out that flood of water, and I am now en route home to confer with my associates as to the advisability of putting in a larger pumping plant. The shaft will be stripped and all the old hoisting and pumping machinery taken out. Work upon this undertaking was begun Monday. We will probably put in a new hoisting plant and pump. The plans for both plants are already prepared, and, although the pump will have to be constructed, it will require but two weeks' time to do the work. The improvements contemplated will necessitate the expenditure of a large sum of money, but the mine when in operation is a good producer and we will never abandon it."

Tuolumne.

Democrat: At the Patterson tunnel No. 2 is to be retimbered and put in shape for future use, after which the level will be continued north.

At the Grizzly the new shaft is 90 feet, while 310 feet deeper down is the objective point. The work is being carried along in a strong 8-foot ledge, which mills on an average $10 per ton.

The Soulsby will shortly resume operations.

Everything is almost in readiness to work the Seminole group of mines.

Yuba.

The Webb Mining Company who have been pumping the old Pennsylvania mine at Browns Valley, have at last bottomed the shaft.

NEVADA.

The Douglass mill at Dayton, which has been working tailings, has shut down on account of low water. The mill put through 200 tons a day from the time it started.

The reported success of the process which saves the flour gold of Carson river has started a miniature Klondyke excitement in Douglass county.

The quartz mine of the Alder Creek Co., at Blue canyon, is about to be developed on a large scale. Supt. Balliet is constructing several buildings and will put in an 8-stamp mill. He will also put in concentrators. The mill will be run by water power. The company has a finely developed ledge that prospects well.

At Golconda the name of the Adelaide Mining Company of twenty years standing has, under the new management, been changed to that of the Glasgow and Western Exploration Company of Glasgow, Scotland. J. Hennessey of Park City, Utah, is the general superintendent. He has the contract of sinking a 300-foot working shaft, which he expects to complete within ninety days. From the 100-foot level a drift has been run 168 feet, of which 40 feet are in ledge, averaging 55 feet in width. The first 30 feet are solid ore, then come 8 feet of barren rock, when the next and last 2 feet, so far worked, again disclose a solid body of even higher grade ore. This drift passes under a portion of the old workings. The shaft is of the double-compartment kind, each 5½x5½ feet. Outside timbers measure 7x14 feet. The quality and quantity of the ore to the ton: Copper sulphide, 10 to 20 per cent; gold, 2 to 7 per cent; silver, 5 to 12 ounces.

Times: The Davis leaching plant at Dayton, which has been running on river material of the Carson River Dredge Company, has so far worked about 900 tons, and it has proved that there is a fair margin in the working of the tailings. About 60 tons per day are handled by the plant, but some delay has been caused by the dampness of the material, and it is now being hauled out into higher ground to dry. This will somewhat increase the cost of handling, but this loss will be more than made up by the more rapid working of the material in a dry state and a higher percentage of extraction. The material is low grade, but there is an endless quantity of it, and a small margin is all that is necessary to have the enterprise prove a paying one, which it is now doing.

WHITE PINE COUNTY.

The North Mountain Company's mill at Egan is crushing fifty tons a day.

The mill at Robinson, when completed, will be 236x26 feet.

The Star & Grey Eagle Company are pumping from the Star shaft 1200 gallons a minute, and will soon be through.

OREGON.

Hale Bros., says the Jacksonville *Times*, are making arrangements to equip their mine on Harris Flat, Josephine county, with pipe and giant. A new ditch, which is expected to furnish them with water for eight months in the year, is being built.

The Alexander & Bent mine (formerly known as the Ennis & Cameron) in Galice creek district, has, it is reported, again changed hands. The price was $75,000, $5,000 down and the balance in payments ranging from two months to one year.

F. A. Baker, E. S. Reed., R. B. Miller, J. F. McCartney and W. H. Hearn have organized at Portland the Gall's Creek Mining Co., with a capital of $60,000, to work the old placer claim of the Pfell Bros., on Gall's creek, near Gold Hill, which they lately purchased for, it is said, $8000.

WASHINGTON.

The *Spokesman-Review* is informed that the Clarks and their associates will erect this fall a milling and cyanide plant near the Republic, in the Eureka camp. They have already secured water rights on Granite creek and surveyed a route for a flume. If this mill goes in this fall it will result in a big boom for Eureka as well as for the whole Colville reservation, for quartz showings of a similar character are reported throughout the Sans Poil and Curlew valley. With the opening of the reservation it was overrun with prospectors hunting for iron caps and copper showings, no attention being paid to the white quartz showings. It is thought that the Eureka quartz can be transported to water and milled for less than $2 a ton. Everything is open to the visitor. He can go on any property and sample and investigate as he sees fit.

BRITISH COLUMBIA.

The new 200-ton blast furnace of the Hall mines smelter at Nelson was charged for the first time this week and will be used for smelting copper ores. The ore bins are full and the mine is now turning out 200 tons a day.

Last week the deal started two months ago for the sale of the Lexington group in the Slocan was consummated by a first payment of $1,500, and the transfer to the McCunes was recorded, says the Spokane *Review*.

M. J. Burns, superintendent Lullus mine, Trout Lake district, has arranged to ship a car of ore to Nelson. The ore is gray copper and galena and the pay streak is about 8 inches, averaging about $100 to the ton.

The 10-stamp mill at Horsefly mine, B. C., in charge of John Hobson, was started July 10th. Drifting will be continued all winter. The walls of the mill are 4 feet thick, with tar paper between. Its construction required 80,000 feet of lumber. Thirty men are employed.

(Special Correspondence).—Lieutenant Governor McIntosh of the Northwest Territories is the authority for the statement that work on a smelter at Robson will begin within six months. It is the popular notion that the C. P. R. will make Robson the smelter town of Kootenay. The company own the country at Robson. Besides country, there is a great water power in the Kootenay river at that point.

F. A. Heinze of the Trail Smelter and the Columbia Western Railway says he has offered the Le Roi Company a site on his railroad above Trail, all the water power they need, and a rate on ore from mine to smelter as low as Corbin of the Red Mountain Railway will give them.

The Le Roi people, including United States Senator George Turner, are all Spokane people, and their American friends and they would like to locate their smelter at Northport, on the American side. It is expected that Heinze's offer will be passed upon at a meeting of the company this week.

The Canadian Pacific also took a hand in this smelter contest and called on Heinze to make a railroad rate that would meet the

American road's tariff. The C. P. people say the Rossland-Trail ores must be smelted on this side. They offer a low rate on coke from Nanaimo, Vancouver island, until the Crow's Nest Pass Railroad is built, and then a better one.

James Breen, who built the Trail smelter and one at Durango, Colorado, will build the Le Roi smelter. He believes in locating it on the Canadian side, on the Columbia river.

Sir Charles Ross, the Scotch baronet and promoter, is pushing the work on an electric power plant at Middle Falls, on the Kootenay river, seventeen miles above Robson. He, Oliver Durant of the Center Star and Charles R. Hosmer of the C. P. telegraph line are the pushers of this electric scheme. They expect to have the power house built, dynamos set and wires strung into Rossland in four months. They will first furnish power to the Center Star, but not exclusively, as they advertise their readiness to furnish it to the mines generally. The capacity of the plant will be 10,000 H. P. The length of the transmission line will be at least thirty-six miles, ten miles greater than the distance from Niagara Falls to Buffalo. Ross says the cost of power to the mines will be reduced 50 per cent. An interesting question is involved in this enterprise—its commercial success. L. B. Stilwell, electrical director of the Niagara Company, says the transmission of 1000 H. P. twenty-six miles is still an experiment, and until he has had actual experience in transmitting a block of 5000 or 10,000 H. P. that distance he has no opinion to express upon its efficiency. The Kootenay promoters seem to take it for granted that they can successfully transmit 5000 or 10,000 H. P. thirty-six miles. They could have located nearer Rossland, but from the point selected they can reach Nelson, Kaslo, Slocan City and Sandon, making their plant the great generator of power for West Kootenay.

Trail, B. C., Aug. 3, '97.

(Special Correspondence).—The Credit Lyonaise, a French syndicate, is prospecting the British Columbia M. & M. Co.'s property, which is bonded for $20,000. In addition to other work, four diamond drill holes have been put down from 90 to 160 feet, each proving the ledge to be about 20 feet wide for at least 1700 feet. The ore, which is gold bearing, free milling and low grade, is being treated by the cyanide process at the reduction works.

The Chinese hydraulic mine on Cunningham creek, which was bought by the M. & M. Co. last winter for $16,000, is being thoroughly prospected under the management of R. J. Sawyer. Two and one-half miles of ditch has been dug and 1000 feet of pipe is on the way from Ashcroft.

All the hydraulic claims near here have done well, though the season was short owing to the light snow fall last winter, followed by hot weather in the spring.

The Cariboo Gold Fields, Ltd., has about fifty men employed, chiefly on ditching.

Johnson & Fry, who purchased Shaw's drifting diggings on Hardscrabble for $5000 last spring, are running a tunnel from the level of Willow river to drain the lower end of their ground.

McCloskey Bros. have struck pay gravel on Antler creek, near Sawmill Flat.

Laird, at Willow river, has replaced the machinery destroyed by fire some weeks since, and is drifting into the channel.

The Slough Creek Co. is getting some gold in the work being done to reach bedrock.

The 10-stamp mill at Horse Fly (Hobson's) has been started up on a large bank of cement gravel.

Barkerville, B. C., Aug. 3, '97.

(Special Correspondence).—If it were not for the all-absorbing query, "Can I get to Klondyke?" the British Columbia mines would be receiving more public attention than they are, for results demonstrate that many of them owned on the seaboard are going to be big winners. The Athabasca of Nelson district, a free milling proposition, owned in New Westminster, B. C., and Toronto, Ontario, has shipped seventy tons to the Hall smelter and received gross returns of $5280. The Golden Cache in Lillooet district, said to be the richest free milling proposition in the Province, have their 10-stamp erected and will commence crushing on Aug. 15th. The Alpha Bell Company, adjoining the Golden Cache, have the identical vein of the Golden Cache and are 25 feet in the same ore on their main tunnel. Ashcroft, the post-office town of Lillooet, is growing. The American Pulverizing Company are locating a plant there. On Taxada island, near Victoria, B. C., the Victoria Taxada mine has produced a brick from fourteen tons of ore—free milling—worth $900, and has men developing the mine. At Phillips Arm, near Vancouver, a number of claims have been bonded for from $10,000 to $100,000. On Harrison lakes, close to New Westminster, the Providence mine, close to the water's edge, is shipping ore with good paying results. The prominent properties at Fairview Camp, Okanogan, are being well spoken of just now. The Smuggler stock has been taken off the market. The Tinborn mine has 1500 tons on the dump. Their 20-stamp San Francisco mill is being installed. The vein in No. 1 tunnel has widened from 4 to 29 feet. The company claim that their ore averages $65 and that their vein cuts the mountain in two. The Winchester has two shafts sunk, one 40 and the other 50 feet. The surface assays are the highest yet made in the camp—$75. Besides this shaft work there are 600 feet of crosscuts. The Comstock Mammoth Company are running a tunnel to crosscut two ledges. The cut is in 235 feet. The ledges run through the Jim Dandy-Morning Star-Brown Bear and Stemwinder, all prominent properties in the camp.

Vancouver, Aug. 1, '97.

Correspondence *Spokesman-Review*: Capt. Hall, superintendent of the Le Roi, will sink a triple-compartment vertical shaft 600 feet westward from the present hoist—800 feet before drifting to any extent is done. A hoist of corresponding capacity is to be erected, and double-decked cages put in, which will give a capacity of about ten times that of the plant now in use. This will be the central main working shaft, though the present one will still be used. To complete this undertaking will require about a year's time, though it can be used before the depth mentioned is attained. The mine is working a staff of 175 or 180 men, about 125 of them being below ground. More would be put on if skilled hands could be obtained. The mine is turning out from 250 to 300 tons a day, all of which is shipped to Trail, and it will take about three months yet to complete the contract with the smelter there. A concentrating plant will be put up within no distant day to treat the low-grade ore, of which there is so much on the dumps.

*Rossland*er: The report of the sale of the Pilot Bay smelter to the Omaha & Grant Smelting Company is confirmed, and Wm. Braden, the Northwest representative of the company, is making arrangements for ore.

A contract has been let to build a 100-ton concentrator at the Montezuma to cost $45,000.

From January 1 to July 24, inclusive, the shipments of ore from mines at Rossland to smelters were as follows:

Mine.	*Tons.*
Le Roi	27,650
War Eagle	6,538
Columbia and Kootenay	1,275
Iron Mask	2,072
Jumbo	91
Josie	365
Cliff	457
Center Star	313
Red Mountain	56
O. K. (concentrates)	172
Evening Star	30
Giant	21
I. X. L	12
Total	39,768

Cariboo City dispatch: The new wagon road to Mineral City is now completed as far as Goat canyon, and it is expected that it will be finished by the 1st of September. This will facilitate matters so as to allow mines in the vicinity of Mineral City to ship ore, as heretofore they have had no means of shipping their ore except by pack horses, which necessitated an expense of $20 per ton. Up to the present time only one mine has shipped from this district.

IDAHO.

A. Klockmann, lately operating in British Columbia, has gone to Idaho and will devote his attention to the opening up of the well known Continental mine, situated a few miles north of Priest lake in Kootenay county, Idaho. Mr. Klockmann became interested in the Continental in 1893. It is one of the largest galena prospects in Idaho, having enormous ore bodies running about $60 in all values. A wagon road will be constructed from the mine to the Kootenay river, a distance of eighteen miles, and ore will be shipped on that river by boat to the Great Northern Railroad at Bonner's Ferry. Mr. Klockmann hopes to begin shipments this winter.

The Parrott mine at Sunset peak, near Wallace, has been started up in a small way after a long shut down.

In the Pierce district, near Kendrick, a promising strike has been made on a ledge which measures about 2 feet in width and panned $200 to the ton. Coming so soon after the recent rich strike made on the Musselshell and in the French creek district, has created a good deal of excitement. A noticeable feature of the recent discovery of the ledges is that they have been found in the vicinity of rich placer diggings, and as a result prospectors and miners are turning their attention towards the old diggings which made the camp famous in the '60s to look for ledges.

Princeton letter: Last week the Bishop made a strike that is considered by far to be the best looking rock yet discovered in the camp. The ore runs very high in copper and silver with a showing of free gold that, it is estimated, will go from $60 to $120 per ton. The find was made in the shaft at a depth of 58 feet and is growing better as the work progresses. The lead is between 3 and 4 feet wide, with strong indications of its widening very fast. The Bishop is the north extension to the Gold Bug.

Gibbonsville *Miner*: The mill on Pratt creek, erected the past winter by C. E. Bolton for the Goldstone Mining Company, was started up a week ago and worked to perfection.

Spokane *Spokesman-Review*'s Idaho letter: The Acme group of mines on Grouse mountain are showing up well in free gold. Considerable work has been done and the claim is well prospected. The main shaft is down 30 feet. The same character of ore as appears on the surface is found at that depth. The average of thirty-eight assays gave a value of $19.60 a ton.

MONTANA.

The Mastodon Gold Company at Mammoth, has settled its differences with the former employes, paying the labor claims, and will push development work.

The Revenue people at Norris are putting in a cyanide mill. This company, says the Marysville *Mountaineer*, has recently purchased the old Bradley mine.

There has been a revival in gold mining about Helena. Mills that have been closed down for years are now running, and others are being built, among them a 600-stamp mill for the Diamond hill mines, forty miles east of the city. The mine was sold last year to a Scotch company for $2,000,000. It has electric equipment, water power is furnished by a dam across Crow creek, three miles from the mill. The mine has blocked out considerable free milling ore running from $2 to $6 per ton.

Under date of July 5th, the general manager of the Calumet and Hecla copper mine says: "During the past fiscal year we produced mineral equivalent to 43,404 tons of refined copper; our product in refined copper was 46,237 tons. For the previous year our refined copper product was 42,776 tons. The price of copper has varied from 10¾ cents to 12 cents per pound. It is now 11¼ cents."

Herman Thofehrn, superintending an electro-cyanide plant at Iron Rod, tells the *Inter Mountain* that the plant is a success. With four men employed, it treats twenty tons of ore a day, saving 85 per cent of the gold and 50 per cent of the silver at a total cost of only $1 a ton. It is estimated that there are about 20,000 tons of tailings at the old Iron Rod mill which will be worked. The tailings will average $11. Several attempts have been made in the past to work the tailings of the Iron Rod, but, owing to the fact that they were full of slimes and extremely difficult to filter, the attempts resulted in failure.

The method of gold and silver extraction of this company is very simple and may be described briefly as a combination of lixiviation of potassium cyanide and barrel-amalgamation, both the solution and deposition of the precious metals being aided by a weak electric current. The ore, in a finely divided state, is charged into a barrel, or cylinder, so supported as to admit of slow revolution. To each ton of ore 1600 pounds of water is added, with from ¼ to ½ per cent of cyanide and a little caustic alkali, if the ore is acid. In the interior of the cylinder are slats of iron, so arranged as to mix the ore and prevent the scraping of amalgam as the cylinder revolves. The interior of the barrel is covered with amalgamated copper. The iron slats are connected with the positive pole of a dynamo and the amalgamated cylinder with the negative pole. The barrel is revolved by means of a small engine for about five hours, the cyanide solution, aided by the current, dissolves the gold and silver and the electricity deposits these metals on the amalgamated surface. The contents are discharged into a settling tank to recover the solution and any amalgam that might be detached by the action of the ore. The cyanide solution is then brought to the proper strength and used over and the tailings are run away.

Basin *Progress*: The Boulder mill has been closed to make improvements. A new vanner and three jigs are being put in.

At the Ruby twenty-five men are working on the mill. Additional men are also being put to work in the mine.

Butte *Inter-Mountain*: The hoist at the Moonlight is nearing completion. The foundation is laid for the big hoisting engine which will replace the one now in use. During the work of reconstruction the mine is being operated as usual.

UTAH.

E. D. Loose and David Evans have got the control of the Ibex mine in the Detroit district. In the transaction they secured 98,000 shares of stock, the figure at which it changed hands being quite a large one, although the purchasers decline to name the exact figure. It is proposed to do a vast amount of exploration work in the immediate future.

David Moffat has bought the Copper Queen for $11,000. Negotiations are pending for the purchase by Thos. Musgrove of the Golden Dream belonging to the estate of Capt. G. A. Jackson. The property was bonded by Musgrove, who put in a 5-stamp mill from which the most satisfactory results were derived. The first run showed a valuation of $27 per ton, the second run an average of $23 and the third $40 per ton. All of this ore was taken from 35 feet of work and at present the outlook is one of the best that has been shown in that district.

Salt Lake *Tribune*: Advices from the Grand Central at Mammoth indicate that a most important strike has been made in that property, which has been so long prospected, and that the bonanza for which they have been searching, at an expenditure of over $100,000, is about to be developed. Within the last few days the management has run across a big body of ore running $120 in gold and six ounces in silver per ton. There is not a speck or spot of copper stain in it. No matter from what part of the ore body samples are taken the assay value only varies $1 from the highest to the lowest. On the level at 400 feet, they have a 2-foot vein of steel galena which assays eighty-five ounces silver, 16 per cent lead and a little gold. Between the 600 and 700-foot levels the management encounters streaks of high-grade ore. The big strike is on the 800-foot level.

COLORADO.

Manager Buschman of the Speedwell mine, Ouray, has just completed a 1500-foot two-bucket tram, connecting the Speedwell with the Sky Rocket mill. The new tram is designed to carry 100 tons of ore in twenty-four hours.

Colorado Springs *Telegraph*: The Octopus Gold Mining Company is probably making the best showing of any of the numerous companies at work on that section of Grouse mountain known as Little Pisgah peak. The company owns the Octopus group, consisting of four patented claims on the south slope of Grouse mountain. In a shaft sunk to a depth of 95 feet, on a promising lead, assays have been secured as high as $120 per ton. The company is composed principally of McCook and Omaha, Neb., capitalists.

Contractor William Cross is crowding the work of excavating for the foundation of the new sampling works located in the northeast part of Goldfield. The new sampler is being constructed by Colorado Springs capitalists, and the Smith-Moffat syndicate is known to be a heavy stockholder. The sampler will be 30x60 feet in dimensions, and will have a capacity for sampling over sixty tons of ore per day. The work will be pushed with all possible rapidity, and it is expected that the machinery will be in motion before the end of sixty days.

The management of the Little Montana, near the Florence & Cripple Creek depot, has up to date been unable to combat the heavy flow of water; they have been obliged to draw their pumps and abandon work until a pump of greater capacity can arrive from Denver. The shaft is now 230 feet deep.

Record: The recent average output of the Vindicator has been about fifty tons a day. Although the company has large ore reserves, the development is progressing rapidly and they are sinking the shaft intending to run another series of levels as soon as a depth of 50 feet more can be reached. One-half of the ore shipped by the Vindicator is a high grade smelting ore.

Systematic development has been the motto of the Blue Bird, Cripple Creek, for some months, and now large blocks of stoping ground have been opened up in the different levels. Two carloads of good grade sylvanite ore have been sent to the Pueblo smelters which are expected to run very high.

NEW MEXICO.

The Mesa del Oro Company, L. B. Tulley superintendent, are preparing to work the Hillsboro placers. The area includes 1,500 acres. A part of the work will be a ditch twenty miles in length from the Rio Animas to Animas peak. A pipe line 2,600 feet in length will span the Animas, and also a further extent of this pipe line about 1,900 feet in length crossing the Tank canyon. The ditch will be 4 feet wide at the bottom and and 7 feet at the top, and its capacity will be 2,000 miners' inches per second. The fall will be 10½ feet to the mile. The water to be used in washing the placers will come from a dam on the Animas. The estimated cost of fitting up the placers and putting everything in readiness for operation is about $500,000.

Raton *Reporter*: Wm. Reed reports another strike on the Highland Mary, about 11 inches wide. Mr. Reed and Mr. Biddle, manager of the property, took twenty pounds of the rock and pounded out from it $14.70 in gold. The company at once put men on to get it in shape to work as at the point of discovery it is impossible to do development work on account of water.

New Mexican: In the Chloride country ores bear copper and silver, with a little gold. The U. S. Treasury and White Eagle, one the extension of the other, have veins over 24 feet in width on the 100-foot level, and show $10 per ton value across the face. In working these claims no waste is encountered, all the stuff taken out being "pay dirt," and over 1000 tons of ore are now on the dumps. These mines are the only gold-producing mines in the Chloride district that have been discovered, the other claims producing copper and silver. The Colossal, Midnight and Silver Monument, once producers but for years allowed to remain idle, will resume work soon. The renewal of operations in silver mines is due to the demand for copper, and nearly all the silver lodes carry that metal in paying quantities.

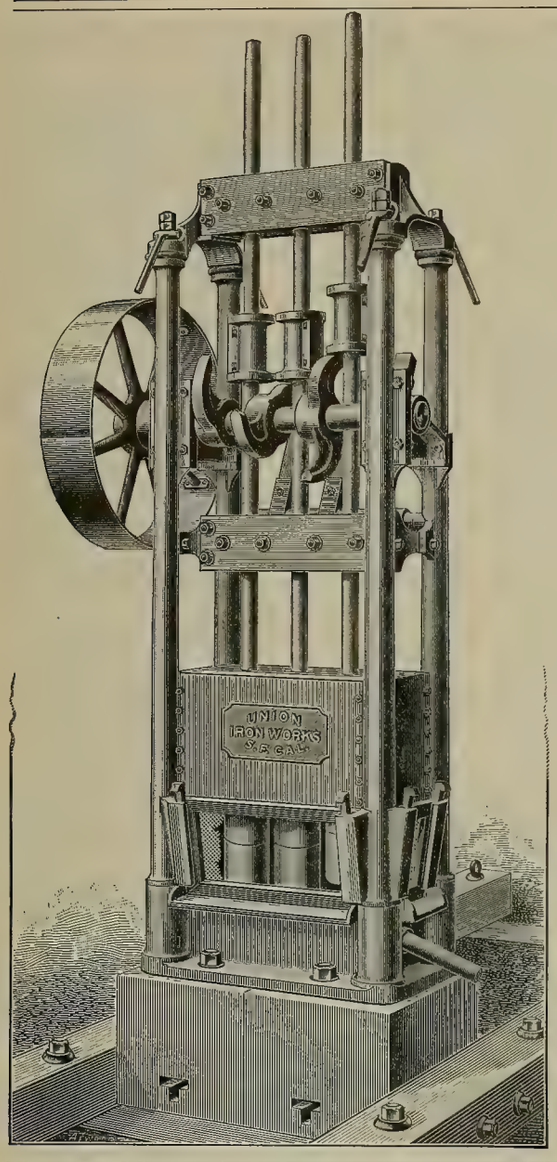
In the Magdalena district much attention is given to the lead deposits, particularly around the old camp of Kelly, and long-abandoned claims are again made to produce. I. S. Church has opened up a copper claim which is an extension of the old Iron Mask, and is doing a large amount of work. The Graphic mine and smelter are running night and day; in fact, through all the time of low prices work was not stopped.

ARIZONA.

The Rio Colorado Gold Extraction Company, capital stock $1,000,000, is incorporated at Colorado City, Colo., and has purchased twelve mines 600x1500 feet area on the east side of the Colorado river, in Yuma county, Arizona. They have a 75-foot shaft and will put on a stamp mill and work the mines.

The Crowned King is now rated, next to Congress, as the second best producer of Yavapai county. The three claims cross the western slope of a peak of the Bradshaw mountains. The development of the mine is reported unique by the *Republican*. From the southern end of the property, which contains the Silver King claim, a tunnel is driven into the mountain in a northerly direction. The extent of this tunnel is 1900 feet. It takes the course of the veins. The ore body strikes into the mountain at the Silver King claim and dips to the north. From the mouth of the tunnel, at a distance of 524 feet, is a large station. The main shaft extends from this station 400 feet. On the surface, 150 feet directly above, are the boiler and engine rooms and the hoist. A cable runs down on a direct line with the mouth of the shaft and connects with the elevator in the shaft. The ore comes up in the cars and is pushed out to the ore bins. The tunnel goes on north into the mountain 1100 feet from this station. There is a 10-stamp mill and eight 4-foot vanners. The output is about twenty-eight tons a day. The plates catch about 50 per cent and the rest is left to the concentrates and cyanide. About 150 men are employed by the Crowned King Company at the present time. This includes the entire working force. The wages are $4.50, $4, $3.50, $3 and $2.50. Miners' wages are $3.50. The mine has been in operation for nine years. N. S. Shekels is the principal stockholder. He expects to soon erect a 30-stamp mill at the mine. P. A. Johns is foreman. The tailings are being treated by cyanide. The plant has a capacity of thirty tons a day. It is only an experiment thus far. If the values extracted are sufficient to warrant it, a ninety-ton plant will be put in. Dr. J. W. Coleman and Dr. Alderdice of Prescott own the plant and treat the tailings upon the royalty plan. G. P. Harrington is superintendent at the mill and postmaster at the camp.

Republican: In running a crosscut in the Buster mine, Bradshaw mountains, a large body of copper ore has been encountered. The crosscut is over 200 feet long and 300 feet under the croppings, which latter are large, and the work was done to ascertain if the ledge went down. It has been found to hold its own, both as to extent and richness. E. D. Treadwell is superintendent of the property.



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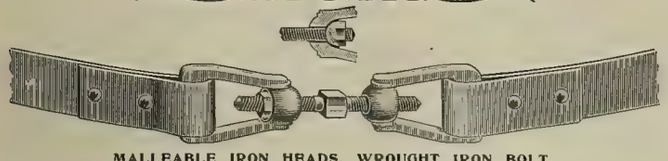

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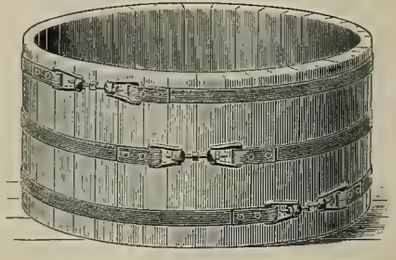


WELLS, RUSSELL & CO., Mechanics' Mill, Cor. Mission and Fremont Sts., San Francisco, Cal.

Coast Industrial Notes.

—Hawaii has excluded the Chinese.

—The San Francisco revenue office reports collections for July as aggregating $450,000.

—The 44th Annual State Fair at Sacramento, Cal., begins Sept. 6th and closes Sept. 18th.

—The Sierra, Cal., Telegraph Co. has incorporated, to build along the line of the Sierra Railway Co.

—In the southern part of Humboldt county, Cal., it is believed that there is sufficient oil to justify work on the wells on an extensive scale.

—Negotiations are pending at Vancouver, B. C., for the purchase of all the salmon canning industries in that vicinity on behalf of an English syndicate.

—The Mexican Central Railway is at present receiving but 46 cents for its silver dollars, which is the lowest price received for Mexican dollars in the history of the company.

—Russians are arranging for a line of steamships between San Francisco and Vladivostock, the eastern terminus of the Transsiberian Railway. Fifteen days is the scheduled time.

—The Santa Barbara Oil and Mining Company's five wells produced 128 barrels of oil the first week of their opening. The company has machinery to handle the output of 100 wells.

—Dodwell, Carlill & Co. of Hongkong, together with a number of Tacoma capitalists, have organized a steamship company and will compete for Alaskan trade, with headquarters at Tacoma.

—Regardless of the attitude of the Greater Republic of Central America, it is the intention of the Administration to recommend Government Control of the Nicaragua canal when Congress assembles next December.

—Moran Brothers of Seattle, Wash., building the torpedo boat Rowan, had made good progress until the Alaskan craze set in. So many of their workmen have dropped their work to go to Klondyke that they appeal to the Navy department for an extension of time in which to complete the boat.

—Two new wells are now being excavated at Coalinga, Fresno county, Cal. The production of the wells is now about 175 barrels a day and the shipping is over a carload a day. The oil goes to San Francisco, Oakland and Portland. The gas used in Fresno is manufactured from the Coalinga oil.

—During the past fiscal year there has been a reduction of mortgages throughout California. In Yolo county $338,275 worth of mortgages were cleared from the books of the county. San Bernardino county swept off mortgages to the amount of $450,000, Riverside county to the value of $600,000. Other counties make similar favorable reports.

—F. M. Smith is credited with present intention to build a new borax refinery in or near New York to supply refined borax for the Eastern market. The Alameda, Cal., factory, said to be the largest in the world of its kind, has raised its monthly output from about 600 to 700 tons. The demand has been increasing during the last several months, and it is now up to 800 tons monthly.

—Because of a call for animals suitable for use in Alaska pack trains, horses which were selling in Washington for $3 to $6 are now bringing $10 to $40. Horses are being shipped by every steamer. The Willamette carried 300 pack animals north. By August 15th, it is calculated, 800 horses will have arrived at Dyea and Skagaway for use in packing Klondyke outfits over the Chilkoot and Whites passes.

—The Chicago, Burlington & Quincy Railroad is going to extend its line across Colorado to Utah and to the coast. The extension will begin at Lyons, the terminus of the Colorado branch of the road, and run through Left Hand canyon, in Boulder county, to Ward; thence across the range to Routt county, tapping the Hahn's peak region, and across Colorado to Utah, passing to Ogden and Salt Lake.

—The following shows the taxable valuation of all the railroads operating in California, as fixed this week by the State Board of Equalization:

California & Pacific	$ 2,000,000
Central Pacific	13,000,000
Northern California	275,000
Northern Railway	3,100,000
South Pacific Coast	1,105,840
Southern California Motor	80,000
San Francisco & North Pacific	1,935,000
Southern California	2,950,000
Southern Pacific Company	14,664,580
California & Nevada	92,000
Carson & Colorado	230,000
Nevada, California & Oregon	110,000
Nevada County Narrow Gauge	100,000
North Pacific Coast	650,000
Pacific Coast	304,400
Pajaro Valley	150,000
San Francisco & San Mateo Electric	75,000
Gualala River	40,000
Sierra Valley	53,725
Pullman Palace Car Company	90,000
Pullman Palace Car Company (over A & P. Railway)	31,140
Atlantic & Pacific	1,450,000
Alameda & San Joaquin	143,520
San Francisco & San Joaquin Valley	876,540
Total assessments	$43,486,445

—Secretary of Agriculture Wilson has a report from a firm at Lisburn, Ireland, on some retting and scutching experiments conducted by them in Ireland with a ton of flax straw grown in the Puget sound region of Washington under the direction of the Agricultural Department in its experiments in 1895. These experiments developed the fact that for flax culture the Puget sound region is the equal in climate of some of the best flax producing regions of Europe. Attention is called to the low rate of seeding—one-half to two bushels per acre—and to the fact that fourteen bushels of seed per acre was produced. It is asserted that the experiment proves that farmers in this country can grow seed and fiber in the same plant.

—Of the bids for dredging a channel between Mare Island and Vallejo, Cal., that of the San Francisco Bridge Company is the lowest. It will be the largest single contract for dredging ever let by the Government on this coast, requiring the removal of 1,500,000 cubic yards of material. The channel to be deepened is 7000 feet long and will be worked to a depth of 30 feet at mean low water, and its width of 600 feet will make it ample for the passage of the deepest war vessel to reach the navy yard. The bridge company's bid was 10.74 cents per cubic yard. The cost of the work is estimated at $170,000.

—Nothing can be done more than has already been done toward marking the boundary line between Alaska and the British possessions along the 141st meridian until the Senate has passed upon the boundary treaty now before it. There is, however, no doubt of the location of the line along this meridian, as the people in the locality know where it is. The work of demarcation will be superintended by General Duffield, in charge of the Geodetic Survey, on behalf of the United States. He expresses the opinion that a railroad can easily be constructed from Taku inlet to the Klondyke gold fields, and believes the enterprise is well worth the undertaking.

Personal.

E. B. PRESTON of the State Mining Bureau is in Shasta Co., Cal.

W. E. LESTER has been elected president of the Mariposa Estate Co.

U. S. SENATOR SHOUP of Idaho says he will go to the Klondyke next spring.

J. J. CRAWFORD, ex-State Mineralogist, is examining his El Dorado county property.

A. H. RICKETTS has returned from Lakeport, Cal., where he had been arguing a mining case.

C. B. SESSIONS of the San Francisco Electrical Engineering Co. has returned from the Comstock.

MR. GRIFFITH of Donald has been appointed Gold Commissioner for the northern portion of East Kootenay, B. C.

HENRY BRATNOBER writes that he expects to get to Dawson City about as soon as the travelers by the Excelsior.

WALDEMAR LINDGREN of the U. S. Geological Survey will prosecute research in Owyhee Co., Idaho, this season.

S. M. ASHENFELTER has been appointed managing director of the Pike's Peak, Colo., Tunnel Construction Co.

CAPT. RAY, U. S. A., started on the steamer Cleveland on the 3rd inst., to investigate the Alaskan situation and report.

H. S. BLASDEL, the first State Governor of Nevada, has returned to San Francisco from his mines near Coulterville, Cal.

S. H. BABCOCK has been appointed traffic manager Rio Grande Western Ry., with headquarters at Salt Lake City, Utah.

SAMUEL NEWHOUSE, managing director of the U. S. Exploration Company of London, is examining mines in southern Utah.

FRED HOWE BOSTWICK, representing the Hendrie & Bolthoff Manufacturing Co. of Denver, Colo., has returned to that city.

O. O. HOWARD, JR., of Graniteville, Nevada Co., Cal., has negotiated to bond the Berry claims in the Klondyke for $2,000,000, should they prove satisfactory.

E. E. Leake, State Commissioner of Public Works, says, regarding the Newtown Shoals borings by Engineers Nourse and Randall, that he will urge the immediate purchase of the dredger for which the last Legislature appropriated $300,000.

JULIO PEREZ CANTON, commissioner from Chile to the Guatemalan Exposition, has this week been visiting various industrial establishments in San Francisco.

H. C. BEHR of the General Electric Co. is superintending the building of the $15,000 electric plant at the Hidden Treasure mine, Sunny South, Placer Co., Cal.

J. H. CURTISS of New York City is the first man who has gone to the Klondyke to start a commercial bank. Jos. Harvey of this city has gone there to start a faro bank.

PRINCE PONIATOWSKI, returned from Liverpool, says American investments are now more favorably looked upon in England than heretofore, including California mining investments.

DUNCAN MCVICHIE, until recently superintendent of the Iron Belt mine, on the Gogebic range, Wisconsin, succeeds George Kingsbury as superintendent of the Golden Gate mine, Mercur, Utah.

PROF. N. S. SHALER of Harvard University, a recognized authority on geology, is examining some mineral formations in Montana near the Canada line. He is accompanied by J. H. Talbott, ex-Mining Inspector of Colorado.

O. F. FERNBACK of New York city is a passenger on the outgoing steamer for Tokio, Japan. He has been engaged by the Japanese Government to superintend the erection and the operation of a trolley system of electric cars in the capital and throughout its suburbs. He has a three years' contract with the Japanese Government to superintend the introduction of the trolley system in the principal cities.

Commercial Paragraphs.

WHITE, ROGERS & CO., 306 Pine street, San Francisco, have been appointed Pacific coast agents for the Wilfley concentrating table.

THE Risdon Iron Works, Howard and Beale streets, San Francisco, last week sent to the Banner mine, Butte county, one 11-ton 250 H. P. engine.

DURING last week the Colorado Iron Works Co., Denver, Colo., shipped to the Britannia Mining Co., Ainsworth, B. C., one set of 14x27 inch crushing rolls; to British Columbia, machinery of ten-stamp mill, including vanners, crusher, etc.

THE E. P. ALLIS CO. are the Pacific coast agents for the Leyner drill. One can be seen in operation at the San Francisco office, 9 Fremont street.

Recently Declared Mining Dividends.

Morning Star Mining Co., Placer Co., Cal., dividend No. 80, $8 per share; payable immediately.

Kearsarge Copper Mining Co., Michigan, $1 per share; payable Aug. 2nd.

Quincy Copper Mining Co., Michigan, $4 per share; payable Aug. 16th.

Gwin mine, Cal., 30 cents per share, $6000; payable immediately.

Pennsylvania Mining Co., Cal., 5 cents per share; payable immediately.

Boston & Montana Copper Mining Co., Montana, $3 per share, $450,000; payable Aug. 12th.

Recent California Mining Incorporations.

Klondyke Co-op. G. M. Co., Fresno; W. H. McKenzie, B. F. Sheplar, F. J. Haber; capital stock, $48,000; subscribed $600.

Franco-American M. Co., Los Angeles; F. Colas, A. L. Appel, E. E. LeFevre, W. F. Botsford, A. B. Dessery; capital stock, $100,000; subscribed $68,782.

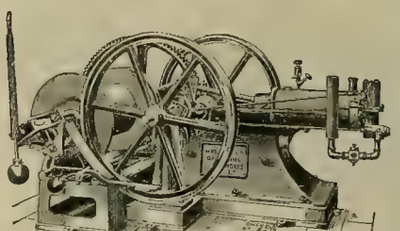
White Peak Group M. Co., Los Angeles; J. W. Wenzel, M. L. Wicks, R. H. Bradley, C. McComas; capital stock, $1,000,000; subscribed $500.

Crystal Hill Mining Co., Oakland, Cal. J. M. Davis, A. and F. Roberts, I. S. Watson, B. C. Fabrique; capital stock, $150,000; subscribed, $50.

Southern Alaska Mining and Development Company, San Francisco. H. T. Renton, C. Greene, R. B. Fripp, F. T. Gerst, C. Olaine; capital stock, $50,000; $7000 subscribed.

Pinas Altos G. M. Co., San Francisco; J. C., F. and R. A. Clark, A. H. Winn, E. J. McCutchen, H. A. Whitley, A. M. Jordan; capital stock, $1,000,000; subscribed stock, $700.

Hercules Hoisting Engines



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THE POULTRY EXHIBIT will constitute a most important division of this year's exhibition, and will offer a most excellent chance for buyers to view the various breeds of fowls in comparison.
THE DAIRY DEPARTMENT will have a complete working exhibit showing the latest methods in dairying, and the working of improved appliances. Competent instructors from some of the leading creameries in the State will be in charge to give instructions to all in this growing industry.
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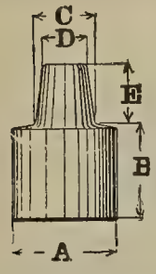

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These Shoes will outlast any other make and will not chip or cup.

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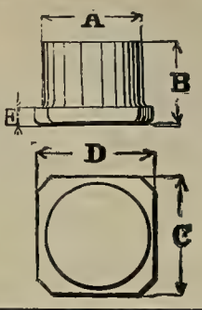

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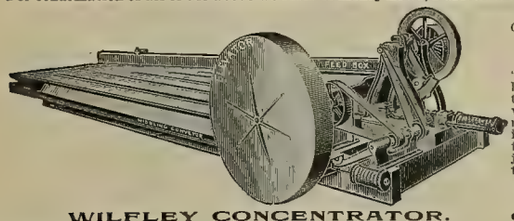

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The Mine and Smelter Supply Co., Denver, Colo.—GENTLEMEN: Replying to your favor of the 8th inst., regarding my experience with the "Wilfley Concentrating Table," will state that in February last I placed in the vanner room of the Standard mill one of your tables, which has been in constant use every day since. It has been operated by the usual attendant of the vanners and has been given no special attention, and has been supplied with the same "feed" as the Frue vanners and at the end of each day's run has shown lower tailings than the vanners and produced from three to four times the quantity of concentrates of the same value per ton as any of the Frues. We have three more of the Wilfleys in the same mill, which are all doing splendid work and handling fully twenty tons each per day of silicious ore carrying about 10 per cent lead and 12 ounces silver. They are all making a remarkably close saving of values and giving the most perfect satisfaction. A very fair opportunity is offered in this mill for comparing the work of different concentrators, as we are using Harz jigs, Collom jigs, round buddles, Frue vanners, and Wilfley tables, and handling nearly 500 tons of crude ore per day, and all of the machines are given the class of work for which they are best adapted. I can heartily recommend the Wilfley to any one needing a concentrator for fine ores.

Yours very truly, EMERSON GEE, Manager Standard Mining Co.

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PRICE, $450.00.

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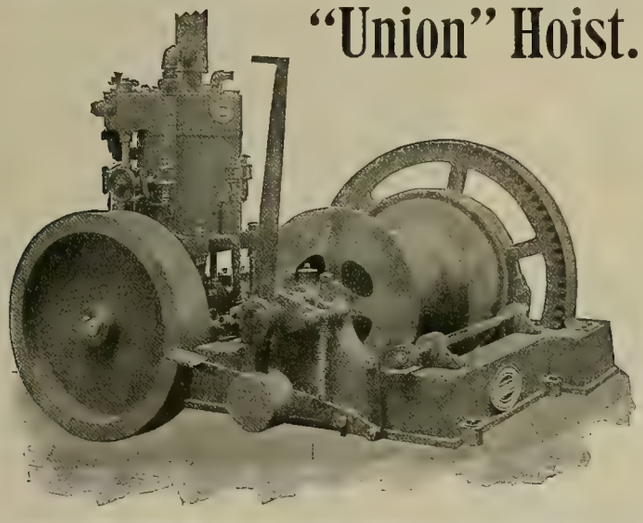

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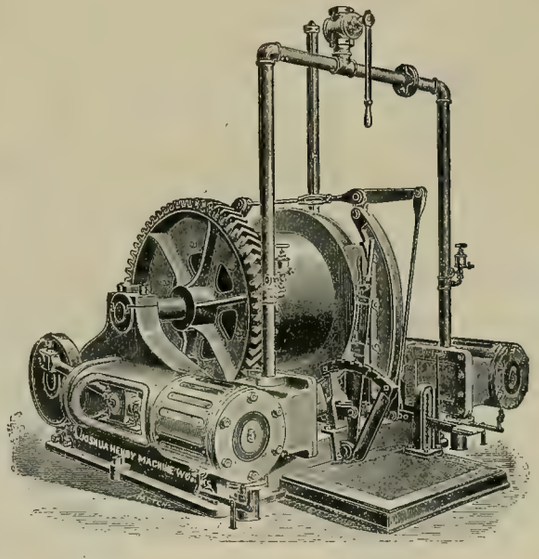

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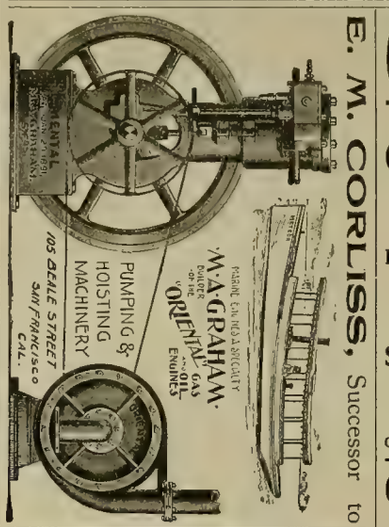

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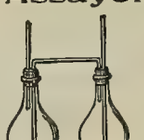

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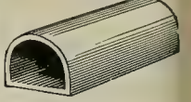

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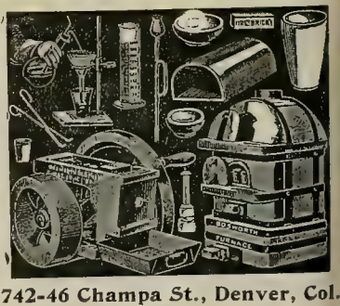

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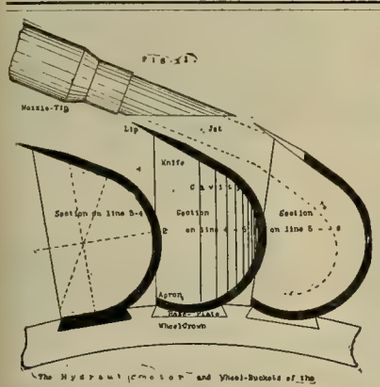

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List of U. S. Patents for Pacific Coast Inventors.

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FOR WEEK ENDING JULY 27, 1897.

586,959.—BED LOUNGE—L. G. Beloud, S. F.
587,115.—MAIL-BAG CATCHER—M. S. Cody, Stockton, Cal.
587,281.—GAME—R. S. & F. B. Crooks, S. F.
587,189.—HOOK AND EYE—I. P. Doolittle, Redlands, Cal.
587,094.—CLAMP—G. M. Dougall, Prescott, A. T.
587,192.—EYEGLASS HOLDER AND CORD—W. D. Fennimore, S. F.
587,193.—MUSTACHE SHAPER—P. S. Ferdy, S. F.
587,285.—STARTING GATE—B. E. Harris, S. F.
587,260.—CIRCUIT CLOSER—S. C. Houghton, S. F.
587,210.—SIDEWALK HATCHWAY—P. H. Jackson, S. F.
587,058.—RUBBER DAM CLAMP—S. E. Knowles, Alameda, Cal.
587,130.—MATCH SPLINT MACHINE—M. S. Leve, Fruitvale, Cal.
587,157.—BUSHING AND FAUCET—M. S. Norton, S. F.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SIDEWALK HATCHWAYS AND DOOR MECHANISM.—Peter H. Jackson, San Francisco, Cal. No. 587,210. Dated July 27, 1897. This invention relates to certain improvements in horizontally placed door frames and the doors which are adapted to close the openings of said frames and which are employed for the purpose of obtaining access through the sidewalks and other places where it is desired to have a door or pair of doors which shall be waterproof against leakage when the door is closed and at the same time to render such doors easily operated and controlled from the basement or chamber beneath them. It consists in the combination with the teams upon which the arches of the basement and the sidewalk are supported of a Z-shaped bar, an angled or channeled bar supported upon the beam and flanges adapted to overlap and be riveted or bolted together. In conjunction with this is an angular lever secured to the door, bent downward and then horizontal so as to lie approximately parallel with the seam beneath the sidewalk when the door is closed, said lever serving when pulled down to open the door. Around the periphery of the door opening, channels are formed adapted to receive any water which may leak in around the edges and passages through which it may be carried away to some point of permanent discharge.

BUSHING AND FAUCET FOR BARRELS.—Mason S. Norton, San Francisco, Cal., assignor to the American Faucet Co., same place. No. 587,157. Dated July 27, 1897. This invention relates to improvements in bushings for barrels, casks and like devices. It consists essentially of a longitudinally moving double-acting valve operated by a faucet or key to open and close upon turning the faucet axially, and to remain locked when the faucet is removed. The bushing which is permanently fitted into the cask has a closed inner end made smooth and continuous with a central opening which has an inwardly facing seat. Opposite to this seat and removed to a distance therefrom within the bushing is a second seat facing the first one, also having a central opening through it. A rotatable valve is movable between these two seats having faces upon it which serve to alternately close one or the other of the openings. The periphery of the valve is screw-threaded and the valve has an inner engaging head and socket connection between itself and the turnable key or faucet so that the valve may be engaged and turned from the exterior of the cask to close upon one or the other of the seats. The interior of the seat is the one against which the valve closes to prevent the escape of liquid and from which it is removed when it is desired to allow the liquid to flow. When the valve is closed against the other seat it forms a smooth continuous surface with the inner end of the bushing and the cask can then be pitched without the pitch getting into or interfering with the interior mechanism of the cap or faucet. In conjunction with this valve are a series of devices for forming tight joints and preventing any escape of liquid when the valve is being either opened or closed.

EYEGLASS HOLDER AND CORD ATTACHMENT.—Watson D. Fennimore, San Francisco, Cal., assignor to the California Optical Co., same place. No. 587,192. Dated July 27, 1897. This invention relates to a cord attachment wich is especially designed for use with eyeglasses and for similar purposes. It consists of holders formed of single pieces of wire bent and having tapering spiral coils formed within some portion of the length, these coils forming conical chambers through which the cord is passed and where knots formed in the end of the cord will be held within the larger ends of these chambers. To one of these devices a pin or other attaching device is secured by which it may be attached to the clothing of the user, and the other carries a clasp which enables it to be conveniently attached to the eyeglass.

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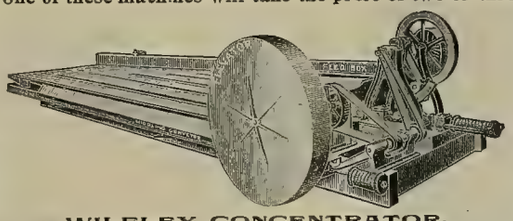

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We furnish Machinery and build **Stamp Mills, Hoisting and Pumping Works** operated by **Steam, Water or Electric Motors;** also complete **Concentrating and Smelting Plants** for the reduction of **Galena, Silver and Lead Ores,** and the recovery of **Copper and Silver;** Improved Air Compressors, Wire Rope Tramways, Etc., Etc.

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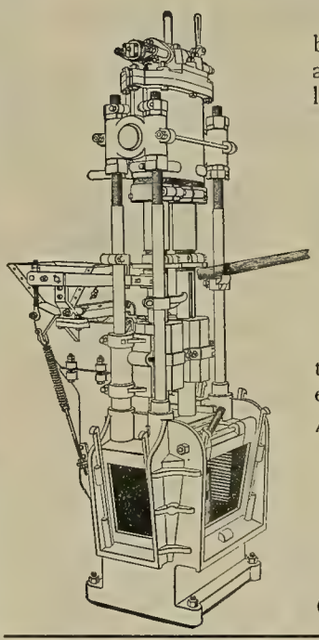

One of the BONANZA MINES of the Black Hills was developed by a **TREMAIN STEAM STAMP MILL,** installed last summer at a cost of about $1600. After six months' run the superintendent wrote the following letter:

HILL CITY, S. D., Feb. 2, 1897.

Gates Iron Works, 650 Elston Ave., Chicago, Ill.—GENTLEMEN: It gives me great pleasure in informing you of our success with the Tremain Steam Stamp Mill which we have been running since last July. We have been running on hard, white quartz, some of it of a flinty character and a small portion of it slightly decomposed. We average about ten tons every 24 hours through a forty-mesh screen. If our financial standing had been a little better, so we could have put in a small engine and rock crusher, I am confident we could put through 14 to 15 tons in 24 hours. The wear and tear is considerably less than an ordinary stamp mill, it all being on the shoes and dies. The last we used of these were of the aluminum steel, which are the best wearing shoes and dies I have ever seen. The parts are all well made and durable, I having failed to see any weak point about the machinery.

We use one cord of pine wood in 24 hours, and run the mill with 70 to 80 lbs. of steam.

I have followed mining in connection with milling for thirty years and have never seen its equal for convenience, durability and cheapness. To parties wishing to purchase a quartz mill I cheerfully recommend the Tremain Steam Stamp Mill for its small cost, economy in operation and complete results of working. Very truly yours, [SIGNED] JAMES C. McDONALD, Supt. St. Elmo M. & M. Co.

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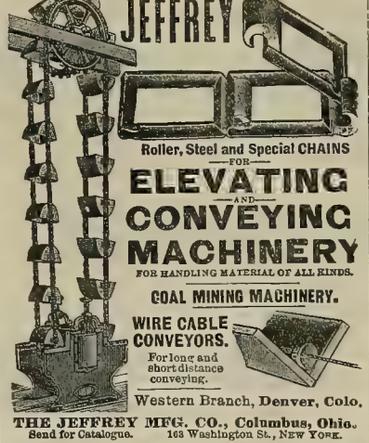

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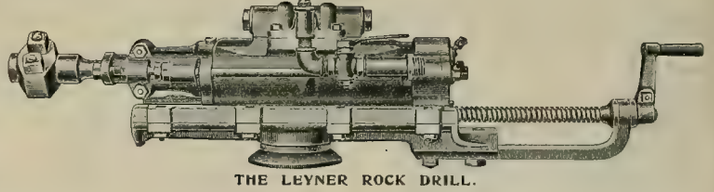

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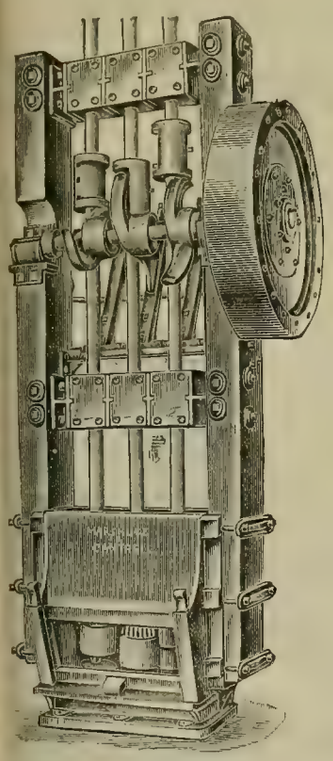

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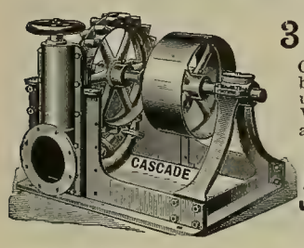

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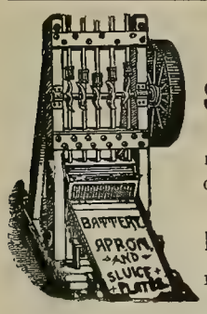

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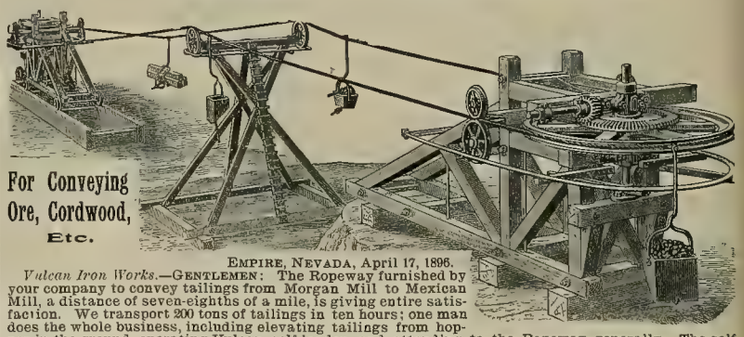

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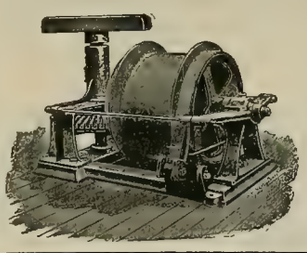

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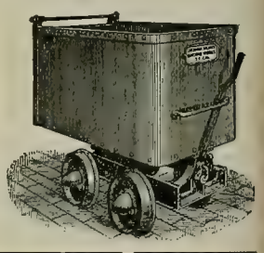

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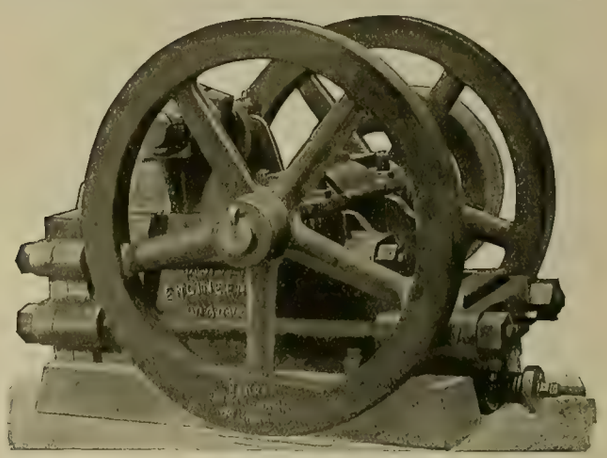

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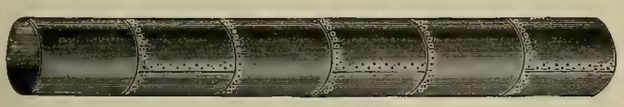

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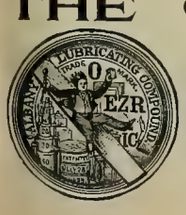

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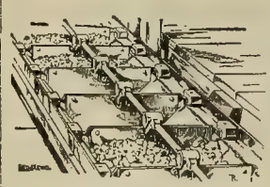

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Market Reports.

The Markets.

SAN FRANCISCO, Aug. 5, 1897.

The buying of supplies for Alaska continued throughout the past week. Every vessel that left here for Alaskan ports has had large shipments of goods suitable for the miners in the new El Dorado. Several lines of provisions and heavy woolen goods have been cleaned up, so large and unexpected has been the call. This has necessitated urgent shipments from the East to this city of the goods most in demand. Iron workers report fair to good business. Some have orders in hand that will run them for some time to come, while the others are kept busy on work which the larger institutions are not able to handle. Very few changes have been made in prices of goods most affected by the tariff, and none are expected until stocks in jobbers' hands are greatly reduced.

The local money market is working easy. The higher prices ruling for nearly everything raised on the farm, have created a feeling of confidence to which the trade has been a stranger for several years. This feeling is made stronger by the boom in gold mining. It has been many years since this coast has witnessed such a mining craze as is that seen in the rush to Alaska. This craze is beginning to attract more attention to gold mining properties in this State, for there seems to be more inquiry from moneyed men at the East. The mint opened this week. Several million dollars worth of gold bullion was waiting deposit, considerable of which came from the Klondyke. This money will soon be available for putting into circulation. New York advices are to the effect that the money market is showing signs of firming up. This is due to the increased demand for crop-moving purposes and a better demand for speculative purposes. With exceptional heavy shipments of grain to Europe, which will be supplemented soon by cotton shipments, it is not at all likely that the rates of interest will go much if any higher than two cents for call loans.

New York Silver Prices.

NEW YORK, August 5.—Following are the closing prices for the week:

	Silver in— London.	N. Y.
Friday	26⅞	58⅜
Saturday	26⅝	57⅞
Monday	26⅝	57⅞
Tuesday	26¼	57¾
Wednesday	26¼	57
Thursday	25¾	55½

	Copper.	Lead.	Iron.	Tin.
Fri.	10 87½@11 15	3 75	10 00@12 00	13 70
Sat.	10 87½@11 15	3 70	10 00@12 00	13 85
Mon.	10 87½@11 15	3 70	10 00@12 00	13 85
Tue.	10 87½@11 15	3 75	10 00@12 00	13 80
Wed.	10 87½@11 15	3 80	10 00@12 00	13 75
Thur.	10 87½@11 12½	3 80	10 00@12 00	13 75

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	12½c Prem
New York Telegraphic Transfer	15c Prem
London Bankers' 60 days	$4.87
London Merchants	$4.85
London Sight Bankers	$4.88
Refined Silver, per oz., 1000 fine	55½
Mexican Dollars	46½

SILVER.—The market has been breaking badly since last Friday. The decline during the week has been 3⅜ cents per ounce. This is the most rapid since India closed its mints in March, 1894, to the white metal. At this writing it looks as if still lower prices will rule, for there does not seem to be any moneyed pool to sustain it, while there is no buying by Japan or Russia and very little by India, China or any other country. While there is not much if any buying, there seem to be quite free selling offers. *Bradstreet's*, just to hand, says: "In spite of the absence of any speculative features in the silver market, its course has attracted no little attention. The principal causes of the drop can be found in a combination of large offerings from this country, extremely limited Indian buying, together with the flatness of exchange on China, which latter circumstance is explained by the large interest payments China is now forced to make abroad and the decline in values of the principal Chinese exports."

MEXICAN DOLLARS.—The market is thoroughly demoralized, so much so that quotations are entirely nominal. There is some buying by Chinese, the low prices to which they have dropped being an incentive.

QUICKSILVER.—The market here is steady but New York reports firmer prices. Shipments by sea to Mexican ports aggregate the past week 170 flasks.

Our market is quoted at $40 for domestic consumption.

COPPER.—The market is firm with a good consumption reported. The East reports steady to strong markets, with a free export movement. The home demand is increasing at the East. James Lewis & Sons, Liverpool, report in their latest received circular as follows:

The following statistics show the apparent increase in the consumption of England, France and Germany to be at the rate of 22,997 tons per annum. The Board of Trade returns for the first six months give the following results: Imports into England, 1896, 65,057 tons fine, do 1897, 67,263 tons fine; exports from England, 1896, 35,344 tons fine, do 1897, 24,196 tons fine. Difference, 1896, 29,713 tons fine, do 1897, 43,067 tons fine. Difference in stocks Jan 1 to July 1, 1896, decrease 13,135 tons fine, do 1897, decrease, 3,560 tons fine. Apparent consumption in England (including sulphate of copper made and subsequently exported), 1896, 42,848 tons fine, do 1897, 46,627 tons fine. The following shows the consumption of France for the same months: Shipments from United States first six months 1896, 11,227 tons, do 1897, 12,801 tons; shipments from England first six months 1896, 3,060 tons; do 1897, 1,502 tons; imports from other countries first six months 1896, 5,517 tons, do 1897, 6,559 tons; total, 1896, 19,804 tons, do 1897, 20,862 tons. Difference in stocks, Jan. 1 to July 1, 1896, increase, 948 tons, do 1897, increase, 320 tons. The increased consumption of England and France is therefore 5465 tons. The official German returns for the first five months are: Imports, 1896, 23,447 tons, do 1897, 28,780 tons; exports, 1896, 3,673 tons, do 1897, 3,978 tons; consumption, 1896, 19,774 tons, do 1897, 24,802 tons. The consumption of Germany therefore shows an increase this year of 5,028 tons exclusive of the copper obtained from their own mines, and from pyrites imported—or at the rate of 12,067 tons per annum. To Italy, Austria and Russia 4,051 tons have been shipped from the United States, against 3,919 tons in the same six months of last year. Producer's returns are as follows, in tons:

	Jan.-June, 1896.	July-Dec. 1896.	Jan.-June, 1897.
European production	42,255	44,114	44,205
American production	101,380	103,714	108,652

Our market is quoted as follows:

Ingot casting, jobbing	13@—
Ingot " wholesale	12½@—
Sheet copper	—@16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½

TIN.—The market for both plate and pig is fairly steady. The East reports easier markets.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

LEAD.—Our market is firm at full figures. The East reports firm markets with a good demand ruling.

Our market is quoted in jobbing lots as follows per pound:

Pig	—	@	4 80
Bar	5 00	@	5 25
Sheet	—	@	6 25
Pipe	5 25	@	5 50

SHOT.—The market is steady to firm. Sales are increasing.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 35
Drop, B and larger sizes, " "	1 60
Buck, Balls and Chilled, do, " "	1 60

POWDER.—The market is steady.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9c to 11c, according to strength and quantity.

IRON.—Our market is well supplied, with some cutting reported. The East reports weaker markets, owing to higher ocean freights, which are against exporting.

AMERICAN.	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50
ENGLISH.		
Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

COAL,—There is nothing new to report. Until stocks on hand before tariff went into effect are exhausted our market will not feel the increase much.

We quote as follows:

SPOT FROM YARD—PER TON.	
Wellington	$8 00@— —
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 50@ 6 00
Coos Bay	—@ 4 75
Cannel	8 00@— —
Egg, hard	12 00@13 00
Wallsend	6 50@— —
TO ARRIVE—CARGO LOTS.	
Australian	5 50
Liverpool Steam	6 25
Scotch Splint	— —
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	9 50	@	— —
" spot, in bulk	10 00	@	— —
" in sacks	11 00	@	12 00
Cumberland	— —	@	— —

ANTIMONY.—The market is steady.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 7¾c for Cookson's, 7¼c for Hallett's and 7c for Japanese.

NAILS.—The market is steady.

Wire, carloads, basis per keg	....		
" jobbing, " "	$2 15		
Cut, carloads, " "	....		
" jobbing, " "	2 05		

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4¼

PLATINUM.—The market is quiet.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is steady.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

Chemicals.

Notwithstanding the new tariff increasing duty on several lines is in effect, still the market does not respond, and what is more, it is not expected to move up any until present stocks are exhausted. The East reports that importers have advanced prices slightly on every line affected by the tariff, but from second and third hands the goods can be had at the old prices, and as they carry liberal stocks, it looks as if it will be some time before jobbing prices are higher.

SULPHURIC ACID.—The demand is fair We quote in a jobbing way at 1½c per lb for 66%.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported steady from store at 6½@7c per pound in carboys.

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delinq't and Sale.		Secretary.
Alpha Con M & M Co, Nev.	19	10c	July 8.	Aug 12.	Sept 2	C E Elliott, 309 Montgomery
Altoona Q M Co, Cal.	1	75c	Aug 3.	Sept 6.	Oct 11	C Allenberg, 206 Sansome
Belcher S M Co, Nev.	55	10c	July 19.	Aug 23.	Sept 13	C L Perkins, Mills Bldg
Best & Belcher M Co, Nev.	62	25c	July 1.	Aug 5.	Aug 26	M Jaffe, 309 Montgomery
Brunswick Con G M Co, Cal.	12	3c	June 22.	July 22.	Aug 14	J Stadtfeld, 309 Montgomery
Bullion Con G M Co, Cal.	11	22c	June 22.	Aug 2.	Aug 23	C A Grow, Mills Bldg
Con Cal & Va M Co, Nev.	9	25c	Aug 3.	Sept 8.	Sept 29	A W Havens, 309 Montgomery
Crown Point G & S Co, Nev.	71	10c	July 27.	Aug 31.	Sept 21	Jas Newlands, Mills Building
Eureka Con D M Co, Cal.	9	2c	June 30.	Aug 7.	Aug 28	D M Kent, 330 Pine
Gold Hill M Co, Cal.	12	25c	June 16.	July 26.	Aug 12	C A Grow, Mills Building
Horseshoe M Co, Cal.	3	40c	July 12.	Aug 23.	Sept 20	C E Green, 532 Market
Inyo Marble Co, Cal.	30	10c	July 27.	Aug 28.	Sept 20	M A Cahn, 323 Phelan Bldg, S F
Jamison M Co, Cal.	9	5c	Nov 27.	June 23.	Aug 18	Sam W Cheyney, 120 Sutter
Marguerite G M & M Co, Cal.	7	10c	July 28.	Sept 10.	Oct 11	F Mettman, 237 Twelfth
Mexican G & S M Co, Nev.	57	20c	July 28.	Sept 1.	Sept 23	C E Elliot, 309 Montgomery
North San Juan G M Co, Cal.	3	7c	July 16.	Sept 8.	Oct 4	H W Morris, 141 First St
Nth G & C G & S M Co, Nev.	18	10c	June 26.	July 28.	Aug 14	E W Sichel, 337 Pine
Occidental Con M Co, Nev.	28	10c	Aug 3.	Sept 7.	Sept 30	A K Durbrow, 309 Montgomery
Osborn Hill G M & M Co, Cal.	6	35c	Aug 4.	Sept 6.	Sept 27	R R Grayson, 331 Pine
Osceola Con M Co, Cal.	6	1c	June 30.	Aug 2.	Aug 21	Holland Smith, 307 Montgomery
Rose Creek M Co, Cal.	1	15c	June 28.	July 28.	Aug 30	J M Wilmans, Crocker Bldg
Thorpe M Co, Cal.	7	2½c.	June 9.	Aug 14.	Sept 4	A F Frey, Phelan Building
Utah Con M Co, Nev.	25	5c	July 6.	Aug 9.	Aug 30	A W Havens, 309 Montgomery

BLUE VITRIOL.—Our market is firm.

We quote in a jobbing way at 4¼c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is firm.

Our market is quoted in a jobbing way at $1.50 a pound.

BONEASH.—The demand is fair.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is firm.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firm at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is quiet at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—There is a fair demand at 2½c a pound from stores.

NITRATE OF SODA.—Market is steady.

Our market is quoted from store at 4c for 95%.

Mining Share Market.

SAN FRANCISCO, August 4, 1897.

Following an advance in Sierra Nevada to $1.75, Con. Virginia to $1.50, and other shares proportionately, the market began to ease until yesterday Sierra Nevada sold down to 90 cents and the others fell off from 20 to 30 per cent. The advance allowed several brokers to sell at good round profit their long shares and also allowed them to short. At the lower prices they have filled. So they made both ways. The reports of ore strike in Sierra Nevada and preparations made in that mine to stope ore caused the more credulous outsiders to buy at advancing prices and also frightened the more timid short sellers into filling. The rapid decline in the market looks as if another advance is in contemplation at an early day, but whether Sierra Nevada will be the leader it is hard to say at this writing, but it is safe to affirm that it will not be unless at the decline long buyers have been shaken out and short shares put out by persons who only become bears when the market has broken. The general situation on the Comstock is favorable, while the general condition of the country is favorable for a bull campaign. Money is in liberal supply and people are anxious to invest in anything which affords opportunities of making quick turns and getting higher prices. All kinds of farm produce are very strong at higher prices, the transportation companies throughout the country are very busy and have to add more rolling stock, while speculation at New York is booming in railroad and industrial securities. The above, combined with a boom in gold mining, are creating and causing a strong speculative feeling everywhere. Although the mining share market has not felt the influences to any marked degree, yet a careful comparison shows that the average of prices is higher, which indicates a slow but steady improvement in values. Whether this, as it has always done before, will lead up to a good-sized or a small-sized deal, is beyond our ken, but it looks well for the former, although we are told different by those who ought to know. The market value for Standard appreciated the past week—moving up to $1.70 to $1.75, at which figures it has held firm. There is good work going on in the mine.

The official letters from the Comstock mines are not calculated to enthuse persons, but rather to dampen the ardor of the more sanguine, who are always having visions of big ore deposits and are under continuous fear of being left. While the better class of experienced miners that have worked in the mine contend that good-sized ore bodies can be shown up when desired, yet they think before this is done there must be a complete change in manipulation of shares, and lawsuits, blackmailing or otherwise, must be quieted. So long as there are fears of suits, just so long will moneyed men not go in for bull markets, and without big moneyed backing good-sized deals can not be promoted. From the letters on file and reliable sources we compile the following: In Utah the north drift is being driven ahead about 3 feet a day. At last advices it was in porphyry, showing clay seams. Work in the east crossdrift 175-foot level of Andes has been resumed. It is in quartz and porphyry. In Sierra Nevada they are cutting out and putting in square sets of timber, to raise or sink, as deemed best, on the ore found on the Layton tunnel level. If the market is in a condition for a bull move, it is quite certain that more ore will be found, but if not in condition, it is liable to get smaller. In No. 3 west crossdrift 900-foot level they were at last advices in good ore. In Union they are still working on the 900-foot level. In Mexican they have finished stripping the south drift on the 1000-foot level. In Ophir they are still running a west crossdrift on the 1000-foot level and extending the north drift on the Central tunnel level. Work is continued in Con. Virginia on the 1000-foot, 1550-foot and 1650-foot levels, without any change of interest to report. An assessment was levied the past week, but the large amount of work that is being done calls for heavy disbursements. From Best & Belcher and Gould & Curry nothing new regarding work or formation of material run through has come to hand. The same remarks apply to Savage. No work is reported in either Chollar or Hale & Norcross. In Potosi new work is reported. Fair progress is being made in the old workings. It is singular nothing comes from Bullion. Some say important work is being done which will be reported when shares are better concentrated. In Alpha they are ready to commence stoping ore. It is not likely that the high-grade ore will be extracted, or, if it is done, the impression prevails that the public will not know it. Nothing new comes to hand from the joint work of Con. Imperial, Challenge and Confidence; neither is there anything new reported from Confidence, Yellow Jacket, Crown Point, or the joint work of the two latter and Kentuck. Work has been resumed in Belcher and Seg. Belcher.

Attention is attracted from the Brunswick lode to the Comstock, yet mining men are still watching the joint work by Con. Virginia, Best & Belcher and Gould & Curry. They are running an east crossdrift on the northern boundary, and also a south drift, both on the 600-foot level. They are crossdrifting east on the 300-foot level. In Chollar work is confined to sinking shaft No. 1, which is down on an incline over 1000 feet, extracting ore on the 300-foot and 400-foot levels,

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opening up the 500-foot level and running north on the 600-foot level. There were extracted and milled the past week 132 tons of ore of about the same value as reported last week. A bar of bullion was shipped to the mint of a par value of $7888, of which $3303 was in gold. In Occidental active exploiting work is reported on the 550-foot and 650 foot levels.

The following illustrates the changes of the week:

MINES.	July 29.	Aug. 5.
Alpha		$ 10
Alta Consolidated	$ 07	
Andes	16	20
Belcher	28	23
Best & Belcher	50	77
Bodie		
Bullion		
Challenge		37
Chollar	80	72
Confidence		
Consolidated California and Virginia	1 50	1 30
Consolidated New York		
Crown Point	24	23
Exchequer		
Gould & Curry	56	46
Hale & Norcross		
Justice		
Mexican	38	29
Ophir	83	62
Overman	09	
Potosi	47	36
Savage	40	33
Sierra Nevada	1 75	96
Union	60	44
Utah	08	05
Yellow Jacket		48

San Francisco Stock Board Sales.

SAN FRANCISCO, August 5, 1897.

9:30 A. M. SESSION.

200 Andes	17	300 Occidental	07
150 Belcher	23	100 Ophir	62
300 Best & Belcher	68	800 Potosi	36
200 Chollar	70	500 Sierra Nevada	93
400 Crown Point	23	500 Union	42
500 Gould & Curry	48	300 Utah	05
200 Mexican	29	100 Yellow Jacket	48

SECOND SESSION—2:30 P. M.

700 Best & Belcher	77	900 Sierra Nevada	96
500 Con Cal & Va	1 30	500 Seg Belcher	04
100 Savage	33	200 Union	44
350 Chollar	72	100 Challenge	37
300 Crown Point	23	100 Occidental	08
700 Yellow Jacket	48	100 Andes	20
500 Kentuck	05	200 Standard	1 70
500 Alpha	10	300 Gould & Curry	46

Rainfall and Temperature.

The following data for the week ending 5 A. M., Aug. 4, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

CALIFORNIA STATIONS.	Total Rainfall for the Week.	Total Seasonal Rainfall to Date.	Total Seasonal Rainfall Last Year to Same Date.	Average Seasonal Rainfall to Date.	Minimum Temperature for the Week.	Maximum Temperature for the Week.
Eureka	00	03	.04	.15	48	60
Red Bluff	00	00	00	.04	52	104
Sacramento	00	00	T	T	52	100
San Francisco	T	T	.04	.02	50	65
Fresno	00	00	.07	.01	56	104
San Luis Obispo	00	00	04		48	84
Los Angeles	T	00	.02	.02	58	86
San Diego	00	.01	T	.03	60	76
Yuma	00	T	.41	.20	76	108

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Assessment Notices.

ROSE CREEK MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Star, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of June, 1897, an assessment (No. 1) of 15 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 163, Crocker building, junction Post, Montgomery and Market streets, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 21st day of August, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 14th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. M. WILMANS, Secretary.

Office—Room 163, Crocker building, San Francisco, California.

BEST & BELCHER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 1st day of July, 1897, an assessment (No. 62) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 5th day of August, 1897, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on THURSDAY, the 26th day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

M. JAFFE, Secretary.

Office—Room 33, Nevada block, 309 Montgomery street, San Francisco, California.

MARGUERITE GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of July, 1897, an assessment (No. 7), of 10 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, 237 12th street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of September, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 11th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

F. METTMANN, Secretary.

Office—237 12th street, San Francisco, California. The Secretary will also receive payments from 12 to 5 P. M. at his business office, 225 Sansome street.

INYO MARBLE COMPANY.—Location of principal place of business, San Francisco, California; location of works, Ingo, Inyo County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of July, 1897, an assessment (No. 30) of 16 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 323 Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 28th day of August, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 20th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

M. A. CAHN, Secretary.

Office—Room 323 Phelan building, San Francisco, California.

OSBORN HILL GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Grass Valley, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 4th day of August, 1897, an assessment (No. 6) of 85 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, room 11, No. 331 Pine street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of September, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 27th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

R. R. GRAYSON, Secretary.

Office—Room 11, No. 331 Pine street, San Francisco, California.

CONSOLIDATED CALIFORNIA AND VIRGINIA Mining Company.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 3d day of August, 1897, an assessment (No. 9) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to to Secretary, at the office of the company, room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of September, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 29th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office—Room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 3d day of August, 1897, an assessment (No. 28) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of September, 1897, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 30th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

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THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 9th day of June, 1897, an assessment (No. 7) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of July, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 9th day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors, the day of delinquency of the above assessment has been postponed to July 31st 1897, and the day of sale to SATURDAY, August 21st, 1897.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors, the day of delinquency in the above assessment has been postponed to August 14th, 1897, and the day of sale to SATURDAY, September 4th, 1897.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

Wanted for the Yukon,

Two or three capitalists to become associated with two experienced explorers and gold miners, one of whom has spent five years in the Yukon and tributaries exploration, is thoroughly conversant with the topography of the whole Yukon auriferous belt and knows of valuable diggings yet untouched which can be secured and operated to great advantage by the methods proposed to be adopted. The highest references will be given, and required. Amount necessary for expenses and plant, $25,000. This being a genuine proposition only principals need apply. For further information, address

"YUKON," this Office.

WANTED.

Able, rugged man, as Roaster, thoroughly familiar with oxidizing dead roast of gold concentrates in Bruckner furnace. None other need apply. Address quickly, stating experience and qualifications.

JACKSON & LAKEVIEW MINING CO.,
LUNDY, CAL.

WANTED. — A Second-Hand 5 OR 10 STAMP MILL.

Address, stating particulars, price, etc., A. B., this office.

WANTED.

A position as Millman in quartz mill by young man, one who can keep a mill running. Address A. E. CHARLESWORTH, Lockeford, San Joaquin County, California.

FOR SALE.

The Following Machinery, Nearly New. Now Located in State Agricultural Exposition Building at Sacramento:

One 16x12 R. B. Poppet-Valve O'Neil Automatic Cut-Off, 100-Horse Power Horizontal Engine, built by the Union Iron Works, with Band Pulley, 22 in. x 24 in. Pipe Connections and Valves complete, as it now stands.

One 22 in. Double Leather Driving Belt.

One 18 in. Union Exhaust Steam Feed Water Heater.

One Buffalo Duplex Boiler Feed Pump 6x4x6.

Two Tubular Steam Boilers, 54 in. diameter, 16 ft. long, in good order, with Furnaces, Grate Bars and Settings complete; one Injector for each Boiler, and all the necessary Checks, Valves and Gauges.

One Stack, 48 in. diameter by 80 ft. long.

For price and particulars, address

EDWIN F. SMITH, Secretary, Sacramento.

For Sale.

23,000 Feet 10 5-8 Inch Steel Pipe,

Lap welded and screw joints. Weight about 27 lbs. per foot. Will stand about 600 lbs. pressure

Three Compound Duplex Worthington Pumping Engines,

Several Pumps and Heaters,

And everything pertaining to a plant capable of elevating 3200 gallons water per minute 550 feet. Plant only operated one week. Address

LEE CHAMBERLAIN & CO., Los Angeles, Cal.

FOR SALE CHEAP.

First-Class Air Compressor (Steam Driven) and Drill, New.

Also, 3-Ton Capacity Pulverizer.

A. L. FISH, 59-61 FIRST STREET, S. F.

FOR SALE CHEAP.

Gold Wet Washing Machine,

MAIT'S MAKE.

Capacity, 8 Tons Per Day.

Good order. Can be carried anywhere by prospector.

Address T. L., this office.

Valuable Silver and Lead Mining Property for Sale.

The property is known as the Montezuma Silver Mining Co. of Utah; is situated on the Little Cottonwood, Alta, Utah, comprising the "Montezuma," "Savage," "Hiawatha" and "Last Chance" locations, also the "Buckland" tunnel, 1500 feet long, and over it the "Savage" tunnel, 800 feet long, with openings connecting the tunnels. The mine is in good working order, with considerable ore in sight. The ore is rich in lead and in good demand by the smelters. For terms and any other information, address David R. Peirce, Sec'y and Treas, 210 West Larned St., Detroit, Mich.

Klondyke and California Mining Co.,

ROOM 5, NO. 410 MONTGOMERY STREET.

The Company will ship one hundred (100) men who may be able to go and who can pass a Medical Examination and who are physically sound, with a full and complete supply of Woolen and Fur Clothing, Blankets, Food, Supplies and Mining Tools for Alaska, sufficient to last each man one year. The List of Supplies and Clothing are set forth in the following lists, and each article is first-class:

CLOTHING AND FUR OUTFIT.

Three Suits of Underclothes,
Three Woolen Shirts,
Two Pairs of Overalls,
Two Pairs of Blankets,
Six Pairs of Socks,
One Fox Robe or Six Deer Robes Lined,
One Reindeer Parkee, comes over Head to the Knees,
Three Pairs of Cariboo Mits,
Two Fur Caps,
Two Pairs of Hip Rubber Boots,
Three Pairs of Moccasins,
One Muccinick,
One Mackinaw,
Two Pairs of Woolen Sweaters,
One Pair of Snow Glasses,
Ten Yards of Mosquito Netting,
One 8x10 Tent,
One Miner's Stove.

COMMISSARY OUTFIT.

Five hundred pounds of Flour,
One hundred pounds of Oatmeal,
One hundred pounds of Beans,
Twenty-four pounds of Coffee,
Twenty-four pounds of Tea,
One hundred pounds of Bacon,
One hundred pounds of Dried Potatoes,
Fifty pounds of Dried Vegetables,
One hundred pounds of Dried Fruits, &c.
One pound of Citric Acid for Vinegar,
One hundred pounds of Condensed Milk,
Five pounds of Baking Powder,
Fifty pounds of Canned Butter,
Five pounds of Salt and Pepper,
Thirty pounds of Lard,
Twenty-five pounds of Rice,
Twenty pounds of Tools,
Two pounds of Matches, etc.,
Twenty-five pounds of Soap, Borax and Washing Powder.

Included is transportation by steamer to Dawson City from San Francisco, via St. Michael's, the steamer to sail about August 12th or 15th.

The vessel will be a steam schooner of two hundred and fifty tons register, commanded by experienced officers. A physician and supply of medicines will go with the men. Medical attendance and medicine furnished to any of this party who are sick during the year; this is included in the price paid.

The price to be paid is Six Hundred ($600) Dollars. As the time is short no one is expected to apply who cannot pay the full amount to the Company.

Will ship men August 7th and 14th to Juneau by steamer Farallon, and pack all goods from Juneau to Dawson, Alaska.

JOSEPH RAY, Secretary.

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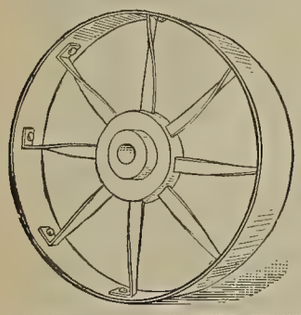
McBETH PATENT STEEL RIM PULLEYS,

WITH WROUGHT STEEL SPOKES.



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EVANS HYDRAULIC GRAVEL ELEVATORS,

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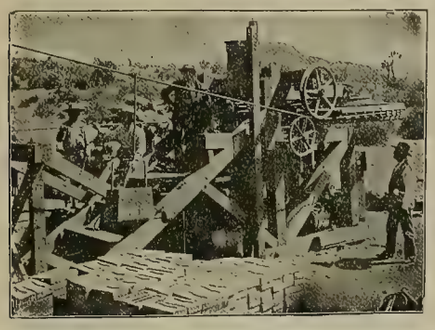

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Stands pre-eminent for the transportation of Ore, Fuel and other materials over mountainous and rugged country.

Parties desiring to remove large quantities of Sand, Gravel, Earth, Ore, Rock, to construct Dams, Levees or Embankments, etc., can do more efficient work at less cost by the

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Than by any other known system.

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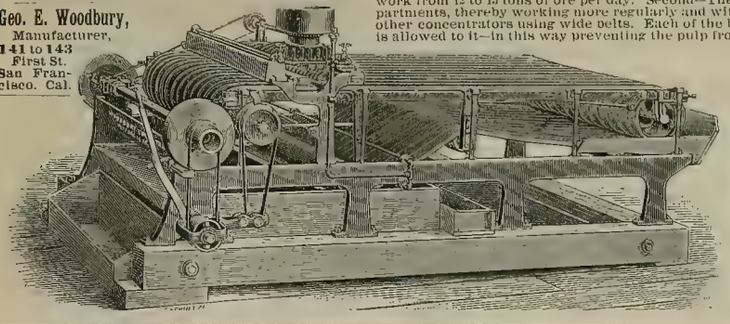
THE WOODBURY ORE CONCENTRATOR WITH IMPROVED BELTS

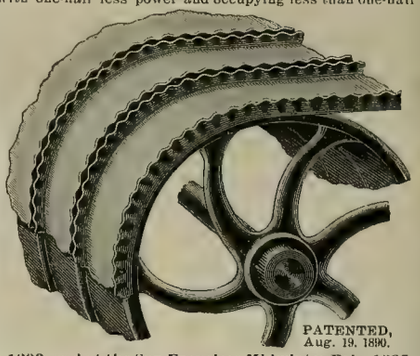
was awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891.

MORE THAN DOUBLE THIS CAPACITY with one-half less power and occupying less than one-half the space of any other concentrator. Built of best Steel and Wrought Iron. Strong and durable. **Price $575 f. o. b.** Send for Catalogue and Testimonials.

The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge. THE IMPROVED MACHINE HAS THE FOLLOWING MERITS: First—The Improved belts, which consist of seven, are constructed and arranged so as to allow each belt to receive a portion of the pulp in such a manner as to relieve the machine of its load, thereby giving it twice the capacity of other concentrators, and enabling it to work from 12 to 15 tons of ore per day. Second—The machine equalizes the load by several compartments, thereby working more regularly and with much less attention than is necessary to give other concentrators using wide belts. Each of the belts on this machine takes care of the pulp that is allowed to it—in this way preventing the pulp from running to the lower side of it, as is the case when a machine becomes out of level where wide belts are used. Third—The belts run on a perfect line, needing no adjustment to prevent their running from side to side, as in other concentrators. Fourth—The belt surfaces are improved by indentations and corrugations, causing the Concentrator to save fine sulphurets and quicksilver, and perform close work. Fifth—The belts have fluted or corrugated edges, to form an expanded top edge, which effectually prevents from cracking. Sixth—The feed arrangement is perfect. Seventh—The machine is constructed of iron, with steel crank-shaft self-oiling boxes, and everything made in the most thorough manner, enabling it to run with very little attention or wear.

Geo. E. Woodbury,
Manufacturer,
141 to 143
First St.
San Francisco. Cal.





PATENTED, Aug. 19, 1890.

This Concentrator took the 1st prize at the San Francisco Mechanics' Institute in 1890, 1891 and 1892, and at the California State Fair in 1892; it took the 1st, prize at the World's Columbian Exposition 1893, and at the San Francisco Midwinter Fair, 1895.

PERSPECTIVE VIEW OF FURNACE.

PARKE & LACY CO.

21 & 23 FREMONT ST., SAN FRANCISCO., CAL.

Mining Machinery & Supplies.

Sole Licensee for the Manufacture and Sale of the

ROPP STRAIGHT LINE FURNACE

FOR ROASTING, CHLORINATING AND DESULPHURIZING ORES.

Extracts from Letters Received from Mr. Philip Argall, Manager the Metallic Extraction Co., Cyanide, Colorado:

January 2, 1897.

"The roasting is invariably good. We can do 80 tons per day to 0.13% sulphur, when everything runs smooth. Our month record which, of course, includes all delays, is 1700 tons, from 1.94% sulphur to 0.16%."

February 19, 1897.

"Our furnace is now running very nicely indeed, averaging 90 tons per day to 0.10% sulphur, and doing excellent work; in fact, it has improved right along and we are highly pleased with it.

"For 24 hours ending 7 A. M. to-day 102 tons were roasted."

The ROPP FURNACE is now in successful operation at the following reduction works: The Hanauer Smelting Works, Salt Lake City, Utah (one furnace); The Metallic Extraction Co., Cyanide, Colo. (one furnace); The Colorado-Philadelphia Reduction Co., Colorado City, Colo. (three furnaces); The Selby Smelting & Lead Co., Selby, Cal; (one furnace); The Mount Morgan Gold Mining Co., Rockhampton, Queensland (one furnace); and Broken Hill Proprietary Co., Broken Hill, New South Wales (two furnaces).

Catalogue on application.

MINE BELL SIGNALS. Adopted, Used and in Force in Accordance with State Law.

FOR THE CONVENIENCE OF OUR READERS IN THE MINING COUNTIES WE PRINT IN legal size, 12x36 inches, the Mine Bell Signals and Rules provided for in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Mine Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and rules, printed on cloth so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS. 330 Market St., San Francisco.

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MINING AND SCIENTIFIC PRESS.
AND PACIFIC ELECTRICAL REVIEW.

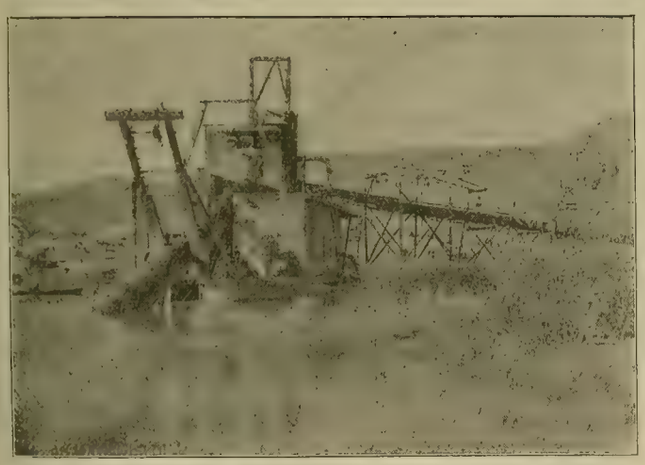
No. 1936.— VOLUME LXXV. Number 7. SAN FRANCISCO, SATURDAY, AUGUST 14, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Gold Dredging in Montana.

Dredging for gold is a form of gold mining that is yearly attracting increased attention. In California and New Zealand the results are satisfactory, and other sections are passing beyond the experimental stage. Two years ago this paper had an illustrated account of the first dredger in Montana, operating in Grasshopper creek, near Bannack. A few weeks ago a third dredger of greatly increased capacity was put in successful operation there. We are indebted to the courtesy of the Dillon, Montana, *Tribune* for the accompanying engravings. The Bannack Dredging Co. is the owner of the "A. F. Graeter." The Bon Accord Co. has placed an order for a fourth dredger in the same vicinity. With the "F. L. Graves" the Gold Dredging Co. cleaned up $80,000 in a four months' run last season.

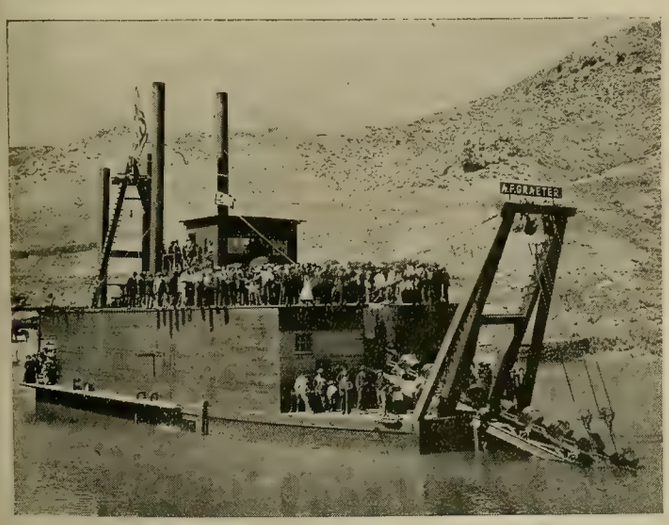
These dredges take the place of the old rockers used in that vicinity for the past thirty years, and for thirteen miles below Bannack Grasshopper creek is devoted to placer mining with these effective appliances. The upper Sacramento in this State affords example of similar profitable work, and a dredge is now building at Smartsville, Yuba county, that is expected to be of practical value.

GENERAL VIEW OF BANNACK, MONTANA

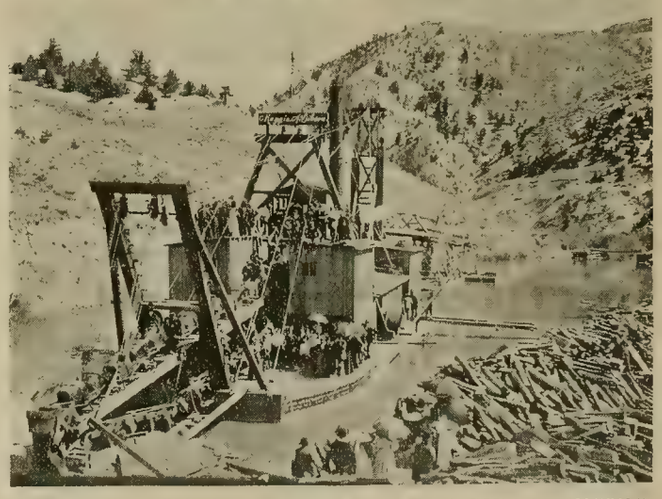


GOLD DREDGING CO.'S DREDGE, THE "F. L. GRAVES."

CHICAGO M. & D. CO.'S SUCTION DREDGE BEFORE REMODELING.



BANNACK DREDGING CO.'S DREDGE, THE "A. F. GRAETER."



CHICAGO M. & D. CO.'S DREDGE, THE "MAGGIE A. GIBSON."

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J. F. HALLORAN.....General Manager

TO THE PUBLIC.

No one is authorized to solicit business for this paper unless in possession of proper credentials and regularly numbered and stamped blank subscription receipts.

San Francisco, August 14, 1897.

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Silver's Decline.

The decline in the price of silver is of serious import. The political aspect of the question gives way to the commercial significance of the fact that silver is selling at 55⅜ cents an ounce, and the silver in a Mexican dollar at that rate is worth but 44½ cents in gold. There are no buyers. Even China for the first time in history is a seller. India has been a poor customer for three years, and, in general, conditions in the Orient have steadily tended to cause a depression in the price of silver.

The few mines in this country now yielding silver as a by-product have even the poor encouragement of possible profit taken away; any and every mine producing silver solely has been obliged to shut down.

Mexico figures that the fall in the price of silver (or the rise in the price of gold) may, if it continues, be of advantage there as encouraging domestic manufacture, the present condition being the same as an extraordinarily high tariff in that country; today a draft to settle a bill of $100 in goods bought here costs the Mexican importer $222.24. As between Japan and China the fall must encourage manufacturing in the latter country and turn the balance of trade against the former. India's present forlorn condition of famine places her outside the ordinary limits of business discussion.

The drop causes concern to European countries having large trade connections with countries having debtor obligations payable in gold, and may hasten the ultimate solution of the question by an international understanding.

The versatile American miner long since began other ways of earning a livelihood: when he found that silver was denied its ancient rights he simply started in to mine what was in more present demand, viz., gold and copper: should at any time these metals be at a discount he will furnish whatever the fashion of the day demands. While the low price of silver has been the ruination of many mines, and has caused a paralysis of entire sections formerly prosperous, it has occasioned such a development of the gold mining industry as to create new demand for men and machinery in that direction and thus partly compensate for the drop in the price of silver, that beginning seven years ago has now culminated in the lowest price for silver in the commercial records of the century.

Some Large Pieces of Gold.

Finding large gold nuggets is not so unusual a thing in California as to justify more than passing notice. Of course, what is seldom is wonderful, and because of this the recent little bunch of gold dust brought here from the Yukon has occasioned unbounded excitement, as such things are wonderful—for the Yukon—but the finding this week of the mass of gold in Trinity Co., in this State, hardly deserves the fuss made about it in the daily papers. The thousand columns of stuff that the dailies have had about the fairly sized batch of gold gathered all last winter in the Klondike are largely sensational. A murder or crim. con. case would elicit the same meretricious attention. In this no slur on the dailies is intended. That is their province, and they admirably fill their chosen field.

But to make such a fuss about so ordinary a thing as the finding of a great mass of gold in California would imply that was as much of a wonder as the year's scrapings so diligently collected in the Yukon tundras. The fact is that without in the least detracting from the size or value of the $42,000 piece of gold found by the Graves Bros. in the Blue Jay mine, Trinity county, Cal., this week, it is smaller than at least two other auriferous masses previously unearthed in this State. It is less in size and value than the piece found at Carson Hill, Calaveras county, or the lump found at Downieville, Sierra county, as mentioned by Louis Blanding, which was valued at $90,000. Another mass found in the Bonanza mine, Tuolumne county, gave a value of over $40,000. It is but fair to say that these were not "nuggets" but lumps of gold and quartz.

The largest piece of gold ever unearthed anywhere free from quartz, of which there is any record, is that taken out of the Byer & Haltman mine, Hill End, N. S. W., on May 10, 1872. It was imbedded in a thick wall of blue slate 250 feet from the surface; it weighed 640 pounds; it was fifty-seven inches long, thirty-eight inches wide, and averaged four inches in thickness; it was valued at $148,800. It is of interest to further state that the owners of the mine were subsisting on charity when they found it.

The "Welcome Stranger" nugget was found on Mt. Moliagel, Australia, Feb. 9, 1869. It weighed 190 pounds and was valued at $45,000. The Welcome nugget was found at Bakery Hill, Australia, June 9, '59; it weighed 184 lbs. 9 ozs. and was valued at $44,356. The piece found in Trinity county this week is a true "nugget," or was before being broken, being a solid piece of gold, shaped somewhat like a beaver's tail, and 38 inches long, 18 inches wide at the widest end and 5½ inches thick in that place; it weighed in place about 2470 ozs. It was broken in being taken out of where it lay, near an open cut twenty-five feet long, soft porphyry on the hanging wall, greenstone on the footwall, the nugget lying against the footwall. It is of regret that the piece could not be exhibited in its entirety.

Why Mining Properties Should Be Sold.

The oft-repeated but irrelevant question, "Why should a man want to sell mining property?" is now receiving practical and pertinent answer in Trinity county in this State. As has been so often pointed out in these columns, in that region as elsewhere in this State are placer properties that require capital to properly develop them. A man may have "a good thing," but be unable to do anything with it in want of money. Some time ago some Frenchmen, who first read in the MINING AND SCIENTIFIC PRESS in Paris of the rich placer ground of Trinity county, sent a representative to examine and report, with the result that they bought extensive holdings, purchased machinery, built flumes and ditches, put in many miles of pipe and are now taking out one thousand dollars per day. The manager expects to put in twenty miles more of pipe line "and take out $1000 per day for the next twenty years." At this writing two men—one an English mining engineer, another a San Franciscan—are examining another seven-mile stretch of placer ground in the same vicinity, which, it is believed, will probably be purchased by an English company, who will do what the adjacent French corporation has done, with, in all probability, the same satisfactory results. Of course, it would be better were California capital interested rather than foreign companies, for then the profits would be distributed here and not sent over the sea; but this is another story. The point is that these two recent instances effectually answer the question, "Why should a man want to sell mining property?" The former owners weren't able to work it; the present owners are, and are making a handsome profit.

Dredging the Rivers.

On page 144 appears the official report of the California Debris Commission for the fiscal year ending July 1st, '97, and in the light of recent events a matter of considerable importance to the interests affected.

Since the date of the report the operations referred to therein have established the fact that the Newtown shoal in the Sacramento river is fine sand which can be removed by dredger. Up to the present time it has been believed in some quarters that that and similar shoals were not movable ones; that theory is now dispelled. Engineers Nourse and Randall exhibit about 200 different specimens of sand taken from cross-sections of the shoal, which show a difference in composition. The deepest boring was thirty-seven feet, showing sand all the way. That part of the shoal deposited by debris from the hydraulic mines occasions the belief that the lower strata can be dredged as easily as the upper.

Every one in this State interested in the matter remembers the effort in the last Legislature—measurably successful—to get an appropriation, and, though that appropriation when secured had a string tied to it, it is believed that that appendage can now be removed and the work begun.

There is a little question of clashing authority here. Commissioner Leake says he will now go before the Public Works Auditing Board and argue for the immediate purchase of a $300,000 dredger. While no friendly action is to be slighted, yet it is possible that that matter is outside Mr. Leake's province, and that it were, on the whole, better to leave the matter in the hands of those who, whenever the work does begin, will have original jurisdiction and charge of it.

The California Debris Commission, composed of U. S. engineers, are the men who can best arrange for this work and conduct it. It is in their charge, and with them lies largely the say as to how and when the work shall be done.

TWO YEARS ago appeared herein a series of editorial articles calling attention to the necessity and profit of narrow gauge railroads in the foothills of this State, more especially in the gold-bearing counties, and especially designating Oakdale, Stanislaus county, as a good point to build from into Amador county. At that time the project and policy of this paper were fiercely attacked by an Amador county paper, the question being: "What would become of the stagers and freighters?" The result, however, of these articles in '95 now appears in the shape of twenty-three miles of the Sierra Railway already completed from Oakdale toward Stent and Jamestown, Cal. The result will of course be the increased development of the rich mining country the little road taps. A stage owner or blacksmith may lose a job, but the general public will be greatly the gainer. There are other localities in the State where similar enterprise would be in better line with the present requirements than sitting around whittling and telling of "the days of '49."

CALIFORNIA is unique in being the one great commonwealth whose great transportation companies treat with indifference its greatest resource. Every other mining State is magnificently advertised by the railroads that traverse it. The biggest and best advertisement the State of Colorado gets is the myriad of splendid pamphlets issued by its railroad companies regarding the extent and diversity of its mining industry. But not one word do the California railway people ever issue to indicate that this State has a mine of any kind within its borders. It is a singular fact, and stands in unpleasant contrast to the action of every other section of the Union fortunate enough to have metal mines.

Concentrates.

THE United States is now producing 1,500,000 pounds copper daily.

THE Le Roi smelter at Northport, Wash., is to be in operation January 1st, '98.

THE Katie mine at Basin, Montana, is to be reopened and the concentrator rebuilt.

THE Everett, Wash., smelter has raised its employes' wages from $1.35 to $1.50 per day.

THE Miners' Union of Butte, Mont., is nineteen years old and has a membership of nearly 5000.

THE Golden, B. C., papers say that there is no assayer there and that a good one would do well in that camp.

THE *Miner* says Rossland, B. C., is producing weekly 2000 tons ore and is in better shape than one year ago.

IT will be interesting in say February, '98, to compare the gold output of California for '97, with that of Alaska.

THE Canadian Government has abandoned its scheme to make Klondike miners pay royalty upon gold mines there.

THE Anchor Mining Company, of Park City, Utah, is holding a test of different makes of concentrators for low grade ores.

WELLS-FARGO have reconsidered their determination and will not establish an express office at Dawson City till '98, if then.

THE Denver *Daily Mining Record* is doing good work in exposing some of the mine swindlers that at present infest Colorado.

A LAWSUIT has been already begun over the claims in the Wadsworth, Nev., district, which is very good indication of their value.

THE Hutchinson mine, Olinghouse canyon, Nevada, produces at the rate of $13 to the ton, in gold; the cost of milling is $5.50 per ton.

THE Ontario and Daly, Utah, silver mines are closed down, it being impossible in other cases to operate at the present price of silver.

A FEW more local papers like the *Union-Democrat*, published at Sonora, Tuolumne county, Cal., would be of value to the mining industry of this State.

IN '95 Calaveras county, this State, produced $1,717,916 gold; Nevada county, $1,789,815; Trinity, $1,166,745; Placer, $1,599,634; Amador, $1,391,429.

NOTWITHSTANDING Trinity Co. and the Klondike, the price of gold and liberty—$20.67 per ounce and eternal vigilance, respectively—remain the same.

IT is believed that there is at present no exclusively silver mine in operation in the United States. There are several in which silver is a by-product.

EUREKA, Nev., which in the '70s was a lively base metal camp, is to have an ore sampling works. The old Eureka Con. plant has been leased by O. J. Smith.

"ORE BREAKS" is a term now offered in lieu of the time honored "fissure vein." An "ore break" is defined as "a break in the rock accompanied by ore."

THE customary "British syndicate" is reported to have bought the property of the Gold Creek Mining Co., of Nevada, for $15,000,000. The report lacks confirmation.

THE director of the Mint figures that Nevada produced 19,404 ounces of gold, valued at $2,648,300, in 1896. The silver product of that State for '96 he reports to be 1,048,700 ounces.

THIS paper admitted but one Klondike advertisement in its columns, wherein $600 each was asked for transportation and services, which, under the circumstances stated, was little enough.

THERE are thirty-seven people in Ohio who believe that they are the heirs and true owners of the great Comstock lode in Nevada, through a relationship to the Comstock after whom it was named.

THE last California Legislature made no change in the law regarding the posting of a notice on a mine disclaiming any responsibility on the part of the owner for expenses incurred by bonder or leaser.

A MIDDLETOWN, N. Y., firm engaged in manufacturing gold-dust bags of sheepskin for California customers are working with double forces on account of telegraphic orders received since the Klondike craze.

THE Klondike trails will be blazoned white with bones of those who perished. There is no comparison between that country and this, where, if pecuniarily unsuccessful, one can at least eat and enjoy life.

ANY CITIZEN of the United States may file in the patent office a claim to a partial invention, stating that he has not yet completed it, and praying protection until he shall have had time to bring it to perfection.

AT Owyhee, Idaho, the report is credited that the Standard Oil Co., is about to close a deal for the Trade Dollar and Black Jack mines, the holdings of the Florida Mountain Co., and the little Owyhee railroad, for $4,000,000.

GOLD galore is reported on the Amoor river, Jeho, China. Here's a chance for those who couldn't get standing room on a scow alleged to be headed toward Klondike. Get a sack of rice and a shovel and ho for the Jeho!

CRIPPLE CREEK, Colorado, produces as much gold in one month as the amount recently sent down from Klondike, which has apparently crazed a good many who had heretofore been credited with ordinary intelligence.

THE United States Government should immediately prepare to provide the inevitable relief expedition that will be implored to save from starvation ten thousand of the misguided men now thronging to the frozen North.

IT is estimated by Hamilton Smith and others who have given the subject attention that fully $180,000,000 in gold yet remains in the unworked gravel beds that lie between Smartsville, Yuba Co., and Graniteville, Nevada Co., Cal.

THE Southern Railway Company has issued a booklet treating upon the gold belt extending through the States of Virginia, North and South Carolina, Georgia and Alabama. These people claim to have a little mother lode of their own.

SECRETARY OF THE INTERIOR BLISS has issued a solemn warning to all and sundry to beware the dangers of the Klondike trip. It is well meant but useless. Those who go will go despite the plainest showing of peril, and are deaf to admonition.

ALREADY are being received at this office inquiries from Eastern States for information of "miners" who left home as much as two weeks ago to go to the Klondike and who, strange to say, have not been heard from in all that time. Evidently some Eastern people have a queer idea of geography, but they seem to know all about the MINING AND SCIENTIFIC PRESS.

SOME funny pictures are appearing of the Klondike district. One New York illustrated paper has an engraving "from our special artist at Dawson City," showing a mule pack-train loaded with ore.

THE Highland Boy mill, Bingham, Utah, has the largest mill structure there, a 100-ton affair, the process being a combination of plain amalgamation and the cyanide process. There are no stamps, the pulverizing being done by crushers and rollers.

J. B. GRANT says: "I have figured out that, with lead at 3.60 and silver at 55½, it is just about as profitable to a miner as when lead is 3.25 and silver 65," and argues that the present low price of silver will have no serious effect upon the production of lead.

THE seven-year Hale & Norcross litigation was argued and submitted before the Supreme Court this week in bank, upon an appeal from the judgment of the Superior Court, for $417,000, in favor of M. W. Fox and against Alvinza Hayward, H. M. Levy and the Hale & Norcross Mining Company.

AMONG the good results of the Klondike excitement are the greatly increased business along the coast in shipping, provisions and clothing, and the awakening of a good many to the fact that plenty of as good gold mines as any in Alaska are to be found very much nearer home.

THE results of thirty-one days' operation of the Hall mines smelter at Nelson, B. C., ending July 30th, are reported by Manager Croasdaile as follows: Amount of ore smelted, 3935 tons; yielding 313 tons of matte, containing approximately 144 tons of copper, 81,360 ounces of silver, and 84 ounces of gold.

IN A Utah court last Saturday was upheld the law of eminent domain, the judge deciding that the Silver King Mining Company could condemn land on which to construct a pipe line to convey water to its mine. Evidently the Kingdom of Deseret proposes to accord some of his ancient rights to the miner.

ALL PRESENT mining activity is not toward the north, the usual steady development work going on in every district and considerable new prospecting started. In a few instances in Amador and Calaveras counties working miners under pay left their jobs to join the rush, but their places can readily be filled.

IT is locally claimed that the stack at the Gaylord, Montana, smelter plant is the largest in the world at its base, as well as in diameter at the top. It is 200 feet 5½ inches high. The foundation base is 47 feet square and required 130 cars of stone. There are 1,500,000 brick in the stack and it is 22 feet in diameter inside at the top.

THE little plan to insure men's lives for $10,000 each, then "stake" them with $1000 to go to Klondike on prospecting trips, didn't work. The life insurance companies didn't recognize the usual percentage in favor of the game, seeing only a likely chance for the policy holders to make between $8000 and $9000 in each case of demise.

FOREMAN DUPUIS, of Carson, Nevada, is working on an invention of machinery to convert zinc plates into thin shavings to be used in the cyanide process. At the present time the shavings obtainable for the purpose are uneven. Mr. Dupuis' contrivance is intended to make the shavings precisely the same thickness throughout.

HEREAFTER no mining company outside of Ontario may transact business or sell shares in the province without first registering and securing a license. The penalty for violation is a fine of $20 for every day such business is transacted and three months' imprisonment. This shuts off many companies that have heretofore done business in Toronto and Ottawa.

DIRECTOR OF THE MINT PRESTON announces that the price of silver bullion makes the commercial ratio between silver and gold 36 to 1, and predicts that within six months silver will fall to 40 cents an ounce. He estimates that the world's production of gold this year will be about $240,000,000, of which the United States will contribute about $60,000,000.

ALL the gold brought from the Alaskan gold fields to the San Francisco mint and that sent to other mints of the country amounts to about $2,800,000. California contributed to the world's gold last year $17,181,562. This is the third year since the discovery of gold in Alaska. The third year in the California gold mining excitement gave to the mints (1850) $41,273,106.

THE recent protest of the American Copper Producers' Association, filed with the Senate ways and means committee, showed the total production of copper in the United States last year was 424,402,735 pounds. The output of the Arizona companies is given as follows: Copper Queen, 22,260,696 pounds; United Verde, 22,328,413; Arizona, 12,472,000; Old Dominion, 5,620,000; Detroit, 6,985,150.

PARTS of Utah object to the new mining law. The following is from the Salt Lake *Tribune*: "James T. Monk, ex-mining recorder of the Big Cottonwood mining district, appeared before Judge Cherry yesterday morning and again refused to turn over the records of the Big Cottonwood district to the county recorder. Judge Cherry ordered him committed to the county jail until he complies with the writ of mandate ordering him to produce the records."

INDIA'S absorption of silver for the four years, 1856 to 1860, was $257,500,000; during those years the total production of the world's mines was about $205,000,000. Professor Fawcett, in his "Manual of Political Economy," sixth edition (Macmillans), bk. III., chap. 16, gives the importation of silver into India during the eight years before 1867 at $600,000,000; the total production of silver from the world's mines during that period is set down at $372,500,000.

THOUGH an unusually large number of copies of last week's issue were published, the demand almost exhausted the supply. "That is just what I wanted," was the comment of several, "an accurate, scientific discussion by competent authority of the Klondike country." It is hardly necessary to say that, without any great flourish of trumpets, whatever is necessary to a proper understanding of things in that section will appear in these columns at least as soon as anywhere else.

THE Jesuit missions in the Klondike are in luck, if as is said, they are in the very heart of the gold region. The land consists of about three acres, which was purchased by the head of the mission, Rev. William H. Judge, a few years ago for a church, school and graveyard. One report says it is the richest part of the Klondike region, and provided some one does not jump the Jesuit claim, the returns should be large. The Jesuits, however, are men of peace, and hardly strong enough in that wild territory to maintain their right in case an effort should be made to push them out.

J. T. VAN SMITH, Prescott, Ariz., has patented a contrivance to save the fine gold which ordinarily escapes from a stamp mill. The device consists of several sets of silver-plated wire screens, kept in motion by a small water-wheel operated by the water running through the sluice. The water containing the tailings in suspension runs through about twenty of the screens, which take up the gold. These are taken out and the metal brushed off as it accumulates. The screens are then dipped in quicksilver and are again ready for use. It is practically automatic in operation.

THE Dominion Government has decided to appoint an administrator for the Yukon district with entire charge of all Canadian officials there. J. Walsh has the position. Thirty-five mounted police go with two Maxim guns. The recent mining rules have been amended. At present a miner is at liberty to stake out a claim of 500 feet running along with the stream and back to the bank. This has been reduced to 100 feet, the new regulation going into force immediately. A court for the administration of civil and criminal questions of the gold district has also been decided upon, Justice McGuire of Prince Albert to preside.

THE current number of *Electricity* publishes a letter from Arkadelphia, Ark., in which the writer makes the extraordinary statement that he owns several argentiferous galena claims which run in silver, 200 ounces to the ton, $10 gold, average 10 to 15 per cent copper, but cannot work it profitably on account of distance from railway. He wants to know if he cannot work it "by electricity." Galena that goes $10 in gold is considerable of a curiosity, to say nothing of 200 ounces of silver. The copper percentage of the "galena" is also a little unique. In such a claim as his, "distance from the railway" need cut no figure. The more distant the better.

A REPRESENTATIVE of the Omaha & Grant Smelting Company, in an interview in an Omaha paper, says that the duties on lead ore prohibited them from treating any of the British Columbia ores on this side of the line and they expect hereafter to do the bulk of their business at the smelter they recently purchased at Pilot Bay, and which they will start up on September 10th. President Nash of the company says that owing to the rapidly increasing production of lead ores in British Columbia more than one smelter company would find its way across the Canadian border in the next twelve months, and that these smelters would be literally driven out of the country by the high rate imposed on lead ore in the new tariff bill. In a year the Omaha Grant & Company has paid out $60,000 in import duties on ore from Kootenay mines, but cannot afford to import the ore at the new tariff rate.

SILVER CITY, Nev., mine owners met last week to effect a joint arrangement with the American Flat Tunnel Co., or the Comstock Tunnel Co., to drain and exploit the mines of that district to a greater depth than the present owners can afford to do. The American Flat Development Co. has under consideration the proposition of operating a pumping plant at the old Dayton works and running a tunnel to drain the mines of both Silver City and the American Flat. It had been found that two tunnels would be necessary for this project after a main tunnel had been run for some distance, one to drain the western country, and one which would run almost directly under Silver City, and that it would cost about $600,000, and if the mine owners would deed to the American Flat Development Co. a one-half interest in their claims, the company would put up the money.

ONLY a small percentage of the silver product of this country is now derived from ores treated by lixiviation and amalgamation. In Colorado there is not a silver mill in operation; in Utah there are only the Ontario and Daly mills at Park City, and they probably closed down this week, and a small works in the Silver Reef district. In Montana, where the Alice, Lexington, Bluebird, Granite Mountain, Bimetallic and Elkhorn amalgamating mills were in operation a few years ago, the entire production of silver bullion in 1896 was only 676,451 ounces. In Idaho the DeLamar mill is the only one of importance now running, and the ore it grinds contains as much gold as silver; in Arizona, where the Silver King mill was formerly a great producer, the output of silver in mill bullion is now only 125,000 ounces per annum; in Nevada mills on the Comstock lode are still in operation, but the Comstock ore averages 46 per cent gold.

GRAVES BROS. struck a pocket on Morrison gulch, a branch of Coffee creek, in Trinity county, near Trinity Center, one day last week, and before the sun went down took out $40,000. Don't rush to Morrison gulch! It is in California, where such things occur right along. Besides, it is too nice a country—too much grass and flowers and fruit and sunshine. If you want to rush go 5000 miles away where you must bring food and where, if your food gives out, you may starve. That gives an adventurous aspect that is denied an equally auriferous region all around you right at home. In four days Graves and Carter secured $61,000 in gold. The gold was found in the gravel about thirty feet from the surface, with no bedrock in sight. But remember this is only California! It is ever so much more heroic to go into the shadow of the North Pole and thaw through forty feet of ice and live on frozen blubber gnawed in the dark.

MR. PRESTON, Director of the Mint, has again spoken. He now estimates the gold production for the year 1896 to have been $205,000,000, of which the United States contributed over $53,000,000. For 1897 he believes the world's gold product will reach at least $240,000,000—an increase of $35,000,000 over 1896. He says: As an indication of the increase in the world's gold product for 1897, the following table, showing the product of the United States, Australia, South Africa, Russia, Mexico, British India and Canada for 1896 and the probable output of these countries for 1897, is given:

	1896.	1897.
United States	$53,000,000	$60,000,000
Australia	46,250,000	52,550,000
South Africa	44,000,000	56,000,000
Russia	22,000,000	25,000,000
Mexico	7,000,000	9,000,000
British India	5,800,000	7,000,000
Canada	2,800,000	10,000,000
Totals	$180,850,000	$219,550,000

He also believes that by 1901 the world's product will exceed $300,000,000.

Annual Report of the California Debris Commission.

Through the courtesy of the California Debris Commission we are enabled to give the recent official report in full, as follows:

GENERAL:—The California Debris Commission has the honor to submit the following, its fifth annual report:

The Commission was created by act of Congress approved March 1, 1893. During the past year its members have been the following officers of the Corps of Engineers, viz.: Colonel Charles R. Suter, President, Major Charles E. L. B. Davis and Captain Cassius E. Gillette, Secretary.

The State Debris Commissioner, the Hon. John F. Kidder, has been present at most of the sessions of the Commission, and has accompanied its members in visiting hydraulic mines.

Mr. Hubert Vischer, civil engineer, has been in the employ of the Commission throughout the year, inspecting the operations of mines working under permits from the Commission, and looking after illegal mining in the district under the Commission's jurisdiction.

The jurisdiction of the Commission extends to hydraulic mining in the territory drained by the Sacramento and San Joaquin river systems in California.

The duties of the Commission may be briefly stated to be: First, the prevention of such hydraulic mining as may be deemed injurious to the navigable waters within the Commission's jurisdiction, permitting, under proper legislation, such mining in cases where it can be carried on without such injury; second, to mature general plans for the improvement of the rivers whose navigability has been injured by hydraulic mining, and, if practicable, to devise general methods whereby such mining may be carried on without damage to the navigable waters.

Prevention of Illegal Mining.—In accordance with the opinion of the Attorney General of the United States (Appendix A, Ex. Doc. No. 11, Fifty-third Congress, third session), the Commission has since the date of its last report, July 1, 1896, called the attention of the owners and operators of ten mines which were being worked illegally to the requirements of the law and the duties of the Commission in the matter. So far as known these mines have been closed, and in five cases applications have subsequently been made to the Commission for the permits to mine. These mines are all small.

On June 8, 1897, the Commission received notice from the United States District Attorney that the injunction suit requested by the Commission on December 4, 1894, against the North Bloomfield Mining Company had been decided by Judge Ross of the United States Circuit Court in favor of the United States, and that an injunction had been issued. On June 22 the Commission was informed that an appeal had been taken by the North Bloomfield Mining Company, and that their motion to vacate the injunction pending the appeal had been granted. Under these circumstances it is unknown when an injuction that will cause the cessation of the apparently illegal work of this company will be obtained.

Applications and Permits.—The Commission has, since it organized, received 311 applications to mine; 238 permits have been granted. A table showing a synopsis of the applications received and the action taken is appended and marked A.

Eight permits have been canceled and 28 permits have been at different times temporarily suspended, generally on account of the neglect of the owners to comply with instructions concerning the impounding works, or from accidents to those works.

Several of the smaller impounding dams have broken or have been damaged during the year, but none of any importance excepting the dam connected with the Manzanita mine, near Sweetland, Nevada county. The permit for this mine was canceled January 19, 1897, for irregularities in its management. On January 25 the substantially built crib shaft connecting the settling pool above the dam with the tunnel underneath the dam collapsed from some unexplained cause, and the bulk of the material, about 130,000 cubic yards, stored above the dam escaped or will eventually escape into the Yuba river. This fact, together with the alleged blowing up with dynamite of a number of large dams in Slate creek, built before the Commission was appointed, illustrates the difficulty of securing permanent dams for large mines in streams of any magnitude, located, as most of them are, distant from inhabited neighborhoods, and dependent for their maintenance upon owners who have no direct interest in maintaining them.

The total amount of material mined under permits during the year is estimated at 1,256,910 cubic yards. The available storage provided at present and partially or wholly completed for future operations is estimated at 11,000,000 cubic yards.

The requirements in respect to storage of detritus exacted by the Commission during the past year have been the same as those during the previous year.

No dam for impounding detritus in the larger streams has as yet been authorized by the Commission.

Improvement of Rivers.—The duty of devising plans for the improvement of the rivers concerned devolves upon the Commission by Section 4 of the act. A Board, consisting of the same membership as the Commission, has been appointed in accordance with the act of Congress approved June 3, 1896, and charged with essentially the same duties. Under the latter act the Board has been making the necessary surveys of the Sacramento river. This work has not yet been completed.

The same river and harbor act also provides:

"For the construction of restraining barriers for the protection of the Sacramento and Feather rivers in California, $250,000; such restraining barriers to be constructed under the direction of the Secretary of War in accordance with the recommendations of the California Debris Commission, pursuant to the provisions of, and for the purposes set forth in, section twenty-five of the act of the Congress of the United States, entitled, 'An act to create the California Debris Commission and regulate hydraulic mining in the State of California,' approved March first, eighteen hundred and ninety-three: *Provided*, That the Treasurer of the United States be, and he is hereby, authorized to receive from the State of California, through the Debris Commission of said State, or other officer thereunder duly authorized, any and all sums of money that have been, or may hereafter be, appropriated by said State for the purposes herein set forth. And said sums when so received are hereby appropriated for the purposes above named, to be expended in the manner above provided."

The Legislature of the State of California on March 17, 1897, passed an act appropriating $250,000, to be used in conjunction with the above appropriation of the United States. This act provides:

"Whenever said 'California Debris Commission' or the Government of the United States shall have entered into any contract for the construction of works for the purposes described in this act, in pursuance of plans and specifications that have been theretofore approved by the State Board of Examiners as in this act provided, it shall be the duty of the Debris Commissioner to carefully inspect such works during the process of their construction and to keep a record of the result of such inspection and to report the same monthly to the State Board of Examiners. Said Debris Commissioner shall also from time to time, during the process of the construction of such works, when requested to do so by the said 'California Debris Commission,' draw his warrants upon the State Controller in favor of such person or persons as may be designated by said 'California Debris Commission' for such amounts as shall equal one-half of the cost of the construction of said works; and said Debris Commissioner shall, in like manner, and when requested to do so by said 'California Debris Commission,' draw his warrant upon the State Controller for an amount equal to one-half the purchase price of any site or sites necessary for the construction of said works: *Provided*, That the purchase of such site or sites shall have been first approved by the State Board of Examiners; *and provided, further*, that no warrant shall be drawn in excess of the amount appropriated by this act."

In compliance with instructions from the Secretary of War, the Commission has been developing a project for the expenditure of the money appropriated by the United States, and it is proposed to make this project so that the money appropriated by the State can be expended under it. The act of the California Legislature referred to is appended hereto, marked B.

MONEY STATEMENT.

June 30, 1897—Amount unexpended of appropriation for "Expenses of California Debris Commission, 1897".....	$ 8,983.3
Outstanding liabilities.....	10.0
Balance.....	$ 8,972.
June 30, 1897—Amount appropriated by act of June 4, 1897, for "Expenses of California Debris Commission, 1898"..	$15,000.0
Estimated necessary for expenses of the Commission to the close of the fiscal year ending June 30, 1899.....	15,000.0

Respectfully submitted,

CHARLES R. SUTER,
Colonel, Corps of Engineers.
CHARLES E. L. B. DAVIS,
Major, Corps of Engineers.
CASSIUS E. GILLETTE,
Captain, Corps of Engineers.

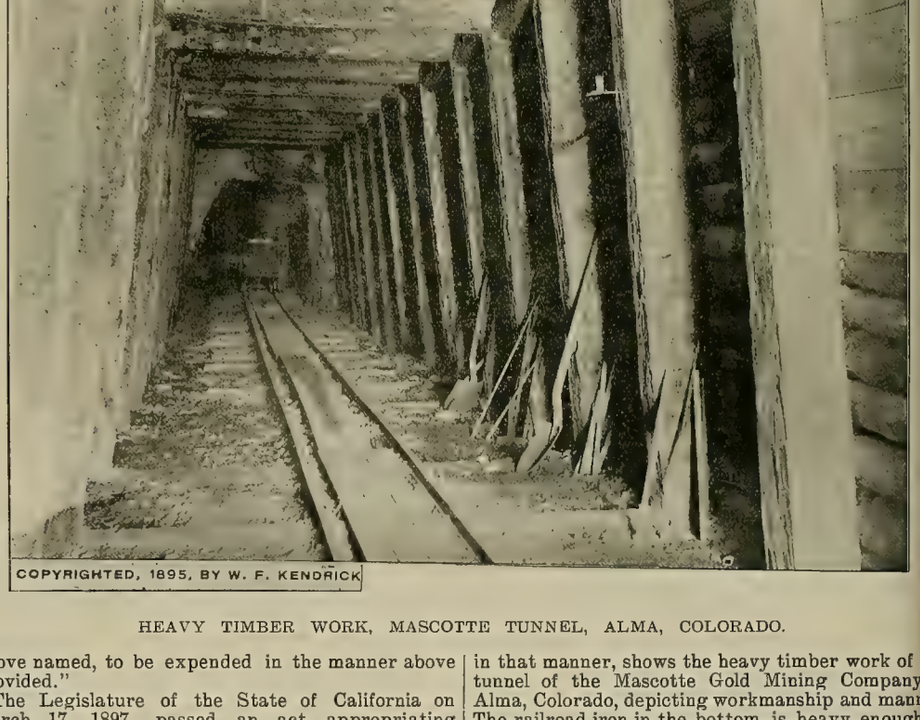
Brigadier General John M. Wilson, Chief of Engineers, U. S. A., Washington, D. C.

San Francisco, Cal., July 1, '97.

Flash Light Photography.

Frequently are portrayed in these columns underground work in California and Colorado mines, the flash light enabling a good view to be had in the momentary illumination.

The accompanying half-tone, from a photo taken



HEAVY TIMBER WORK, MASCOTTE TUNNEL, ALMA, COLORADO.

in that manner, shows the heavy timber work of the tunnel of the Mascotte Gold Mining Company at Alma, Colorado, depicting workmanship and manner. The railroad iron in the bottom is heavy enough to carry an electric motor with loaded train of ore cars. Underneath this, not visible in the picture, is a drain large enough to carry 2000 gallons of water per minute, sufficient to drain the mines of the mountain of its course.

A MINE is one place where, whether around the top or underground, everybody has not only to look out for himself but also for everybody else. Ordinarily one has only to take care of himself; a mine is one of the places where he must care for others, too. Because of this, those in charge owe it to all to be dulcareful about employing proper help. This is suggested at this time because of the fact that in one mine in this State, in Mariposa county, a young man under eighteen years of age is running a hoisting engine twelve hours per day. This constitutes a risk to himself and others. It is also a violation of Section 651 of the Penal Code, which says: Every person having a minor child under his control, either as a ward or an apprentice, who, except in viniculture or horticultural pursuits, or in domestic or household occupation, requires such child to labor more than eight hours in any one day, is guilty of a misdemeanor. See Stat. 1872; Stats. 1868, 63.

ASBESTOS formerly in use now has a formidable competitor in the blue asbestos of South Africa. The latter is less than half as heavy and furnishes finer and longer fibers, which have been worked into webs but little inferior to those made of vegetable fiber, are absolutely fireproof, and resist most known chemicals, corrosive vapors and atmospheric influences. A blue asbestos rope ¾ inch in diameter

is weighted at one end with 220 pounds, and exposed to a constant flame from a large gas jet so that a considerable portion of its length was surrounded by fire. It only broke after twenty-two hours. The asbestos rope has only two-thirds the strength of a new hemp rope, but as they grow older the proportion changes in favor of the former, since it is but little affected by the atmosphere. The blue asbestos fiber is also worked into mattresses for hospitals, which are cooler in summer and warmer in winter than those of animal hair or vegetable fiber. As an experiment, firemen's apparel is being manufactured from the fiber.

Recent Additions to the Collections of the California State Mining Bureau.

Gold quartz, from the Stringer district, Randsburg, Kern county, Cal.; L. L. French; tests show about $50 to $60 per ton free gold. Quicksilver ore, with cinnabar with dolomite; Great Western mine, Lake county, Cal.; A. Rocca, superintendent. Quicksilver ore, cinnabar; Chicago mine, Lake county, Cal.; from the company. Geode of chalcedony filled with aragonite, cut and polished; from the Healdsburg onyx quarry, Sonoma county, Cal.; Geo. Madeira. Wurtzite, sulphide of zinc; Lake county, Colorado. Gold quartz, showing free gold; Wedge mine, Randsburg, Kern county, Cal.; J. M. Kelley. Gold quartz, showing free gold; Kinyon, or Good Hope, mine, Randsburg, Kern county, Cal.; from the company. Gold quartz; from the Lucky Boy, Black Hawk, Gold Coin and Butte mines, Randsburg, Kern county, Cal. Gold quartz, Alameda mine, Johannesburg, Kern county, Cal. Gold quartz; Gold Bug mine, Rademacher district, Kern county, Cal. Gold quartz; Welcome and Exposed Treasure mines; from the new district three to four miles south from Mojave, Kern county, Cal. Model (in wood) of fine ore quicksilver furnace, recently invented and patented by C. E. Rockford of Sulphur Creek, Colusa county, Cal. Iron; rawhide bag used by the Mexican miners in the early working of the New Almaden quicksilver mine to transport the ore from the stopes to the surface on their backs. It is fitted with a broad strap, which passed across the peon's forehead, and smaller straps to steady the load. This interesting relic of early days was presented by C. C. Derby, superintendent, who also presented the museum with one of the old-style Mexican mine ladders. Gold in serpentine; from the hanging wall of the mother lode in the mines of the Mariposa Commercial and Mining Co., Bear Valley, Mariposa county, Cal.; J. D. Ludwig. Diamonds, rough; five specimens from a coal mine at Newcastle, New South Wales; R. W. Backrach. Phosphatic earth with 10.63 per cent of phosphoric acid; Jenolan caves, New South Wales. Copper ore, tetrahedrite, carrying gold and silver; cupro-scheelite, 57 per cent tungstic oxide; bismuthinite; native bismuth; rich silver ore; two varieties of tin ore; stannite; cinnabar, and ten specimens of rich gold ores from new districts; all from New South Wales, Australia, (Dept. of Mines). Gold quartz, assaying $200 per ton gold, from the Reward mine, Nevada County, Cal.; Hon. Samuel W. Backus. Gold quartz, showing free gold, and a considerable amount of chloride of silver (horn silver); Commonwealth mines, Bisbee, Arizona; from the company, per D. M. Barringer, secretary. And sundry other specimens.

July 24th, '97. H. S. DURDEN, Sec'y.

Rights of Miners in the Suspended Forest Reserves.

Mr. Gifford Pinchot, special forest agent of the Interior Department, thus replies to a query if the present regulations governing the suspended forest reserves deprive miners of the right to take and develop claims:

"The regulations issued under the law permit the development of mines under the same regulations which exist outside, with the exception that, where timber does not exist on a claim in sufficient amount to develop it, other timber may be used to the extent of $100 stumpage value without charge. For larger amounts a permit is required from the Secretary of the Interior. The text of the law is as follows: 'Nor shall anything herein prohibit any person from entering upon such forest reservations for all proper and lawful purposes including that of prospecting, locating and developing the mineral resources thereof, provided that such persons comply with the rules and regulations covering such forest reservations.' Another section is as follows: 'All waters on such reservations may be used for domestic, mining, milling and irrigation purposes under the laws of the States wherein such forest reservations are situated, or under the laws of the United States and the rules and regulations established thereunder.'

"The validity of existing claims and patents within the reserves is in no wise affected, while the settler is given the option of exchanging his claim or holding for the same area elsewhere outside a forest reserve, without cost to him, except that he must comply with the same conditions which would have been required on his original claim. Wagon roads may be constructed under authority from the Secretary of the Interior, and land may be occupied for schools and churches. There is no regulation prohibiting the ingress or egress of any person upon the forest reserves for lawful purposes, and in general the regulations have been so framed as to allow every possible freedom consistent with the preservation of the forests."

Aluminum Alloys.

Tin has been alloyed with aluminum in proportions of 1 to 15 per cent of tin, giving added strength and rigidity to heavy castings, as well as sharpness of outline, with a decrease in the shrinkage of the metal. The alloys of aluminum and tin are rather brittle, however, and, while small proportions of tin in certain casting alloys have been advantageously used to decrease the shrinkage, on account of the comparative cost and brittleness of the tin alloys, they are not generally used. Sometimes phosphor tin is used to give additional hardness to aluminum alloys.

Nickel is one of the favorite hardeners used in alloying aluminum. In proportions of from 7 to 10 per cent of nickel and the rest aluminum, the best casting metal is produced for purposes where toughness, combined with hardness and good casting qualities, is desired. "Nickel aluminum" has become a trade name. Several new nickel and aluminum alloys for special work have been made.

Manganese is one of the best hardeners of aluminum; it can be cheaply added in aluminum casting metal by means of the rich alloys of ferro-manganese, and for rolling purposes by adding the pure black oxide of manganese to the electrolytic bath in which the aluminum is produced. The alloys of manganese give special rigidity and hardness to aluminum; in combination with copper and nickel, one of the best hardening alloys of aluminum yet produced has been obtained.

The alloys of aluminum and tungsten have for the past few years been especially popular for rolled sheets and plates, to be afterwards spun. Under the trade name of "Wolfram aluminum," the metal has been largely used for military equipments. The alloys of aluminum and tungsten can be advantageously used, with the addition of copper, and also with the triple hardeners, tungsten, copper and iron; or tungsten, copper and manganese; or as more usually made, the aluminum is hardened with some copper; tungstate of sodium and ferro-manganese are added to the reducing bath, making an alloy of aluminum, copper, tungsten, manganese and iron.

Chromium, though rather expensive, is an especially advantageous hardener of aluminum. Aluminum hardened with chromium seems to retain its hardness, after annealing or being subjected to heat, better than any other of the alloys.

Titanium alloys of aluminum, although hard to manufacture uniformly homogeneous, have greater spring and reliance than most other aluminum alloys. Alloys of titanium, chromium and copper, together with aluminum, give some of the hardest and toughest light alloys yet produced.

Zinc is used as a cheap and very efficient hardener in aluminum castings, for such purposes as sewing machine frames, etc. Proportions up to 30 per cent of zinc with aluminum are successfully used. An alloy of about 15 per cent zinc, 2 per cent tin, 2 per cent copper, ½ per cent each of manganese and iron, and 80 per cent aluminum, has special advantages.

Aluminum and antimony unite with difficulty, and only in bearing metals of the class of Babbitt metals have any useful alloys as yet been discovered.

Aluminum and lead unite with great difficulty, and no useful alloys have yet been discovered.

Cobalt also acts, with about an equal amount of copper, as a specially good alloy for hardening aluminum.

The following are two cobalt and aluminum alloys used for special purposes: 50 parts cobalt, 10 parts aluminum, 40 parts copper; 35 parts cobalt, 25 parts aluminum, 10 parts iron, 30 parts copper.

Prof. W. C. Roberts-Austen discovered a beautiful alloy, composed of 78 parts gold and 22 parts aluminum, which has a rich purple color.

Aluminum and cadmium have been alloyed to produce a solder for aluminum, which seems to give good results. Cadmium does not appear to act appreciably as a hardener for aluminum, as do almost all other metals.

Aluminum and bismuth combine easily, the alloys being very fusible, as might be expected of alloys with bismuth. They remain unchanged in the air at ordinary temperatures, but oxidize rapidly when melted. Bismuth makes aluminum very brittle. No valuable alloys of these two metals have as yet been discovered.

Vanadium is a good hardener of aluminum, and can readily be alloyed with it, due to its presence in some of the bauxites that form native aluminum ores.

A TEMPERATURE of 4000 or 5000 degrees can be produced only between the carbon points of an electric arc light. The next hottest place in the world is the crucible of an electric furnace.

Coal the Result of Flotation and Deposition in Lakes.

The recent important modifications in our ideas of the manner in which coal was produced are summarized by Dr. Philippe Glangeaud in *La Nature*. It was not long, says the doctor, since we had no exact idea of the manner in which coal was formed. It was once supposed that it was due to the influence of the "central fire;" we were far from suspecting that it had an organic origin. It is chiefly by the discoveries of French scientists that we have been able to solve this problem, which is so important both from the scientific and practical point of view.

In the first place observation showed that coal is made up of vegetable remains, more or less altered, mingled with a brown substance, coming also from the decomposition of vegetable matter. This proof led certain scientists to believe that coal had come from the burial of forests in the place where they had grown. A luxuriant vegetation must have covered the soil, and on the remains of the vegetable species that fell and decayed sprang up new plants. This assemblage formed a considerable accumulation of vegetable matter. According to theories then in favor, a cataclysm soon took place; the forest was covered by waves charged with sands and clays, under which the vegetable mass disappeared. Quiet was restored, another forest grew on the remains of the first, and a new cataclysm covered this also with new sands and clays. Thus was explained the alternation of coal-bearing strata with rock and slate that was observed in coal regions.

This theory, which was current for some time, could not be sustained by a close examination of the facts. In fact, it was noticed that the layers of coal were very regular, and that trunks of trees had often been found with their roots in the air; finally, it was impossible to admit that vegetation could be preserved in the open air. It was necessary that it should be removed from the action of the air in order to be altered into a combustible mineral.

After having made a large number of observations of this kind, M. Fayol, a French engineer in charge of the coal mines at Commentry, was led to propose a new theory of the formation of coal—a theory based on facts and experiments, a rational theory, which has now gained the adherence of all scientific men. The mines of Commentry are in a part worked in the open air, so that it is easy to observe the relations of the different strata that make up the region. M. Fayol noticed at first that the pebbles constituting the pudding stones were formed of rocks whose place of origin was sometimes quite distant. As to the coal, it was the result of vegetable debris laid down in horizontal layers; one above the other. He concluded from these data that a liquid must have been necessary to transport and arrange in this way these different elements. Coal, then, was not formed in the places where it grew; it is a product of transportation.

The climate of the coal epoch being very moist, abundant floods carried away trees and whole forests and swept them into lake basins. The trees thus formed great rafts of logs, like those on certain American rivers. * * * The heaviest materials, gravel, sand, clays were deposited in the order of their density. The lighter vegetable matter floated longer and was deposited last. Thus is explained why the layers of the earth and coal are not parallel, and why all these layers, as has been observed in deltas, are inclined in the same direction and at different angles.

M. Fayol tested his hypothesis by experiments on rapid sedimentation. He produced, artificially, with the aid of small torrents, all the circumstances observed in the coal basins of the central plateau. The facts observed to-day at the mouth of the Mississippi make M. Fayol's hypothesis even more probable.

But the results reached do not stop here, from a scientific point of view. While the old theory required thousands of centuries for the formation of a coal basin, the theory of flotation enables us to understand that a relatively short period would have been sufficient to form the depressions in which the coal was deposited. The discovery of boulders of coal, found in several basins, even justifies the conclusion that the coal was formed before its transportation by the water. So coal was the result of flotation of vegetable matter and its deposition in lakes.

M. Glangeaud notes that not all coals were formed from trees and large plants. Some were the product of very small, almost microscopic, algæ that covered the surface of still water. Such were the coalbeds called "bogheads."

To sum up, attentive and careful examination of the constitution of coal enables us to understand the different ways in which it could have been formed, concludes the writer. Science has probably not said its last word, and perhaps new discoveries are at hand that will throw new light on the question of the origin of the most important combustible mineral, without which the activities of the nations would be quickly brought to a standstill.

Mining Summary.

CALIFORNIA.

Amador.

The Argonaut Mining Company of Jackson, Amador county, has commenced another, the fourth, suit against the Kennedy Company. The complaint alleges that since August 18, 1894, the defendant has extracted from plaintiff's mine over 3000 tons of gold-bearing quartz and carried away and converted the same to its use, and prays judgment against the defendant for the sum of $135,000 and costs of suit and also for a perpetual restraining order.

Ledger: At the Monte Cristo-Robinson the mill is running. T. B. Dillon has retired from the superintendency.

On the Mokelumne river H. F. Vogt is having ore from his mine crushed at the Esperanza mill.

The steam hoist at the Muldoon mine is now in operation.

Hoskin & Case have put up a 5-stamp mill on Contraros flat.

Butte.

Major Frank McLaughlin is opening up the Rock River mine.

Calaveras.

W. R. Thomas, superintendent of the Central Eureka, Amador county, and Stephen Thomas have purchased the Anderson mine, near El Dorado. Stephen Thomas, who will open the mine, was formerly superintendent of the Sierra Butte.

Cleveland, Callahan & Co. have developed a quartz ledge near Copperopolis that yields, according to a millrun test, $400 per ton in free gold, sulphurets $1000 per ton. The vein matter is 3 feet in width.

Prospect: The Stickle mine and Utica run full-handed day and night, turning out the usual product of gold.

At the Gold Cliff mine ten stamps are kept in constant operation.

The Cross shaft is now 900 feet in depth and will go 600 feet deeper.

The Great Western, Bovee and Madison are being worked.

Heavier hoisting machinery is being put in the Ghost mine.

At the Tryon mine the rock from the 200-foot level is of a high grade.

In the Lightner mine, stoping goes on. The mill at Centerville is crushing the ore from the 200-foot level.

Citizen: At the J. R. mine, at Old gulch, work will begin on the 10-stamp mill as soon as the machinery, which is now at Valley Springs, is hauled to the mine.

At the Greek mine, near Banner Mills, ten men are employed. The old shaft has been retimbered, and sinking has been commenced, which will be continued to a depth of 500 feet.

B. Jennings of San Jose has an option on the Orchard mine, the owner to receive 75 per cent of each cleanup until the purchase price, $6000, is paid, when the new management will be given a deed to the property.

At the Rocky Bar mine, near Murphys, Naylor Williams of Angels is working it under a bond to T. T. Lane and F. McNear.

Del Norte.

All the hydraulic mines in the Happy Camp district have been shut down to be got in order for the winter runs.

The Oranna quartz lead, Bald Hills, has incorporated; J. E. Murphy, J. Murray, J. McGowan, E. Yates; capital stock, $100,000.

El Dorado.

Near Brownsville the Stillwaggon and Rosebud mines have been bought by Messrs. Ireland & Barrows of Los Angeles, who will develop them.

F. C. Hendrick was in Jackson last Saturday and showed the *Ledger* a five-pound lard bucket full of rich quartz specimens, $1000 more or less, the result of five days' prospecting in El Dorado county. One seeing the gold would imagine he had just returned rom the Klondike.

Nugget: The Blue Gouge mine, Cosumnes district, has been bonded to an Eastern company. There are seven tunnels in the property now, and the mine is well opened up. It has been for some time in the hands of Mackay, Head and others. The new company will at once erect a mill.

The Griffith Consolidated mine, Diamond Springs district, is being developed. No mill has yet been erected.

Development work at the Unity progresses; crosscutting west from the 350-foot level.

Fresno.

Near Letcher the Copper King is being developed. Two 25-horse power gasoline engines and a pump are to be put in, and a three-compartment shaft is projected.

Inyo.

The Mammoth cyanide plant is completed and ready to start. Stewart's mill at Sodaville has resumed crushing.

Kern.

The strike on the Little Butte mine improves. Three shifts are at work. Shaft No. 2 at the west end of the ledge goes 50 feet deeper. A gasoline hoist goes in at shaft No. 1, which it is proposed to sink to a depth of 400 feet before any drifting is done.

Hollis and Curtis have bonded the Bower and Gold Bar claims and have men at work developing them.

Randsburg *Miner*: Manager Allen is working three shifts on shaft No. 1 of the Little Butte. The vein is widening and growing in richness. The new ore house is completed. A contract has been let for sinking the shaft on the westerly end of the claim 50 feet deeper.

The Yorkshire Lass Company has begun work on ore from the company's mines. The output of this group will be sufficient to keep the mill busy, and no custom work will be done. Twelve men are working on the Skookum and Yorkshire Lass.

The dry concentrator people are working eight men, grading, erecting mill buildings, etc.

Los Angeles.

A gold bar valued at $30,000, from the Red Rover mine, near Acton, has reached Los Angeles—the first run of the new mill started up thirty days ago.

Mono.

The Standard Consolidated Mining Company had a balance on hand August 1, 1897, of $21,452.62, with July expenses unpaid and the cleanup of bullion to be received. Complete returns show that the mine made a net profit of $10,000 for the month of July.

The Dunderberg cyanide plant started up this week. There are now thirty men at work at the mine.

Nevada.

Mrs. De Noon for her gravel property opposite the Derbec asks $125,000 and wants $80,000 down.

George Mainhart of Grass Valley will resume work at the Erie mine, near Graniteville. There is a 10-stamp mill on the property.

Bigelow & Fletcher are working the National mine, near Graniteville, under a working bond. A tunnel in 400 feet has a vertical depth of 200 feet and is in the pay chute about 100 feet; a 4-foot ledge in the face will go $10 per ton. The National has a 5-stamp mill.

The *Herald* is told that the Massachusetts Hill mine at Grass Valley is at present taking out more money than any mine in that district, and that the Pennsylvania mine is pounding out more gold with a 5-stamp mill than any mine with similar milling capacity in California.

The Powning Gold and Silver Mining Company has elected Geo. Mainhart president and superintendent; A. B. Brady secretary; Jas. Hosking treasurer.

The *Union* says the Reddick Mining Company will let a contract on Friday for sinking its main shaft 100 feet. The mine is on the Blue Tent road above Nevada City.

Union: The employes of the Champion Mining Company were paid off yesterday and over $22,000 was put into circulation. The company employs 230 men and eighty stamps are kept dropping night and day. Seventy of these are at the Champion mine and the other ten at the Spanish. The main shaft is now down 1850 feet and sinking is steadily kept up. During the past five years fifty-five stamps have been added and the mine is the largest of any in the county.

Placer.

In last week's issue the MINING AND SCIENTIFIC PRESS announced that the Morning Star Mining Company's 80th dividend was an $8 per share one. Three inquiries have been received asking if that wasn't a mistake, if $5 wasn't meant. Five dollars per share is the usual monthly dividend of this company, but this time it was as stated, $8. Mr. J. H. Neff, the president of the California State Miners' Association, is the general manager of the company, which employs sixty men, and has a mile of paying channel at Iowa Hill, opened by a tunnel three-quarters of a mile in length. The gravel is run through a 10-stamp mill, about 750 cars being daily worked.

From French gulch, twenty miles northwest of Redding, a strike is reported at the Milkmaid mine of free gold going $300 to the ton the width of the ledge.

At Blue Canyon the Lost Camp, a hydraulic mine, has a permit and is running. The owners are building a restraining dam in the American river. The Red Stone quartz mine is running a 10-stamp mill, netting $2 a ton on the rock they crush. The Doris mine is working a large crew and making a good showing.

(Special Correspondence).—The Big Dipper Mining Company has recently developed an extensive body of gravel at their property near Iowa Hill. No. 16 upraise, 3000 feet from the mouth of the tunnel, discovered a large body of gravel extending in a northerly direction as well as southerly and back along the line of the old works, but considerably to the east thereof. There is reason to believe that this body of gravel extends some 1600 feet to the south, paralleling the old works and separated therefrom by a high ridge of bedrock, this body of gravel being, however, on a higher level than that extracted from the old workings. A crosscut (and other drifts) from No. 16 upraise shows the gravel deposit to be 350 feet in width as far as developed, the east side not having been reached yet, however. The main bedrock tunnel has been driven 1000 feet north from No. 16 upraise. From this piece of tunnel several more upraises will be made shortly, and it is estimated that five months' further work will open up ground which will, with the present milling capacity, require six years to extract. Two years' work is at present in sight. It is necessary to extract 950 cars of gravel (of 2250 lbs. each) per week in order to keep the 10-stamp mill running continuously. This gravel, together with 150 cars of waste per week, is trammed by one man and one horse on each shift of 10 hours. The machinery plant consists of a 10-stamp mill (1050-lb. stamps), assisted by a rock crusher (the gravel being sufficiently cemented to require milling) and a 4-drill air compressor. The main tunnel has recently been driven by two 3-inch Ingersoll drill machines, working on eight-hour shifts, at the rate of 250 feet per month. The power plant consists of ditch, pipe line and Pelton waterwheels, together with a boiler for use in the dry season. About eighty men are at present employed by the company. The Big Dipper mine is located on the same ancient channel that was so successfully worked at Iowa Hill and Wisconsin Hill, and from which the Morning Star Mining Company is now extracting gravel. The piece of channel between the old Wisconsin Hill diggings and the Morning Star mine is now being worked through a bedrock drain tunnel by the Big Dipper Mining Company. The Big Dipper mine was ably superintended from January 1, 1895, to July 1, 1897, by George D. Blood, a graduate from the mining department of the University of California, who resigned to enter new lines in the mining industry, and is now in charge of the secretary and general manager of the company, Seymour Waterhouse, assisted by the foreman, F. H. Schulze.

Iowa Hill, Aug. 12th.

Sentinel: At the Occidental mine twelve men are employed. Wm. Cameron is superintendent. Depth of shaft, 341 feet.

The Eureka Drift Mining Company have reached the 68-foot mark in the upraise. The ground is very wet and they hope to strike gravel soon. This property is located above Forest Hill on the main divide.

E. W. Chapman, in the interest of the Bear River Hydraulic Mining Company, has bonded river claims from a point opposite Colfax, on Bear river, to Dutch Flat, a distance of nine miles. The claims are the Monte Rio, Ophir and other properties. A survey will immediately be made to convey water by means of a two-mile ditch from the South Yuba canal, near Cape Horn, to a hydraulic elevator at the river. The company hope to be able to operate next season.

Plumas.

Davis & Shepman of San Francisco have an option on the Phœnix, East Phœnix and Johnny Bull quartz mines, at the head of North canyon, for $20,000, the first payment of one-third to be made Feb. 1, 1898.

There is no mill running in the Genessee district, but a good deal of prospecting is being done there. On Grizzly creek there was much activity this spring in the gravel mines. Between Genessee and Indian valley the Taylor diggings are attracting attention. A dam is to be built across the outlet of Taylor lake and men are at work extending a ditch from the lake to the mine. G. P. Cornell tells the Oroville *Register* that sixteen stamps are running at the Crescent mill, five stamps on the Johnnie Bull mine, fifteen stamps in the Standard and McGill mine and ten in the Treleven mine. On the North Fork nearly all the gravel mines are active.

Fifty men are employed in the Eureka mine. Work is being pushed in the Little Jamison mine and ten more stamps are being added to the mill.

There are more men now prospecting for mines in Plumas than there has been for the past twenty years.

Independent: Thomas and Orr struck good pay last week on Emigrant Hill in which they sank a shaft into gravel and took out $50 for the first day's washing.

Riverside.

At Gavilan, the English company's shaft is down 265 feet, with a 5-foot vein. About forty men are employed.

San Diego.

It is credibly stated that S. W. Dorsey is about to build a 100-ton stamp mill at his Picacho mines, and contemplates building a railway thence to the Colorado river.

(Special Correspondence).—A large body of auriferous stibnite ore has been discovered in the Laguna mountains, sixty-five miles east of San Diego. It has an assay value of over 65 per cent in antimony and about $8 in gold per ton.

Quite a valuable find is the discovery "below the line," in Lower California, of two veins or ledges of manganese ore. The smaller vein is 3 feet wide at the surface and traceable readily for more than a mile. A good surface specimen assayed 57 per cent metallic manganese. It is soon to be opened up.

A report comes from the Jacumba valley, eighty miles easterly from San Diego, of the finding of a vein of galena ore 12 inches in width on top, an assay of surface ore from which yielded upwards of 4000 ounces silver per ton. It is being investigated.

San Diego, Cal., Aug. 10 '97.

Shasta.

At Sunny Hill the tunnel is in 700 feet, and an advance of 500 feet is being made.

Sierra.

The Shady Flat mine has been shut down. The Mountaineer mine has discontinued operations for the present. The Gold Valley mine has been attached and closed down by the employes.

Most of the hydraulic mines are closing for the season; the drift mines are in operation and turning out well.

The Ante Up and Brush creek mines are again active. A shaft is being sunk on each; grading and building a flume goes on; twenty-four men are employed.

The Thistle shaft is now unwatered.

The *Mountain Messenger* reports that at Deer creek, near Bassett's station, a company of six cleaned up 190 ounces of gold after a six weeks' run.

Siskiyou.

Journal: Coburn & Morrison have ten men at work at the Little Queen mine in Quartz valley.

The McKinley mine in Quartz valley has been closed down, as the expense of getting the ore to a mill is too heavy. All the profit is taken away by the time the clean-up is had. The owners of the mine are thinking of putting a mill on the property.

The Klamath River Flume and Mining Company will develop their property on an extensive scale

Journal: The copper ore in the Butteville mining district assays 31 per cent in copper, $22.60 per ton in gold. Dale Bros. are in about 40 feet in the lower tunnel, and have a big body of ore in sight. The ledge is estimated to be about 20 feet in width.

L. D. McArdle has a party at Klamath Chief group of mines, running lines for a four-mile ditch, through which water will be brought to the property from Coon creek and Wyman creek in time for the winter run of water. This is the property that T. J. Nolton recently sold to C. Hutchinson of Chicago.

The Klamath river miners of Honolulu district are working their claims energetically, this being the harvest time in taking out gold while the river is low and until winter storms commence again. On the upper Klamath, above Shasta river, work is also rushed with full force of hands, and the same may be said of claims on the lower Klamath from Oak Bar down to mouth of Scott river and Hamburgh.

Trinity.

A dispatch from Redding, dated August 11th, says the gold excitement was revived with renewed vigor here to-night by the receipt of news from Coffee Creek to the effect that $40,000 more of gold dust and nuggets was taken out yesterday afternoon from the pocket out of which the Graves brothers took their $42,000 last Saturday. They left in charge of their claim a man named Carter, who at one time was a partner in the claim, and Carter proceeded to work the claim as soon as the Graves boys left, and late yesterday afternoon he encountered another pocket and in less than five hours took out about an even $40,000.

There is plenty of gold in sight and all indications point to the taking out of a million from that single vein.

Another dispatch of the 12th says that news has just reached this city by private source of another exceedingly rich discovery of gold on Morrison gulch, about two miles from the scene of the Graves brothers' discovery. It is said $18,000 was taken out this afternoon, and that two miners, whose names are not known here at present, are taking out gold on an average of $40 to the pan. This strike is on the same vein of the Graves Blue Jay claim and is supposed to be an extension of the same.

The Paulsen hydraulic mines and Dutton's creek placer mines extending along the Trinity river from Douglass City, seven miles from Weaverville, to Lowden's ranch, about eight miles in length and comprising 1400 acres of territory, are under investigation by men representing English capital.

The *Journal* reports that D. C. Dedrick on the Chloride and Bailey mines, struck the ledge in the Chloride at a depth of 200 feet with a crosscut tunnel. The vein where cut was from 3 to 5 feet in width; the quartz is dark in color, carrying free gold and sulphurets, and is of a hard character. From careful tests it will easily go $50 a ton.

The Chloride and Bailey groups comprise sixteen locations. The main work has been done upon the Chloride location and the Bailey location, thousands of dollars have been expended in developing the mines and many thousands taken out.

Tuolumne.

At Saw Mill Flat there is a mine owned by Colin & Graham, in which the gold is a powder, so light that the wind can blow it like dust. It is 20.35 fine and is contained in cells in the quartz like honey in the comb. When the vein is blasted pans are held under the quartz to catch the gold as it falls from the shattered cells. In other places the gold is coarse and solid in the rock.

Carrigan & Co. of San Francisco have bonded the Lost Fox for $14,000 and will develop it. Meek & McGilvray are working 25 men at the Lady Washington. The shaft in the Green mine is unwatered and will be sunk deeper. The Mt. Vernon and Excelsior are also being reopened.

Sonora *Democrat*: J. and D. Coles have an option on the Stokes mine.

At the Porto Fino the vein has milled from $25 to $50 per ton, exclusive of sulphurets.

Supt. J. Tonkins is driving a tunnel to tap the Blue Lead. The rock is extremely hard, and it will require five months more.

The Buchanan mine will soon reopen, with J. E. Donohue as superintendent. When the water has been lowered below the 350 level drifting will begin at this point and a new shaft started 200 feet below the old one.

It is rumored that the Old Donila has been bonded by B. and T. Soulsby for $250,000.

The Andy Johnson mine at Chinese Camp will shortly be reopened by San Francisco men.

Yuba.

At Brown's Valley, the Webb Company have reached a depth of 930 feet on the Dannebrog shaft and are cutting a station at the 900-level preparatory to drifting east and west. The ledge in the bottom is 5 feet and, says the *Appeal*, has all appearances of permanency and good value. Twenty stamps are running night and day.

On the Hawkeye the Webb Company are down 50 feet vertically with a nice ledge in the bottom which shows free gold. From the bottom of the shaft the company is drifting on the ledge.

The water in the Pennsylvania is out to the 600-foot mark and the pumps are lowering it at the rate of about 20 feet per shift. From about the 400-level the company is drifting on the hanging wall up towards the Dannebrog.

NEVADA.

LANDER COUNTY.

Col. R. S. Thorp of Lewis district has started up his mill and has over 1000 tons of ore, chiefly silver, on hand. E. W. Brownell of Austin is the superintendent of the concentrator, which was constructed from the first ten stamps of a 40-stamp mill.

LYON COUNTY.

The Boston Nevada Copper Co.'s smelter in Mason valley will be completed this week. They have sunk 120 feet, struck water and stopped sinking until a hoisting works and pumping plant can be put up. On the McConnell claim three shifts are being worked, four men on a shift.

WHITE PINE COUNTY.

The new cyanide plant of the North Mountain M. & M. Co. at Cherry creek started on its initial run a week ago under the inspection of William Orr. To all appearances everything was successful on the start. C. T. Brant

has taken charge of the mill. The capacity of the plant is fifty tons.

STOREY COUNTY.

The Con. Cal. & Va. has arranged with the Kinkead Mill Company to work 100 tons of low-grade ore, assaying $11 per ton.

OREGON.

The Miller ledge and adjoining claims on Soldier creek, southern Oregon, have been sold to Simpson & Co. of Eureka, Cal., for $28,000.

BAKER COUNTY.

The Eastern purchasers of the Don Juan mine, Robinsonville district, are building another 10-stamp mill. The mine is being given scientific development. The 10-stamp mill which has been on the property and in operation for a year past continues work on rich ore. Thirty men are employed in the mine and on top.

The copper mines in Josephine county are started again. Mr. Keller is superintendent and A. W. McKeen foreman. Twelve men are employed.

W. J. Connors of Denver has bought of H., J. D. and F. E. Cabell the California mine for $30,000, full payment to be made inside of eighteen months and a 10-stamp mill operating by Dec. 1, '97. Six tunnels from different levels have reached one vein, showing an ore chute of 800 feet, with an ore body 2 feet wide.

WASHINGTON.

D. Hart, from the Okanogan, Spokane, has six gold bricks, the result of a 13-day run of a 10-stamp mill near Oro on ore from the Triune mine. The gold is 17 carat, and each brick is valued at $300.

BRITISH COLUMBIA.

W. E. Hall, superintendent Le Roi mine, Rossland, employs 180 men, hoisting 250 tons of ore daily. The daily output will be increased to 350 tons. The ore now goes to the Trail smelter. Developments are now being made on the 450, 500 and 600-foot levels. On the 600-foot level a crosscut at the bottom of the shaft shows 15 feet of solid ore.

During July 380 certificates of work were issued in Trail Creek, representing $38,000 worth of work done on claims. Two hundred and ninety-nine locations were recorded during the same period; 175 companies paid the license fee required by the new mining law, $17,250 revenue being obtained from this source.

The Rossland *Miner* reports that the California mine has been sold in Quebec. The property was purchased in the spring of 1896 by R. H. Pope and others, and a company organized with $3,000,000 capital. A limited amount of work was done when there was a shut down.

The 10-stamp mill at the Horse Fly hydraulic mine, Cariboo, which has been in course of construction for three months, has been started. The mill has ten stamps of 850 pounds, and crushes 120 tons of cemented gravel every twenty-four hours. It will be run by water power during the summer and by steam during the winter.

The Wonderful Group Mining Company on July 31st received a check from the Tacoma Smelting & Refining Company for $1544.47, returns from nineteen tons of ore, which assayed 70 per cent lead and 123 ounces in silver, and netted, exclusive of duty, $90.92 per ton. On August 3rd they received from the Kootenay Ore Company of Kaslo, B. C., a check for $1051.28, returns from fourteen tons of ore, which assayed 73 per cent lead and 124 ounces of silver, and netted, exclusive of duty, $92.55 per ton. The duty and customs on these two shipments amounted to $535.62.

The New York syndicate which bonded the Maud Hydraulic Mining Company's claim on the Quesnelle river some time ago for $100,000 and paid $5000 down, made a proposition to the company to pay a further sum of $5000 cash and renew the option till Jan. 1, '98, which was accepted.

(Special Correspondence).—There is very little excitement in Vancouver over the Klondike fever. Scarcely a dozen persons have left here for the faraway gold fields. This, however, cannot be said of Victoria. Large numbers are leaving there by every steamer.

Victorians are very indignant over the mass meeting at Seattle, which selected a committee to urge upon the United States Government the advisability of refusing bonding privileges to Canadians going to the Yukon in exchange for the duty imposed upon Americans for taking necessaries to existence into the country. Victorians say that as sure as the United States Government accedes to the request of Seattleites they will ask the Canadian Government to refuse bonding privileges to Americans going into Alaska.

Three crushing mills will soon be running—the 20-stamp mill at the Fairview, Okanogan, on the Tinhorn Company site, September 15th; the 10-stamp mill at the Golden Cache site, Lillooet, September 15th; and the 10-stamp mill at the Fire Mountain mine site, Harrison lake, near Westminster. If these companies save what they claim they will on the plates they will all be paying dividends, and the boom that will strike the seaboard will be more far-reaching in its beneficial results than the Klondike craze.

Vancouver, B. C., August 10, '97.

Ashcroft *Mining Journal*: At Quesnelle the M. & M. Company have shut down, owing to a shortage of water, for the season. The managers do not give out the output for the season. The mine is being worked at a disadvantage, owing to a limited water supply.

The Sydney Gold Mining Company have moved their scows up the river a few miles and will test their machinery pretty thoroughly before attempting the difficult trip through to Smoky river, where they have a large tract of dredging ground.

The dredger now in operation on the Quesnelle river, it is stated, will again try to work the river bed by a suction pump. Reports so far have been encouraging about the results of a dipper used. There is rich ground on the part of the Quesnelle where the dredge now is and if yards of gravel enough can be moved the work should be a success.

UTAH.

A modern mill of forty tons daily capacity for the concentration of its ores is to be erected at the Crystal mine, at Marysville.

Tribune: The Daisy group, on the Mercur West Dip, is to be incorporated. Preliminary arrangements have been made for the construction of a 200-ton mill, and it is the intention to have it completed and in operation on 100 tons a day by Dec. 1st. The new project will depend for power on the Telluride Power Company, which is under contract to furnish current for Capt. De Lamar's Golden Gate mill.

Record: At present the outlook for Park City is not very bright. Its only reliance for support is silver mining. That industry is practically killed, for only mines whose ores carry a heavy percentage of lead can be worked at a profit. There is but one such mine—the Silver King—in Park City. The Anchor never has paid, and with silver at its present price, it is very doubtful if it can be made to pay, even with the improved concentrating machinery the company is putting in. The silver-lead ores of the Daly West are not of as high grade as those of the King, and there is no hope of that property starting up until conditions change. The bulk of the Ontario ores is milling, and if the price of silver continues to drop that great property will soon have to follow the example of its sister, the Daly, which has already closed. That is the situation in Park City.

IDAHO.

R. J. Anderson of Boise has made the final payments on the placer property on Boise river purchased by the Twin Springs Company for $22,000. The claims purchased embrace about 1000 acres at different points along the river for twenty-two miles.

The Bond mill, the pioneer quartz mill of the Oro Fino, moved from its original location last fall, is owned by the Crescent Mining Company, Pierce City, who own five claims, all on the same lead. The vein runs 12 to 18 inches wide, free milling.

At Wardner, Idaho, the Bunker Hill and Sullivan has laid off most of the men while the mill is being overhauled.

At Kingston, H. W. Wheeler, president of the Idaho Antimony Mining Company, calculates starting the mill September 1st, and will concentrate the ore by heat instead of by machinery. The concentrates run about 80 per cent antimony. The capacity of the present plant is only 10 tons daily.

The lead crops along the west bank of Pine creek, lying less than 30 degrees from the horizontal, and is of unknown extent. During the old work an incline was run on it 170 feet into the hill. No other antimony in anything approaching paying quantities is known anywhere in the Cœur d'Alenes.

MONTANA.

Owing to the continued low price of silver the Alice mine, the oldest in Butte, has closed down, and others will follow.

The directors of the Montana Mining Company state that in July the 50-stamp mill crushed 3,320 tons of ore, which contained gold 1700 ounces, and silver 9480 ounces; estimated realizable value $39,300; expenditure—working expenses on revenue account, $26,400; outlay on developments, $6000; other, $300; total, $32,700; net result, $6600 for the month.

The Anaconda Copper Mining Company is developing its properties in every direction, says the *Miner*. Shafts are deepened, crosscuts and drifts extended, larger hoists put in, higher head frames erected, larger shaft houses built, while the usual quantity of ore, 5000 to 6000 tons, is produced daily. At the Buffalo sinking is in progress below the 800-foot level. At the Green Mountain a large new engine for sinking is in place on the 1400-foot level. About 700 tons of ore are hoisted daily. At the High Ore drifting is in progress to connect with the Mountain Consolidated, about a mile west. At the Mountain Consolidated No. 2 the shaft is down to the 1500-foot level. A new double-cylinder hoist 15x36 inches, manufactured by the Union Iron Works of San Francisco, is ready to be lowered into the mine, to be placed on the bottom level and used for sinking and development purposes. The new hoisting engine, Aztec, designed by the company's employes, has been in continuous operation about six months, hoisting on some occasions 600 tons of ore from a depth of 800 to 1400 feet, besides waste, timber and men, in eight hours, and could, if necessary, hoist much more; it is considered an economical steam user, and will hoist a four-deck loaded cage from a depth of 1200 feet with less than fifty pounds of steam pressure. At the St. Lawrence a new hoist 30x72 inches, high pressure double cylinder, manufactured also by the Union Iron Works, is almost completed. The roof of the shaft house is partly taken off, preparatory to putting up a higher head frame. The vein on the bottom, 1300 to 1400 feet deep, of the Anaconda, Never Sweat and St. Lawrence is in places over 100 feet wide, all ore, with some of it high grade.

SOUTH DAKOTA.

On the A. J. Smith group of claims in Ragged Top a body of ore assaying $1048 per ton in gold has been uncovered. The find has served to allay the Klondike fever.

WYOMING.

P. Steel has made a strike on Rock creek, half a mile west of Atlantic, from which he took two yeast powder cans of gold in one hour, which weighed $1200. The gold was in a small pocket near the surface.

Cheyenne *Tribune*: The Big Horn Placer Mining Co. begins active work on its placers near Hahn's peak next Monday. This company has spent $100,000 in getting water on the ground. A ditch eighteen miles long and a mile of steel pipe line have been built. The company expects to run from three to five giants during the summer. The ground to be worked is on Independence mountain, adjoining Hahn's peak. The values are said to average $1 per yard. With the arrangements made it is expected to average about 1500 yards of ground per day

COLORADO.

The new schedule for treating Cripple Creek ores at one of the mills is as follows, with no preference for oxidized ores: $10 ore, $7.25, treatment charge; $12.50 ore, $7.50; $15, $7.75; $18.50, $8.25; $20, $8.75; $25, $9.50; $30, $10.50; $35, $11; $40, $12. The rest of the millmen are fighting the cut.

The Telluride Power Transmission Company is installing a new Westinghouse motor in the works recently erected just below the Smuggler-Union 50-stamp mill at Pandora, to treat the Smuggler-Union tailings, by A. G. Kirby, says the Telluride *Journal*. The treatment consists mainly of running the tailings over a series of incline tables covered with canvas, the metals settling on the canvas and the silica and light matter passing over.

The annual meetings of the Anaconda and Victor mining companies, Colorado Springs, as reported by the *Telegraph*, show that no change was made in the board of directors of the Victor company. Superintendent N. H. Cone reported that development work is being carried on in the lower levels, the low grade ore being shipped to the cyanide plant of Florence. In these levels it was reported that very rich ore was being uncovered. The report of the working of the Victor mine shows the comparative shipments since 1893. In that year ore to the amount of $230,100 was shipped; in 1894, $202,229; in 1895, $480,000, and in 1896, $449,667. The monthly rate of dividend on the property has been $20,000, and the average number of men employed 120.

The directors of the Victor company are Eben Smith, R. H. Reid, G. E. Ross-Lewin, J. A. McClurg and William R. Brevot. The stock of the company consists of 200,000 shares, par value $5 each.

The report of the workings of the Anaconda property since 1893 shows the output in ore for each year to be: 1893, $51,000; 1894, $26,821; 1895, $120,000, and 1896, $185,000. The output fell off in 1894 because of the labor troubles in the district, since which time the returns have been steadily increasing, which is owing to the fact that low-grade ores have been successfully treated at the Florence cyanide plant. The directors of the Anaconda mine are David H. Moffat, David Rubidge, N. H. Cone, W. S. Jackson, Thomas Keeley, S. H. Reed and Eben Smith.

One of the largest air compressors made recently arrived at Telluride for the Tom Boy Gold Mines Company. At an ordinary altitude this compressor plant has a capacity of driving sixteen machine drills, but at the elevation the Tom Boy mine is situated—11,000 feet—it is calculated that it can only generate enough power to drive nine machine drills. The compressor was ordered for the purpose of expediting the development of the Tom Boy vein from the intersection of the mill tunnel crosscut which six weeks ago tapped it at a depth of 450 feet below the lowest of the upper workings.

At Cripple Creek the July output shows a total of $1,047,940, itemized as follows: Gillett reduction works, 1100 tons, averaging $30; value $33,000; all increase. Philadelphia smelter, 5000 tons, averaging $28; value $140,000. Brodie mill, 1690 tons, averaging $26; value $43,940. Metallic reduction works, 9500 tons, averaging $25; value $257,500: increase 1500 tons. Stamp mills, 1500 tons, averaging $10; value $15,000. Smelters, 8000 tons, averaging $70,000; value $560,000. Total tonnage, 267,090; increase over last month. Railway shipments—Midland, 450 cars of 9900 tons; F. & C. C., 1200 cars of 14,400 tons.

One of the numerous new cyanide mills being set up in the Rocky mountains this year is located at Summitville, and it will begin work this month. The superintendent says he has 5000 tons of $50 ore ready for it on the dump of the Aztec mine, besides enough ore in the mine to run a 30-ton mill three years. This certainly beats Klondike, says the Pueblo *Chieftain*.

Denver *Republican*: At Telluride A. H. Brown, Jr., superintendent Columbia-Menona M. & M. Co., is having development rushed; its 30-stamp mill is treating 100 tons ore every twenty-four hours, which yields ten to fifteen tons of concentrates on an average six ounces of gold, 300 to 400 ounces silver and 40 to 60 per cent lead per ton. There are over 100 men employed. The Columbia vein carries from 5 to 8 feet of ore, consisting of large streaks of gray and yellow copper decomposed quartz and prophyry it is easily mined. The mill is being principally supplied with mineral from the lower workings, where the quartz and prophyry streak assays as high as six ounces gold per ton.

NEW MEXICO.

The Hornbeck and Osberg mine, four miles northwest of Elizabethtown, has a lead 14 inches thick, which assays $3,625 per ton.

At Red River a contract was signed last week by the agent of a St. Louis house for the erection of a 25-ton stamp mill and a new chemical patented process for treating ores, whereby it is claimed that a large percentage of mineral, wasted in other plants, will be saved. It is claimed that this is an entirely new invention and hitherto unknown to mining men. It will be erected for the Challenge, Gold Hill and Iron Bird, and will be located near Hemitite, a camp about eight miles east of Red River. The contract specifies that the plant shall be in operation within ninety days.

An 80-horse power steam hoist is being erected at the Montezuma placer, and the force of men employed has been largely increased. Water is in abundance, and that part of the district is perhaps the most thriving at present, although further down the river, west of Red River, and as far as the Columbine, great activity is being shown.

ARIZONA.

At the King of Arizona, two shifts are taking out high-grade ore. The last mill-run of five days gave a $3000 brick.

At Phœnix the Bay Horse Mining Company—capital stock $125,000, $200,000 paid up, R. Garvey, J. A. Stevenson and F. H. Keith of Los Angeles—and the Laurel Mountain Mining Company, Los Angeles—capital stock $1,000,000, $805,000 subscribed, H. H. Laflin, O. J. Weber, H. M. Weaver, J. R. Manning, J. L. Stanley, D. O. Donoghue, G. S. Stewart, P. J. Holloway—have incorporated.

The Consolidated Copper, Gold & Silver Mining Company was incorporated at St. Louis, Mo., by S. and C. H. Peck, T. Randall Jr., J. W. Wallace, J. H. Canavan; capital stock, 300,000 shares, $5 each. The company's mines are in the Silver Reef mining district, fourteen miles below Casa Grande. The property was bonded last January, and the development work since done upon it, under the direction of Mr. Canavan, is said to more than realize expectations. Thomas Rankin is secretary and J. H. Canavan superintendent of the mines.

Farrell & Migeon vs. Arizona Copper Company is the title of a suit filed in Graham. The plaintiffs allege that the defendant has been using converters at their plant in Clifton embodying a process of converting copper matte into commercial copper on which there is a patent, and that they are the exclusive agents in the United States. The complaint states further that the process was patented by Pierre Mauhes, of Lyons, France, and patent papers were issued first in the United States July 21, '91. The complaint prays for an injunction to stop the using of this process until the case can be settled.

MEXICO.

The Copper Queen Company of Bisbee, Arizona, have purchased the Narcasori mines in Sonora.

The dredging boat for sluice mining recently put upon the Yaqui at San Antonio de la Huerta, by Wm. Schuckman and associates, was obliged to suspend operations by high water in the river before it had fairly commenced running. In the course of a few weeks the waters will subside and then work will be prosecuted with vigor.

Gold and copper are reported discovered in the Ajo mountains in Sonora. The district lies in angle formed by the Bisbee, Nacosari and Cananea copper mines. The claims already located in the Ajo district lie about 120 miles from Nogales and seventy miles from Bisbee. The formation is porphyry and lime.

The Santa Rosalia mine, owned by John Daggett and other San Franciscans, has declared another monthly dividend of 10 cents per share, a total of $10,000. The east drift has been advanced to 60 feet and the face is still in ore. The entire drift on both sides of the shaft is in ore—a distance of 180 feet.

VENEZUELA.

The Orinoco Company, of Faribault, Minn., owners of a 14,000,000 acre concession in Venezuela, has leased to J. E. Searles and others iron mines on the Orinoco river at a royalty of 12½ cents a ton with a minimum output of 500,000 tons. The lessees stated that they will mine 3,000,000 tons a year.

SOUTH AFRICA.

The directors' report to shareholders of the Bobinson mine, Johannesburg, for May contains the following:—Mine—Quartz mined, 15,186 tons. Development—Drives, 633 feet; rises, 203 feet; crosscuts, 357 feet; total, 1,193 feet. Mill—Stamps at work, 120; net running time, 29¼ days; tons crushed, 15,186 tons; tons per stamp per diem, 4.3 tons; gold won from above, 10,800 ozs 12 dwts. Chlorination and Cyanide Works.—Gold won from own concentrates (by chlorination), 977 ozs 0 dwts; bullion from tailings (cyanide process), 2,656 ozs 18 dwts; bullion from slimes (recovered by Rand Central Ore Reduction Co., Ltd.), estimated, 1,020 ozs—total from own ore, 15,454 ozs 10 dwts; gold from concentrates purchased (by chlorination), 5,784 ozs 9 dwt—total, 21,238 ozs 19 dwts. Production for June:—Mill—120 stamps at work; 14,980 tons of ore crushed; yielded in smelted gold, 10,076 ozs. From concentrates (by chlorination), 960 ozs; from tailings (cyanide process), 3,566 ozs; from slimes, 2,981 ozs; from own ore, 17,583 ozs; from concentrates bought (by chlorination), 5,412 ozs; total gold recovered, 22,995 ozs; profit for the month, £35,000.

The total June crushing on the Rand was the record one of 251,529 ozs, against 193,640 ozs in the corresponding month of last year.

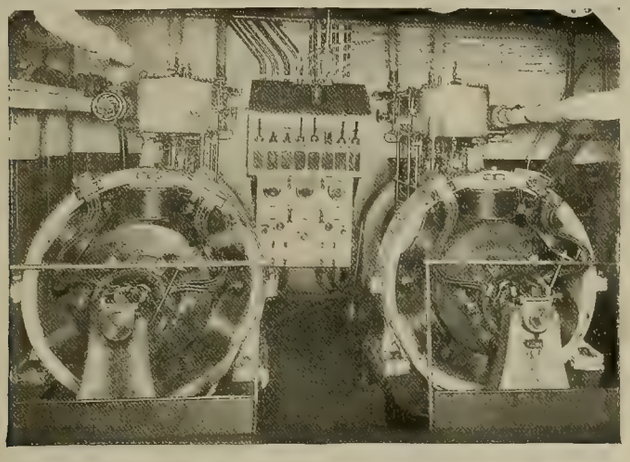
The Wemmer directors' report for May: Profit for month, £8050 1s 9d. Capital Expenditure—Development (398 ft. driven, sunk and risen), £1422 13s 3d; No. 2 new main shaft, 57 ft., £984 4s 5d; No. 2 new main shaft equipment, £1561 19s 8d; buildings and improvements, £180 16s 2d; machinery and plant, £1052 16s 4d; reservoirs and dams, £298 3s 11d; total, £5500 13s 9d—less development redemption, £2376 10s—£3124 3s 9d. Output—Mill, 3532.65 ozs.; cyanide works, 884.15 ozs.; concentrates (estimated), 920 ozs.; total, 5336.80 ozs. Crushed during the month—South Reef, 3352.22 tons, 49.37 per cent; Main Reef Leader, 3437.78 tons, 50.63 per cent. Mining and development—Feet driven, sunk and risen, 398 ft.; ore opened up by development, 11,536 tons; ore mined, 8049 tons; clean ore for the mill, 6425 tons; waste picked out (20.18 per cent), 1624 tons. Reduction—50 stamps ran 29 days 12 hours 49 minutes; ore milled, 6790 tons; duty per stamp per day, 4.6 tons; yield of bar gold, 3532.65 ozs.; yield per ton crushed, 10.4 dwts. Cyaniding—Tailings treated, 4500 tons; yield of bullion, 884.15 ozs.; yield per ton treated, 3.929 dwts. Concentration—Tonnage caught, 160 tons; average assay value, 5.75 ozs.; fine gold per ton of ore milled, 2.709 dwts. Yield (fine gold) per ton treated—By amalgamation, 9.029 dwts; by concentration, 2.709 dwts; by cyanide, 3.123 dwts; total extraction per ton, 14.861 dwts.

Electrical Progress.

Marine Electrical Equipment.

The steamship Bremen of the North German Lloyd line, which recently made her first transatlantic trip, is, perhaps, more fully equipped electrically than any other vessel of the merchant marine in the world. Aside from the usual electric lighting plant, she has a very complete and most novel power plant, the successful operation of which is now fully conceded.

The first power installations on the steamers of the North German Lloyd, were made by the Union Electricitats Gesellshaft of Berlin, the German ally of the General Electric Co, of Schenectady, N. Y., on the steamships Darmastadt and Prinz Heinrich; in these two cases the familiar and noisy donkey engine were superseded by electrically operated winches and it was the successful operation of these that determined the North German Lloyd to extend the use of electricity to the Bremen. In this case, however, in lieu of winches, a full equipment of electric cranes was installed. These cranes are sixteen in number, eight on the starboard side of the vessel and eight on the port side. Four of these have a capacity of 3000 kilograms, or 6614 pounds, and twelve of 1500 kilograms, or 3307 pounds, and have a total swing outboard of 20½ feet.



STARBOARD DYNAMOS, 75 K. W. EACH, STEAMSHIP BREMEN.

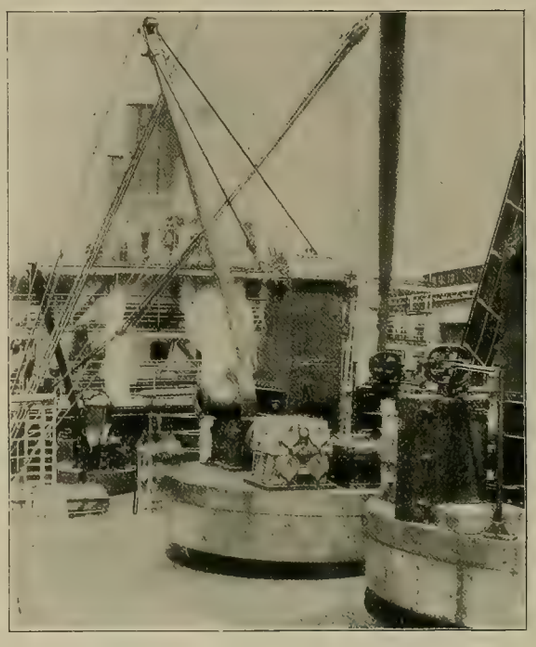
The power-generating plant is located in the after portion of the engine room and consists of four dynamos each directly connected to its own engine. Two of these are placed on the starboard side and two on the port side. The dynamos have each a capacity of 75 kilowatts, or 100 H. P., and run at a speed of 210 revolutions per minute delivering current at a pressure of 105 volts. The output of two dynamos is used for the cranes; one is used for the lighting of the ship, and the fourth dynamo is held in reserve in case of accident or other emergency. The engines are of the triple expansion type and were built by Schichau of Elbing, near Danzig.

The most notable feature of the electrical equipment is the cranes, the lighting installation conforming to the standard practice. In designing the cranes, the principal requirements specified and obtained were as follows: The load should be lifted smoothly; the resistance should be so arranged that the various speeds of the motors should be obtained without too apparent and sudden change; the control of the different motions should be instantaneous and positive, these motions to be effected in the smallest possible space; the cranes to be compact and contain the smallest possible number of parts; the controlling mechanism to be of the simplest to suit the class of operators likely to handle them; and the electrical apparatus to be absolutely protected against changes of weather, inroads of dust and sea water and to be of such a nature as to withstand rough handling. In addition all conductors were to be carefully protected and the last consideration, but by no means the least, on a passenger carrying steamer destined to be constantly loading and unloading, the operation of the cranes was to be noiseless. In conforming to these requirements, the Union Electricitats Gesellshaft has produced what is the latest and a very decided innovation in a ship's equipment.

AFT DECK BREMEN, SHOWING EIGHT CRANES.

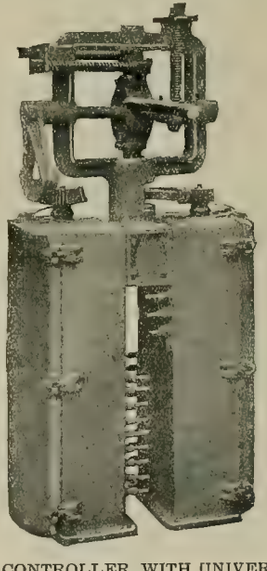
The cranes, motor and controlling mechanism are mounted upon a circular iron platform which revolves upon a pivot. This is turned by a motor of 7 H. P. running at 700 revolutions per minute, directly coupled to a worm gear which in turn meshes in a gearing bolted to the deck. The loads are raised by a 25 H. P. series motor, running at a speed of 900 revolutions, and driving a special worm gear meshing into the gear of the drum. On the gear end of the drum shaft is fitted a winch head.

The controllers resemble a double street car controller about 2 feet high.



CRANES SHOWING OPERATING HANDLE.

They are fitted with magnetic blowout, any spark being immediately extinguished in a magnetic field. The contract cylinders are operated by a special mechanism actuated by a simple handle or lever, the movements of which correspond to the movements of the load. Raising the handle raises the load, depressing the handle lowers the load and movement of the crane to the right or left is obtained by corresponding movements at the lever. Raising and swinging movements can be effected simultaneously. So simple are these operations that the dullest stevedore can handle these cranes with ease. Motors and controllers are water tight and dust tight but the cases of both can readily be opened when necessary. To give a more perfect control both motors are provided with band brakes operated by the foot.



THE CONTROLLER WITH UNIVERSAL GEAR.

These brakes are attached to an extension of the motor shaft.

The difference between the large and small cranes lies in the hoisting speed. Practically both cranes are identical in electrical equipment, but the hoisting speed of the 3000 kilogram crane at full load—60 feet per minute, is only half that of the 1500 kilogram crane at full load—120 feet per minute. The movement of the jib of the cranes is 13 feet per second.

The most remarkable feature of the cranes, however, is the absolute noiselessness of their operation. During the visit paid by the writer of this to the vessel, the whole eight starboar cranes,

four on the aft and four on the forward deck were engaged in discharging cargo. Had the operation of hoisting and lowering not been witnessed, it would have been difficult to detect the fact, had it been necessary to depend upon the ear. It is this feature that will recommend the electrical cranes to shipbuilders, especially those of passenger steamers in such trades as that of the Mediterranean, where loading and discharging is effected at every port, and great credit is due the North German Lloyd Steamship Co. for first effecting this great innovation.

Scientific Progress.

Electro-Deposition and Recovery of Gold.

Zinc was the only medium used for separating gold from its cyanide solution until the electrolytic method was applied. Although the electro deposition of gold seems to be a simple matter, yet when it comes to treating 100 to 150 tons of a very weak solution of cyanide containing a very small proportion of gold, it presents many difficulties, not the least of which is the selection of a proper material to be used for construction of the anodes. All nitrate, without exception, appears to dissolve at the positive pole in a cyanide solution, although iron seems to resist the action to a certain extent. Carbon is also attached. The author has found an anode which is neither a metal nor carbon, and which seems to resist the action taking place at the positive pole in a cyanide electrolyte, and does not decompose or spoil the solution. These anodes consist of lead plates covered by a coating of peroxide of lead. They are made by placing the plates in a solution of plumbade of soda, in which they are rapidly coated with peroxide of lead, then withdrawn, washed, and placed in a strong cyanide of potassium solution, where under a heavy current, they become hard and leave a good crystalline appearance. As cathodes, he uses iron plates, since gold adheres better to iron and steel than to any other metal, and recovers the gold by dipping the iron plates for about one minute in a bath of molten lead or bismuth kept at the proper temperature. An alloy is at once formed which becomes richer and richer in gold, and which can easily be cupelled yielding the bullion in an absolutely pure condition.—E. Andreon in Journal of Society of Chemical Industry.

In the Welsbach and other bright incancescent lights the oxides for the mantles must be chosen with great care, as well as must their proportions, to attain a maximum brilliancy. The best results are reached with about 99 per cent of thoria and 1 per cent of ceria. The presence of any other of the rare earths does not improve the light, and a greater or lesser proportion of ceria is detrimental. "Russium" nitrate, the use of which has been recommended in the place of cerium, proved in one case to be a mixture of thorium nitrate with much cerium nitrate, and in another case to be a mixture of cerium and ammonium nitrates. "Lucium" oxide is impure yttria. The best source of thoria is monazite sand, and the price of thorium nitrate has fallen from $500 per kilo at the opening of 1895 to $5 at present. The cause of the low price is competition, and there is no probability that the supply will diminish. The source of the cerium is the by-products of thorium manufacture, and the price of its nitrate is $50 per kilo. The bath for saturating the mantle is a 30 per cent aqueous solution of thorium and cerium nitrates in the proportion of 99 : 1.

Prof. Roentgen finds that the X-ray, traversing a slit in metal and impinging on the eye, can produce retinal fluorescence and an image of the slit. From this it may be inferred that by substituting a thin metal disc (having a radial slit) for the ordinary telegraph needle many afflicted with permanent blindness may read the Morse alphabet as read by telegraph operators in the ordinary way. The possible importance of this observation is obvious.

In his latest observations, just communicated to the Berlin Academy, Prof. Roentgen finds that the X-rays emanate from the irradiated air in all directions, so that if they were visible the appearance would be that of a room filled with smoke and lighted up by a candle. When a plate impervious to the rays is placed in front of a fluorescent screen the barium platinocyanide still remains luminous, but the fluorescence disappears when the screen is surrounded by a thin cylinder of lead. The observation that the rays may be made visible, presumably by causing fluorescence of the retina, is confirmed. Our present knowledge of X-rays may be summed up by saying that the rays from a discharging apparatus are a mixture varying in absorbability and intensity; that the composition depends chiefly on the duration of the discharging current; that different bodies absorb different kinds of rays, and that the X-rays are produced by the cathode rays and the phenomena of both are probably of the same nature.

The experiment of producing light from household refuse, now being tried for the first time at Shoreditch, a London suburb, will be noted with interest. The refuse is burned in twelve destructor cells, each having a grate area of 25 square feet, and each pair heating a water tube boiler, which works at a pressure of 200 pounds. Suitable engines use the steam for driving three high and three low tension electric generators. The destructors are operated throughout the twenty-four hours, but, as the power is chiefly required for light, heat is stored by day by warming water to feed the boilers at night. The destructors are designed to burn 20,000 tons of refuse per annum. It is estimated that this will furnish electric light and power and warm baths for the 124,000 inhabitants of Shoreditch.

From scientific experiments upon more than 2000 persons, Dr. J. H. Kellogg of Battle Creek, Mich., has determined the effects of one ounce of alcohol administered internally to be the following: (1) To diminish nerve activity; (2) to diminish cerebral activity; (3) to impair the co-ordinating power of the brain; (4) to lessen muscular strength; (5) to decrease digestive activity to a notable extent. Both his medical experience and laboratory research have convinced him that it is an error to regard alcohol as an aid to digestion, as it has proven highly detrimental. This influence upon the digestion, he declares, is exactly what would be expected of a drug that, like alcohol, is a paralyzer of protoplasmic activity, an anæsthetic and a sedative, and not, as has been erroneously supposed, a stimulant.

To make a new magnesium light magnesium is placed between thin impenetrable sheets of paper, which are coated with paste. They are then stuck together. After drying, a sheet of paper impregnated with potassium chlorate is placed on each side of the package. For an envelope, a wider sheet of paper is placed about the packet, so that the whole forms a thick leaf or pad of paper, which can be cut with a pair of scissors into strips. To produce the light one of the strips is held in tongs and ignited, when it burns with a brilliant magnesium light. The magnesium paper prepared in this way is claimed to be durable and entirely free from danger.

G. Spezia contributes to the *Atti* of the Turin Academy an investigation on the action of water on quartz under pressure. Pfaff has shown, using quartz powder, that at 18° and 290 atmospheres' pressure one part of quartz dissolved in 4700 parts of water; using plates of quartz, Spezia finds that 25° and 1750 atmospheres (in one experiment 1850 atmospheres) in the space of over five months absolutely no quartz went into solution.

Mechanical Progress.

New Reduction Method.

A patent has been granted to Hiram Maxim for improvements in processes and apparatus for reducing metals from their ores, and for obtaining carbides, acetylene, cyanogen, cyanides, nitrides, and for fixing nitrogen. The principle involved is that of subjecting the materials to be treated to the action of a gaseous heating medium, which derives its heat from ordinary combustion and the heat of electrical energy. If desirable, the electrical superheater can be made to revolve. The primary heater is a circular flue, fixed in a furnace heated by the combustion of solid or gaseous fuel. Leaving this furnace, the heated reaction gases pass through the electrical superheater, which consists of two vertical chambers, packed with carbon blocks, fireclay, or other suitable materials. These are heated to a very high temperature by the passage of the electric current introduced through poles at the top and bottom of the heater. The reaction gases passing over the same are heated to the required temperature, and are ready to pass to the small furnace of the blast furnace type which forms part of the plant. These heated gases are introduced through a tuyere at the bottom of the furnace, into the top of which the material to be acted on is fed through a hopper and worm. Any excess of the reaction gas and the gaseous products of the reaction escape by a pipe to a holder, and when of a suitable character are drawn from thence as gaseous fuel for the primary heater. The blast furnace is charged with lime, carbon and potash, magnesium, etc., according to the desired product. The reaction gases are also varied accordingly. Thus, to make illuminating gas and carbide, steam and hydrogen or a hydrocarbon are used, the oxygen of the steam forming CO, and the hydrogen combining with the electrically-heated carbon to form acetylene. For cyanogen compounds nitrogen is employed, or, in conjunction with air, used to form nitrides. For treating ores a reducing gas, such as carbon monoxide, is produced. In making calcium carbide limestone is used, and carbon in sufficient excess to convert the CO^2 as liberated.

Analysis of Smoke.

At this time, when strong efforts are being made to dispense with such volumes of smoke in our American cities, experiments made in the laboratories of Sibley college are especially interesting. These experiments show that the usual figures for dense smoke per ton of fuel employed ranged from ten to twelve pounds of soot; of the latter, about one-half was carbon, the remainder principally unconsumed hydrocarbons, 10 to 15 per cent of ash, and, if collected outside of the furnace, perhaps 2 per cent of moisture. It was found that no smoke was ever produced in an atmosphere of oxygen. With restricted air supply the maximum just stated was obtainable; but low temperature combustion and restricted oxygen supply appeared to be the two main conditions favoring smoke production. Again, the composition of soot was found often to be substantially that of the coal from which it was produced. A reduction of the proportion of smoke made effects a reduction correspondingly and perhaps proportionately in the percentage of carbon contained in the soot. Thus, coal used at St. Louis was found to contain 50 per cent carbon and 36 per cent hydrocarbon, while its smoke contained 25 per cent carbon and 10 per cent hrdrocarbons. Where no hydrocarbons exist smoke cannot be produced by any fuel.

Railway tracks are found to be not absolutely stationary, but to be moved slightly, especially on steep descents, through the influence of the traffic over them. Austrian and French engineers report that the left-hand rail, seen in the direction of running, moves forward more than the right-hand one, while Egyptian engineers have an opposite experience. One explanation is that the cranks on the right side lead on European locomotives, and those on the left on the locomotives of Egypt.

Everlasting Paste.

Dissolve a teaspoonful of alum in a quart of water; when cold, stir in as much flour as will give it the consistency of cream, carefully beating up all lumps. Stir in half a teaspoonful of powdered resin, and pour on this mixture a teacupful of boiling water, stirring well. When it becomes thick pour into an earthen jar, cover, and keep in a cool place. When needed for use, take some from the stock, and soften with warm water. Paste thus made has been known to keep in good condition for at least twelve months, and can be made more pleasant by adding oil of cloves.

Manjak is a mineral substance recently found in the island of Barbadoes, which is used as an intensifier of the illuminating power of coal gas. Its importance to the electrician, however, lies in the fact that it possesses many of the properties of an ideal insulator for electric wires. It is black in color, and has a high luster and a bright, conchoidal fracture, resembling in appearance newly broken pitch. It is found very near and sometimes upon the surface of the ground, in seams varying from 1 foot to 2 feet in thickness, running usually at an angle of about 45 degrees, and in close proximity to rocks. It is supposed to have been formed by the drying up and consolidation of petroleum oil, which is found in abundance in the same localities, and is often seen oozing out of the ground or floating down the streams. In composition it is not unlike Trinidad pitch, the Utah gilsonite and the Mexican albertite. The analysis of the best quality manjak is stated to be: moisture 2, volatile organic matter 70.85, non-volatile organic matter 26.97 and mineral matter .18.

Experimental pipe-driving through new stone-filled cribwork is described in a paper recently read by Professor W. H. Burr before the American Society of Civil Engineers. Nineteen piles, from 52 feet to 60 feet long, which were shod with chilled cast-iron points held on by straps spiked to the wood, were driven without difficulty with a hammer weighing 3500 pounds. The greatest number of blows was 350, and there were no failures. In the discussion that followed other gentlemen gave experiences in pile-driving through loose rock. The shoe used in the work of the New York department is conical, the angle of the cone being about sixty degrees. The base of the cone is flat, and it is secured to the cone by a pin cast as part of the shoe and let into the end of the pile. Practice has proved this type of a shoe very satisfactory.

The life of a locomotive is not as long as generally supposed. Investigations in this direction recently made in Germany show that the average locomotive has to be withdrawn from service after traveling about 500,000 miles. This does not include the time the locomotive is under her own steam without pulling a train. During the period a locomotive is in service a number of parts have to be repaired or renewed. For instance, the boiler and fire-box have to be renewed three times, the tires of the wheels five or six times, the driving cranks from three to five times. After a half-million miles of active service the average locomotive is no more worth repairing and is entirely withdrawn.

Belts made too tight will cause friction to such an extent that it will consume all the power of the engine. Under a given load, it is wonderful to see how much power of resistance is in a good belt. It can be strained for months, and after a short period of rest it will return to its original strength and length.

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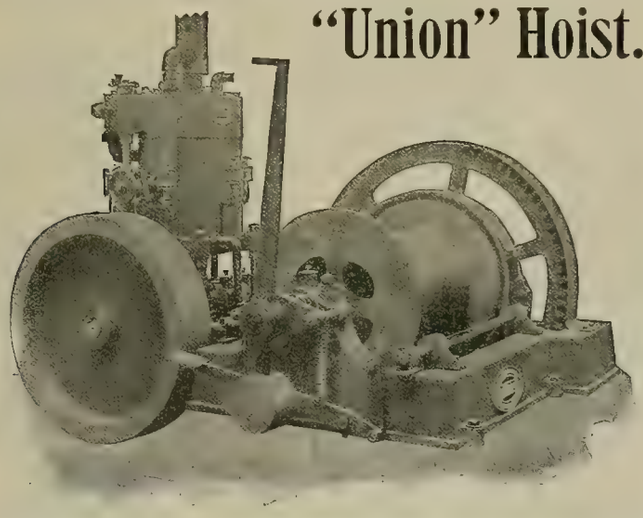

The above cut represents our 10 h. p. Double Cylinder Engine of latest type, and Hoist combined on strong iron base. This hoist is designed to raise one ton 125 feet per minute from an inclined shaft, or 1500 pounds at the same speed vertical lift. The drum will hold over 600 feet of ⅝-inch cable. The outfit weighs 3500 pounds.

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These wheels are durable, highly efficient, and are the only wheels which have perfect regulation, which feature makes them especially suitable for the operation of electric machinery.

Coast Industrial Notes.

—To date about 6000 have started from coast ports to the Yukon placers.

—The salmon pack in the Columbia river, Or., for the season of 1897 is estimated at 430,000 cases.

—The San Francisco cable and steam roads operated by the Market-street system are to be run by electricity.

—Silver is on the rise again, but for the present at least wheat and silver seem at last to have parted company.

—The wages of the lumbermen and mill hands in Shasta county, Cal., have been reduced from 10 to 25 per cent.

—San Francisco has the credit of being the only outfitting point that didn't raise the price of supplies to Klondikers.

—The Japanese section hands on the Oregon Short Line have struck because of a reduction of wages from $1.25 to $1.10 per day.

—The Thirtieth Industrial Exposition of the Mechanics' Institute opens at the Mechanics' Pavilion in San Francisco on the 17th.

—In King county, Washington, 350 coal miners receiving 55 cents per ton mined, have struck for 3000 pounds to the car regardless of its contents.

—Creditors of the California Lumber Company have applied to have the corporation declared insolvent. The liabilities are stated to be $40,000.

—The Los Angeles, Cal., Iron and Steel Works, which till recently gave employment to nearly 300 men, are soon to be reopened, backed by English capital.

—The tug Fearless has gone to Nanaimo to coal up, preparatory to towing from Seattle to San Francisco the big dredger for use in deepening the approaches to Mare Island.

—The new tariff has put a duty on asphalt, in order to stimulate developments of deposits in this country, which will check importations from Trinidad and be a good thing for California and Utah producers.

—Sea otter schooner hunters on the Washington coast have done well this season, four having so far netted $03,000. The sea otters yearly grow scarcer and warier; good skins are now rated in London at $1000 each.

—The Southern California Electric Light and Power Company of Redlands, Cal., has contracted with the Los Angeles Street Railway Company for power for the latter's lines for twenty years; least annual payment, $50,000; maximum payment, $150,000.

—The Siberian railroad is making new business for the Coast lumber interests. The Glenturret, 3026 tons, net register, now at Shanghai, is chartered to load lumber and ties at Astoria, Or., for Vladivostock. A cargo was shipped from Port Blakeley, Wash., in July for Shanghai.

—During the past week fifteen carloads of machinery and material were shipped over the Pacific Coast Railway for Zaca for the new asphaltum company lately established in northern Santa Barbara county, Cal. It is estimated that there will be over 250 carloads to be taken there altogether.

—The steamer Mexico of the Pacific Coast Steamship Company, shortly after leaving Sitka, Alaska, on her return trip to San Francisco on August 5, struck a rock and sank, a total loss. The passengers and crew were all saved. The baggage, freight, etc., went down with the steamer.

—J. N. Chapman of San Francisco has a contract from U. S. Surveyor-General Green to survey 210 miles of the outside boundaries of the Yosemite National Park and to re-establish the lines of the Yosemite grant. The price, $25 per mile, includes the erection of cast-iron posts filled with cement for corners and with suitable marks cast in the posts.

—It is reported at Port Townsend, Wash., that the Southern Pacific Railroad Company has secured control of the Port Townsend Southern Railroad and will complete a line through to connect with the Southern Pacific at Portland. The Port Townsend Southern is built from that place south twenty-eight miles. The road would tap the most heavily timbered section of country in western Washington.

—The fastest Transpacific ocean trip was made this month by the Royal Mail steamship Empress of Japan on her last voyage from Vancouver to Yokohama, the time consumed being ten days, three hours and thirty-nine minutes. The distance covered was 4270 knots. Heretofore the quickest passage was made by the Pacific Mail steamship China from San Francisco to Yokohama, in ten days, eleven hours and forty-eight minutes.

—C. R. Lloyd at Los Angeles, Cal., proposes to utilize the water of Bear creek to supply electric power, and has acquired the water rights above the head works of the Southern California Power Company. A diverting dam is to be built on Bear creek and the water conveyed in flumes and tunnels and piped to the junction of Bear creek and the Santa Ana, where the power house will be built. San Francisco capital is interested in the project.

—F. Erickson, the contractor for the building of the Sierra Railway, says that in thirty days the cars will be running to Montezuma, in Tuolumne county. The road starts from Oakdale. "The track is now laid and the cars running to Crimea House, a distance of 32½ miles," he says, "and we are rushing the work along at a rate never equaled in California railroading. I think it will go eventually to the big trees in Calaveras county. It will then be 110 miles long."

—The Oregon Pacific Railroad Company passed out of existence last week. The affairs of the road in Oregon, the original jurisdiction, were closed about three years ago, and the only assets left of the railroad company is a fund of $23,000, the proceeds of the sale of a steamer, and a dozen parties claim this sum. The road was projected to run from Yaquina bay, Or., to Boise City, Idaho. One hundred and fifty miles from Yaquina bay east were actually constructed, which cost $12,000,000, every dollar of which the bondholders lost, as the road sold for $100,000 at auction—hardly enough to cover the court costs. The trouble was no harbor at Yaquina.

—At the Los Alamitos, Cal., beet sugar factory the beets delivered average 18¼ per cent sugar, the highest being 26 2-10 per cent. Twenty-one tons per acre, at an average price of $4.50 per ton, give $94.50 per acre. The factory handles 350 tons of beets per day. The beets after being dug and topped are delivered to the factory in wagons, which after passing from the scales are driven upon an elevated platform so adjusted as to dump the beets from the side of the wagon without unhitching the horses, almost automatically. From the bins into which the beets are dumped they are carried to the factory by means of a flume. The first process on arriving at the factory is a purely mechanical one, which is the washing. From the washer the beets are sliced into thin strips about two inches long called cossettes, and are then ready to have the sugar extracted, which is done in the diffusion battery, which consists of eleven cells which hold about two tons of cossettes each. When full, hot water is passed through the first cell and from that one to each of the others in succession, until all the saccharine juice is extracted. The refuse from this operation is called pulp, and is usually stored in silos and used later for feeding stock. From this point the process has to do with the juice containing the sugar only, which is now heated to a temperature very nearly boiling in an apparatus called a calorizator, after which it is treated with milk of lime; the lime forms precipitates and goes into combination with the sugar and non-sugar; then on the addition of carbon dioxide gas the lime in combination with the sugar is re-precipitated. These precipitates, which are now in the form of mechanical impurities, are removed from the juice by filter presses. The juice is then clarified and conducted to the evaporators, four in number, called the "quad effect," and under a vacuum it is concentrated to about one-fourth of its former bulk, when it has the appearance of a clear amber liquid, after wh ch it is conducted to the vacuum pan, where it is boiled to a grain, after leaving which it has the appearance of grains of granulated sugar in molasses; the molasses is then separated in the centrifugals, and the sugar is dried in what is called a granulator, it now being pure white granulated sugar, and is conducted through a spout to the lower floor, put in 100-pound bags, is weighed and conveyed to the warehouse ready to be shipped in carloads.

Recently Declared Mining Dividends.

Boston & Montana Co., $3 per share; payable August 20th. Total to date, $6,275,000.

Quincy M. Co., Mich., $4 per share; payable August 16th, being $800,000 since January 1, 1897, or $9,470,000 to date.

Kearsarge M. Co., Mich.; $1 per share.

Portland M. Co., Colorado; 1 cent per share, $30,000; payable to stockholders of record August 15th.

Anchoria-Leland, Colorado, 1 cent per share —$6000; payable Aug. 16th; the thirteenth of such dividends.

Moon-Anchor, Colorado, extra dividend, 1 cent per share, $6000; payable Aug. 12th.

Swansea M. Co., Utah, 5 cents per share; $5000; payable August 10.

Santa Rosalia, Mex., M. Co., 10 cents per share; payable Aug. 16th.

Champion M. Co., Cal., 25 cents per share; $8500; payable immediately.

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Personal.

RUSSELL L. DUNN has returned to San Francisco from Placer county.

PROF. F. A. C. PERRINE of Stanford University is at Elberon, N. J.

W. J. MORRIS has taken a position as assistant assayer at the Selby Smelting Works.

W. B. FISHER of Grass Valley, Cal., succeeds Col. Ewing as general manager of the Diamond Hill property, Hassel, Montana.

CAPTAIN CARROLL, of Alaska fame, has resigned steamboating, and has gone to the Klondike to add another million to his wealth.

WM. WESTON has returned to Cripple Creek from the San Juan region in southwestern Colorado, where he went to report on the Poughkeepsie Basin.

EX-SENATOR DUBOIS of Idaho, Senator Cannon of Utah, Senator Pettigrew of South Dakota and Senator Mantle of Montana started this week to visit Japan and China.

H. C. HOOVER, whose technical articles in the MINING AND SCIENTIFIC PRESS have attracted considerable attention, has been appointed manager for Zewick, Moreing & Co., Coolgardie, Australia.

S. C. DUNHAM, statistical expert of the U. S. Department of Labor, has gone to the Klondike to ascertain economic conditions and prepare data for a bulletin, which the department proposes to issue March 1st, '98.

MR. C. C. BURGER has succeeded Mr. John E. Rothwell as superintendent of the new chlorination works of the Delano Mining & Milling Co. of Boulder, Col. Mr. Burger has recently been in charge of chlorination works in Idaho.

M. BAILLOUD, E. Bre'rault and Felix Gouin, French mining engineers, are at Bisbee, Arizona, examining the copper mines and works. The gentlemen are on a tour of investigation looking into the American methods of working ore and their various treatments.

DR. C. W. MCLEAN of Des Moines, Iowa, one of the Directors of the Alder Creek Gold Mining Co., Ltd., is here on business concerning his company, which is enlarging its mill in Placer county. The company operates mines in Nevada and Placer counties, and has just purchased the Van Avery mine, near Blue canyon. L. Balliet is the engineer in charge of the work.

AUG. J. BOWIE, the hydraulic mining engineer of San Francisco, and Alf. Tregidgo of Grass Valley left on the Humboldt last Tuesday for the Klondike. They are backed by considerable money and are empowered to make such quartz or placer properties as in their judgment warrant investment. They took a $6000 outfit and are "well fixed." Mr. Bowie proposes to be gone a year, and for that time is to be paid $25,000. On the same steamer went Fred Deetken, late superintendent of the Marguerite mine, Auburn, Cal., bound to the Klondike. Mr. Deetken represents a German syndicate, who pay all the expenses for a year, $1000 salary and an equal interest in claims that he may secure.

Recent California Mining Incorporations.

Harville M. Co.; W. A. and C. B. Titcomb, A. H. Breed, H. Hilp, H. K. Selby; capital stock, $200,000; $25 subscribed.

Victor M. Co., San Francisco; mining business in Alaska; L. Getz, J. Armstrong, D. L. Fulop, E. Boukofsky, R. Cohen; capital stock, $100,000; subscribed, $50.

Klondyke Prince M. Co., S. F.; L. C. Hyner, M. D. Young, C. J. Dreker, H. B. Denson, F. L. Owen; capital stock, $2,000,000; $2,000 subscribed.

Uranus M. Co., S. F.; F. R. Purinton, G. L. Brown, W. C. Kewin, E. J. Benedict, J. St. Denis; capital stock, $1,000,000; $100,000 subscribed.

Victoria Dredger Co., S. F.; M. Selig; L. Hagan, L. Enereti, R. W. M. Payne, C. F. Humphrey; capital stock, $100,000; $5,500 subscribed.

Indian Creek M. Co., Trinity county, Cal.; R. C. Hall, H. Duvergney, W. H. Radford, J. Bergez; capital stock, $60,000; $19,500 subscribed.

El Paso M. & E. Co., San Francisco; A. O. Tulin, E. Bind, L. Schenck, H. B. and F. T. Larsen; capital stock, $500,000; $300,000 subscribed.

Slate Range Quartz M. Co. of San Bernardino Co.; San Jose; R. M. McCabe, J. R. Chace, J. Q. Robertson, W. Brotchie, J. K. Christie; capital stock, $100,000; subscribed $70,000.

Klondike Prince M. Co., S. F.; P. Hyner, M. H. Young, C. J. Decker, H. B. Denson, F. L. Owen; capital stock, $2,000,000; subscribed $2,000.

Klondike, Yukon, British Columbia Gold M. & Dev. Co., S. F.; F. F. Lord, F. W. Reade, J. E. Slinkey, R. V. Daniels, F. Bralich; capital stock, $250,000; subscribed $50,000.

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E. S. TOPPING, TRAIL, B. C.,
Has prospects for sale in Trail Creek and the whole of the Columbia basin. Will buy legitimate stock and mines for investors. Will examine mines. Has lots for sale in Trail and Deer Park.

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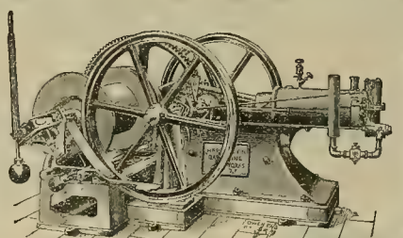

Solve the difficulty of fuel, and make mining profitable where steam power is too expensive. Over 3000 Hercules Gas and Gasoline Engines are in use, giving entire satisfaction. Fully guaranteed. Requires no engineer. No smoke, no dirt. No danger.

We build engines from 2 to 200 h. p. for pumping, hoisting, running air compressors, sinking shafts and for all power purposes. Used in mines throughout the coast.

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THIS ANNUAL EXHIBITION will embrace a complete representation of the Agricultural, Mechanical and Industrial possibilities of the State.
MECHANICAL DEVICES can be here shown to a better advantage, and, if meritorious, receive recognition of value in placing them on the market.
THE EXHIBIT OF PRODUCTS from lands offered for sale, gives both sellers and buyers an acceptable opportunity to meet.
THE LIVE STOCK DEPARTMENT is eagerly sought each season by buyers desiring to replenish their herds with stock of new blood lines. This is necessary and insures sales to all exhibitors.
THE POULTRY EXHIBIT will constitute a most important division of this year's exhibition, and will offer a most excellent chance for buyers to view the various breeds of fowls in comparison.
THE DAIRY DEPARTMENT will have a complete working exhibit showing the latest methods in dairying, and the working of improved appliances. Competent instructors from some of the leading creameries in the State will be in charge to give instructions to all in this growing industry.
ELECTRIC POWER, space and light will be furnished free to exhibitors.
GRAND MUSICAL CONCERTS will be held each evening at the Pavilion by the **California Exposition Band.**
THE RACING PROGRAMME will form one of the leading features of amusement, and usually attracts a large attendance that are of benefit to all exhibitors.
TO MANUFACTURERS AND DEALERS we say exhibit your goods and wares, meet the public on neutral ground and profit by advertising in a practical way. The public attends these exhibitions in vast numbers to be instructed as well as amused.
FREE TRANSPORTATION for exhibits and excursion rates will be given by the Southern Pacific Company on all their lines.
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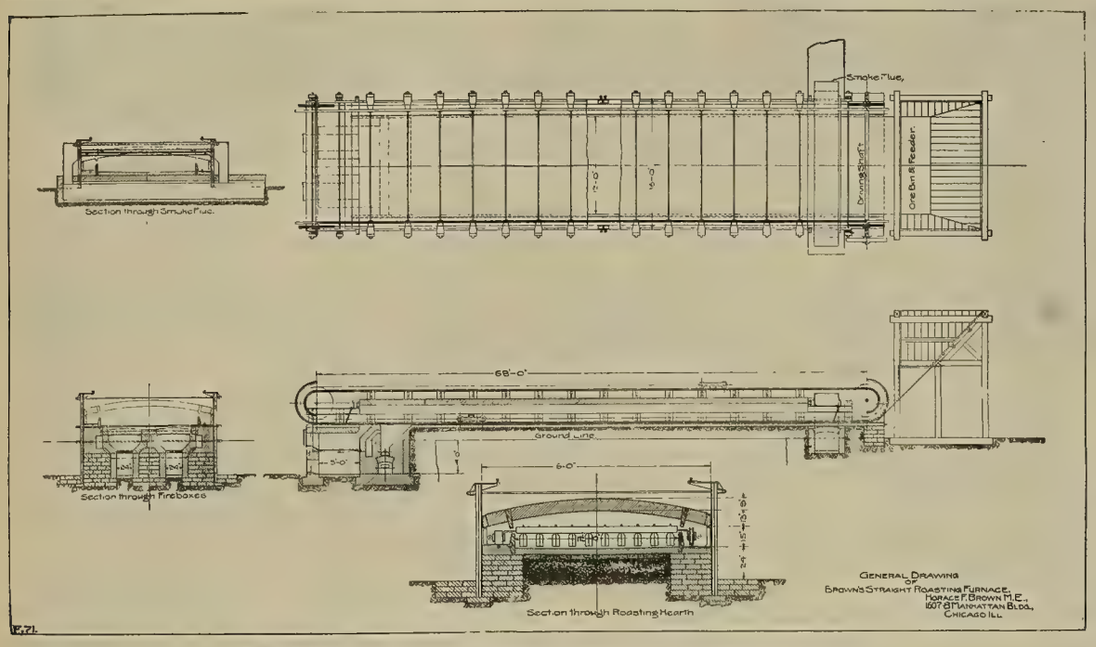
Section through Smoke Flue.
Smoke Flue.
Ore Bin & Feeder
Section through Fireboxes
68'-0"
Ground Line
6'-0"
Section through Roasting Hearth
GENERAL DRAWING OF BROWN'S STRAIGHT ROASTING FURNACE. HORACE F. BROWN M.E. 1607-8 MANHATTAN BLDG. CHICAGO ILL.

The Horace F. Brown Patent Straight Roasting Furnace.

A new form of mechanically stirred roasting furnaces is illustrated herewith. In cross-section it is the same as all of the furnaces built after or in imitation of the Horace F. Brown system of roasting furnaces, having the slotted wall construction for protecting the working mechanism.

The furnace shown is designed for sweet roasting a comparatively small amount of ore, and is well adapted for treating sulphide concentrates from stamp mills. The aim has been to secure the greatest possible efficiency with a minimum cost, both of construction and operation. For a furnace of this kind, having a roasting furnace not to exceed 12 feet wide and 60 feet in length, the fire boxes are placed below the roasting hearth and so arranged as to get the greatest heat at the point of discharge, with a minimum of fuel.

In roasting sulphide concentrates little or no fuel is required, except to break up the sulphate compounds that are formed, and for this purpose a high heat is required only at the finish. The ore discharges from the hearth, just in front of the fire box, to a suitable conveyor, that can be arranged so as to carry the hot ore over a water jacketed cooling floor or trough, the final discharge being at the tank or barrel where the ore is treated.

The carriage returns above the hearth in the same manner as in the Brown-O'Harra style of construction. The driving mechanism consists of two tables, and the carriage is driven from each end, forming a positive and powerful drive. The cables are operated by sprocket wheels mounted on suitable shafts at each end of the structure.

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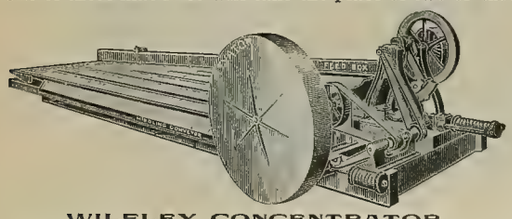

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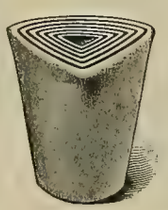

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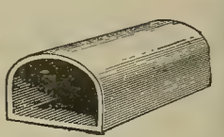

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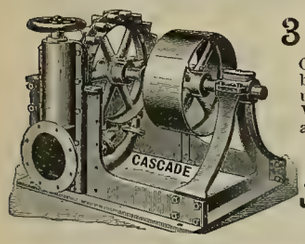

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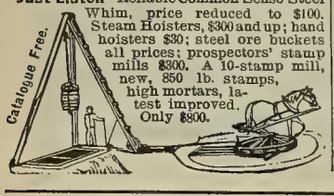

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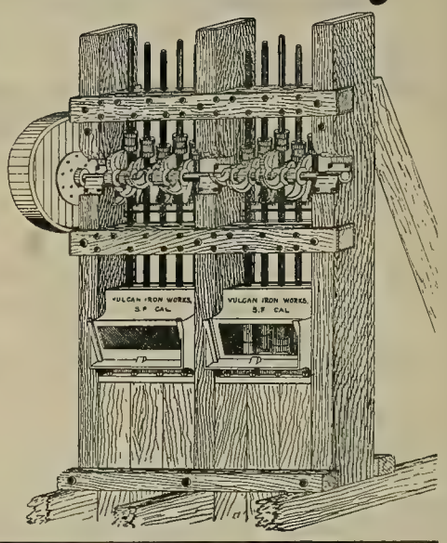

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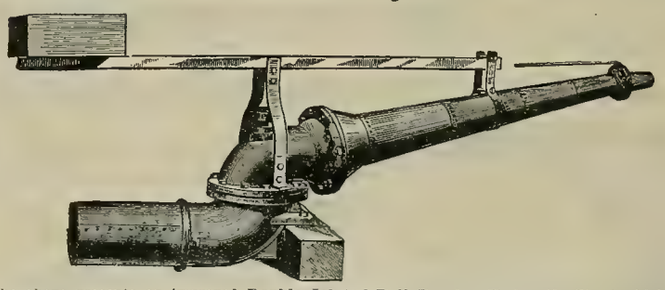

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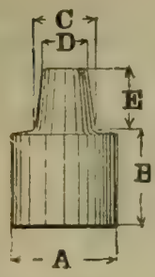

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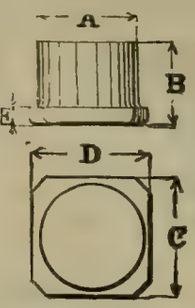

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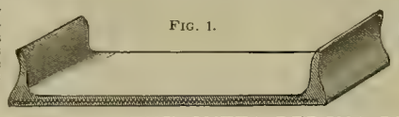

FIG. 1.

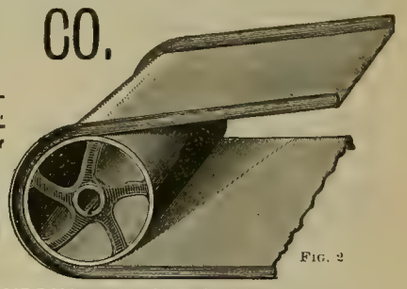

FIG. 2

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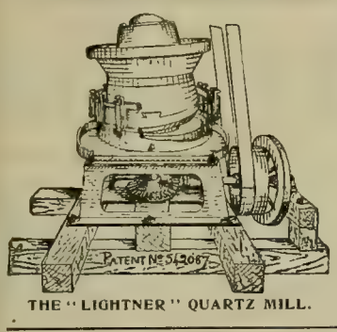

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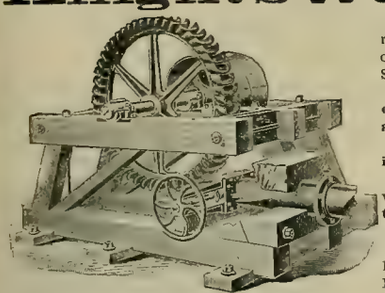

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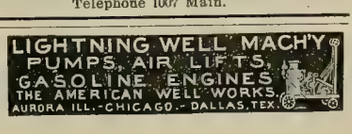

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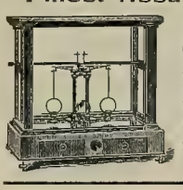

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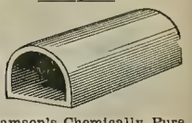

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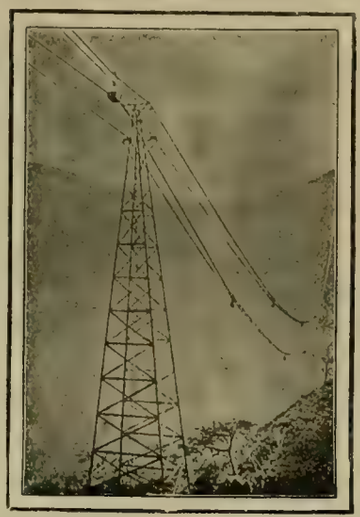

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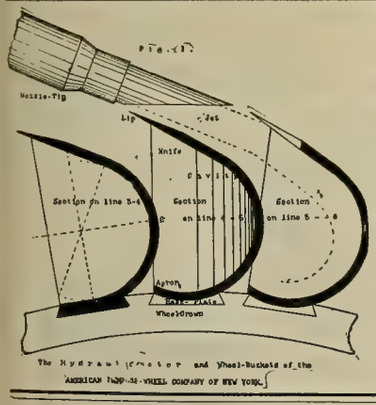

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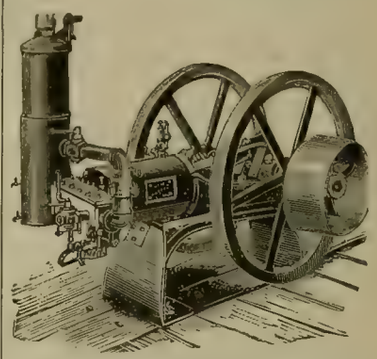

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List of U. S. Patents for Pacific Coast Inventors.

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FOR THE WEEK ENDING AUGUST 3, 1897.

587,419.—CAN OPENER—W. N. Anderson, San Rafael, Cal.
587,643.—AIR BRAKE GOVERNOR—A. J. Clark, Oakland, Cal.
587,427.—HYDRAULIC APPARATUS—E. S. Cobb, S. F.
587,519.—AIR BRAKE SLACK ADJUSTER—W. K. Conness, Oakland, Cal.
587,521.—GANG PLOW—G. W. DeWitt, San Ardo, Cal.
587,434.—LEGGINGS SUPPORTER—C. Fisher, S. F.
587,571.—BUCKLE—C. F. Francisco, San Diego, Cal.
587,524.—SAFETY GUARD FOR CARS—Glennie & Boone, S. F.
587,308.—NET LEADER—E. Haataja, Rosberg, Wash.
587,506.—DISTILLING APPARATUS—Pierce & Bigelow, Gridley, Cal.
587,607.—DUSTPAN—L. P. Ray, Seattle, Wash.
587,510.—WASHING MACHINE—L. Ryder, Woodland, Cal.
587,511.—SWELL MOTOR—H. Schomberg, Los Gatos, Cal.
587,662.—SPRAYING APPARATUS—H. J. Schulte, Los Angeles, Cal.
587,459.—ROTARY PLOW—Spaulding & Robbins, Stockton, Cal.
587,464.—WRENCH—Swick & Reid, Springwater, Or.
587,466.—ANIMAL GUARD—I. B. Taylor, Ellensburg, Wash.
587,622.—FURNACE—Matilda L. Trapp, Tacoma, Wash.
587,623.—HAMMER—A. R. Treat, Los Angeles, Cal.
27,479.—DESIGN FRAME FOR ORE STAMP BATTERIES—W. G. Dodd, S. F.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong&Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

GANG PLOW.—George W. DeWitt, San Ardo, Cal. No. 587,521. Dated Aug. 3, 1897. This invention relates to devices for adjusting and guiding gang plows of that class in which the plows are supported from a triangular framework having wheels near the angles and means for attaching the beam to the base of the triangular frame. The furrow wheel and the rear land wheel are journaled in standards so connected that one or both of them may be held rigidly to resist side thrust, or by turning them to an angle with the line of travel they will act to throw the plows to or from the land and thus regulate the cut. The wheels and their standards are turned by means of horizontally disposed levers and holding racks, and by means of vertically movable levers the wheels and their standards may be raised or depressed to regulate the depth of the cut.

WASHING MACHINE.—Lafayette Ryder, Woodland, Cal. No. 587,510. Dated Aug. 3, 1897. This invention relates to improvements in machines for washing clothes. It consists of a stationary tub having the central portion of the bottom concaved or segmental, a shaft journaled across the tub in the axis of this concavity having a hub secured to it, two sets of arms fixed to the hub diverging from one end outwardly so as to form an enclosed space between them, the arms of one set being fixed to stand out of line with those of the other set. In the bottom of the tub are removable blocks having pressure bars secured to them standing essentially radial from the oscillating shaft, and so arranged that the bars of one side are out of line with those of the opposite side. These bars and the arms upon the oscillating shaft are so arranged with relation to each other that one set of arms will pass between the adjacent bars when moved in that direction and the other set will move in line with the bars by the tilting of the shaft so as to compress the clothing between the arms and bars. When the shaft is oscillated in the opposite direction the clothing is carried over to that side by the arms which are behind it, the arms upon the opposite side passing out between the fixed radial bars and allowing the bars behind the clothing to again compress it against the arms upon the side toward which the bars are approaching. This alternate operation soon squeezes the dirt out of the clothes.

SAFETY GUARD AND FENDER FOR CARS.—George Glennie and Ralph Boone, San Francisco, Cal. No. 587,524. Dated Aug. 3, 1897. This invention relates to an improved safety guard or fender which is especially designed for use upon street railways or other cars to prevent their running over people or obstructions. It consists essentially of a horizontally movable spring-actuated fender frame adapted to be projected to the front from its normal position in line with the front of the car, a receiving surface carried thereon, vertical guides with a vertically moving flexible apron traveling between them, a roller situated above the fender frame at its junction with the fender whereon the apron may be coiled, means by which the two surfaces are projected at right angles with each other by the forward movement of the fender frame, flexible chains or cords passing over guide pulleys, the upper ends of said chains being connected with the upper ends of the vertically movable apron and the lower ends with the fender frame so that the movement of the latter is communicated to the apron. A suitable trigger and trigger frame serve to hold the fender retracted under ordinary conditions; but whenever it strikes an object it will be immediately released and forced to the front by actuating springs, the vertical fender being also moved upwardly to screen the front portion of the car.

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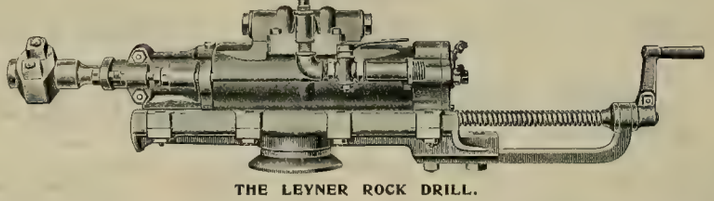
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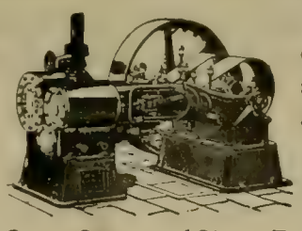
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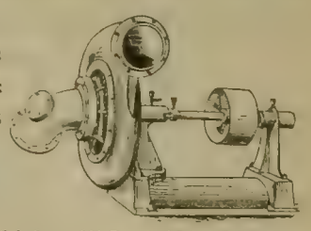
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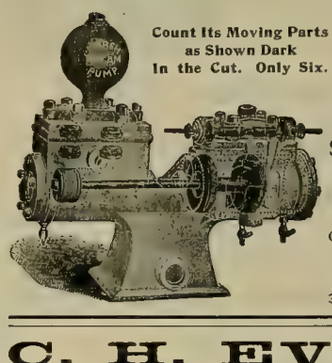
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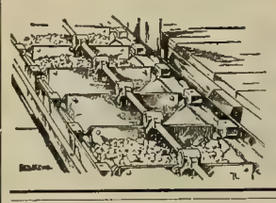
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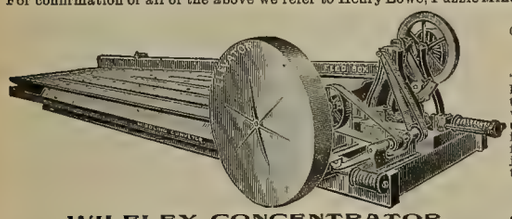

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The Mine and Smelter Supply Co., Denver, Colo.—GENTLEMEN: Replying to your favor of the 8th inst., regarding my experience with the "Wilfley Concentrating Table," will state that in February last I placed in the vanner room of the Standard mill one of your tables, which has been in constant use every day since. It has been operated by the usual attendant of the vanners and has been given no special attention, and has been supplied with the same "feed" as the Frue vanners and at the end of each day's run has shown lower tailings than the vanners and produced from three to four times the quantity of concentrates of the same value per ton as any of the Frues. We have three more of the Wilfleys in the same mill, which are all doing splendid work and handling fully twenty tons each per day of siliceous ore carrying about 10 per cent lead and 12 ounces silver. They are all making a remarkably close saving of values and giving the most perfect satisfaction. A very fair opportunity is offered in this mill for comparing the work of different concentrators, as we are using Harz jigs, Collom jigs, round buddles, Frue vanners, and Wilfley tables, and handling nearly 500 tons of crude ore per day, and all of the machines are given the class of work for which they are best adapted. I can heartily recommend the Wilfley to any one needing a concentrator for fine ores.

Yours very truly, EMERSON GEE, Manager Standard Mining Co.

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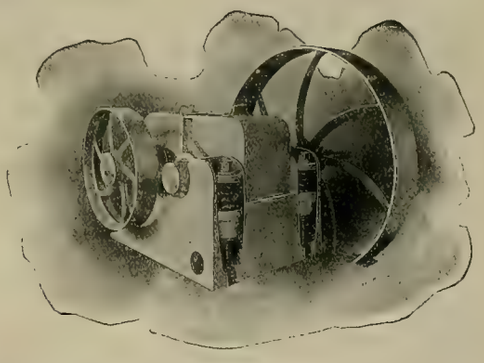

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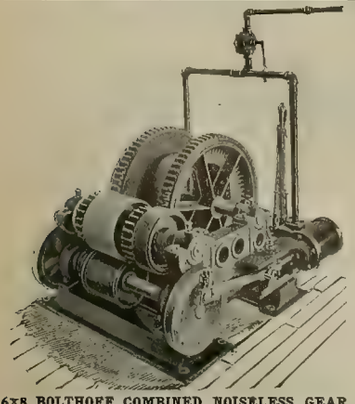

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Will save more of the fine slimes than any other machine.
Is cheaper than any other six-foot machine, costing only $350.00 f. o. b. cars or boat, San Francisco.
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Has adjustable eccentrics, and any length of stroke can be had, thereby giving different speeds per minute.
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Market Reports.

The Markets.

SAN FRANCISCO, Aug. 12, 1897.

The call for shipments to Alaska is decreasing, although there are some fairly free shipments going forward, but the demand from points in this State and other Pacific slope points is steadily enlarging and will continue to until the bulk of fall stocks has been laid in. The merchants, both jobbers and retailers, are disposed to buy in larger quantities. This is due partly to a larger consumptive demand owing to increased population, but to growing confidence can be more directly attributed the disposition to buy more freely. This feeling of confidence is traceable to higher prices for the chief products of the farm and a decided improvement in the speculative markets at the East. These latter are generally a true index to the general situation. The only thing to be feared now is that overtrading in speculative securities and commodities which may lead to a collapse before a revival has hardly begun. This opinion is based on information from the East that the public have taken hold of speculative markets and are carrying prices up, allowing moneyed pools to unload at good round profits on original investments. The cheap money markets with heavy supplies of idle money are favorable to the long buyers, for accommodations can be obtained readily for carrying larger quantities. This continued excitement regarding the Klondike mines and reported discoveries of richer gold deposits in different parts of the coast are doing a good deal on this coast in promoting a more cheerful and confident feeling.

The local money market continues to work easy, with more outside capital offering. The increasing output of the gold mines is playing quite an important part in promoting a more general ease. In the month of July, Selby Smelting and Lead Company refined over $2,500,000 in gold bullion. This is the largest refining in any single month in the history of the company. The heavy disbursements that are being made for grain, breadstuff, canned salmon and fruits, dried fruits, etc., etc., are also being favorably felt. The farmers that sell at present prices for wheat will be able to cancel in whole or in part their mortgage indebtedness, which will add still larger sums of money to the banks' available surplus funds. Exchange in New York is lower and weak at the decline, which indicates that heavy shipments of produce are being made to the East. The East reports active and stiffening money markets.

New York Silver Prices.

NEW YORK, August 12.—Following are the closing prices for the week:

	Silver in— London.	N. Y.
Friday	25¾	56
Saturday	26	56⅜
Monday	25 15-16	56¼
Tuesday	25⅝	55⅝
Wednesday	25⅝	55½
Thursday	25¾	55¼

	Copper.	Lead.	Iron.	Tin.
Fri.	10 87½@11 15	3 75	9 00@12 00	13 70
Sat.	10 87½@11 15	3 70	9 00@12 00	13 65
Mon.	10 87½@11 15	3 70	9 00@12 00	13 70
Tue.	11 00 @11 25	3 65	9 00@12 00	13 80
Wed.	11 00 @11 25	3 65	9 00@12 00	13 85
Thur.	11 00 @11 25	3 70	9 00@12 00	13 85

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	7½c Prem
New York Telegraphic Transfer	10c Prem
London Bankers' 60 days	$4.87
London Merchants	$4.85
London Sight Bankers	$4.88
Refined Silver, per oz., 1000 fine	55¾
Mexican Dollars	45½@46

SILVER.—The market advanced Friday and Saturday, but on Monday there was a weaker tone with lower sales reported, which led to a break the next day of ⅞ cents. Since then the market has been gaining in strength. It is quite impossible to get at the true position without largely theorizing. The famine in parts of India caused the natives to part with their silver hoarding, and as there was not much demand from China this silver went to the parts of India not so much affected by the drouth, which cut off just so much of the requirements. Japan being out of the market, with other countries not taking much to keep up their silver currency, helped also in promoting the decline. At the lower prices many high cost mines have shut down.

MEXICAN DOLLARS.—The market is more or less unsettled, with quotations largely nominal, although ours cover the cost of silver minting and carriage, with silver bullion quoted at 55¾ cents per ounce fine.

QUICKSILVER.—The market is weaker and lower. The drop in silver is said to have an unfavorable influence on the market owing to shutting down of many high cost mines and lessening the output of others. It is silver mining that consumes so much quicksilver. Besides this, in glass-plating the cheaper silver gets the more that is used at the expense of quicksilver.

Our market is quoted at $88 for domestic consumption.

COPPER.—The market has firmed up under a continued improving consumption in this country and large exports to Europe. The low price of silver takes off some of the profits for copper mining.

In their last circular, D. Houston & Co., New York, report as follows: "We have been passing through a period of curtailed manufacture and limited consumption in this country, but when domestic requirements reach the normal point again we may expect a natural and decided rebound from former depression. Trade outlets should expand, and domestic demand increase from this time forward; and when home consumption becomes active, in conjunction with the heavy foreign demand, we may look for a rapid appreciation of market values. Stocks are being depleted, and deliveries are behind on certain grades as it is. Foreign advices show that consumption abroad continues large, in fact considerably larger than last year, when European demand exceeded anything previously. A labor strike among the engineering trade in England of recent occurrence was responsible for a drop in the London market. Two cargoes of Bolco and Mason's copper by their arrival increased the mid-monthly European copper statistics by being included in the stocks. All this copper is sold and goes to the smelters.

Our market is quoted as follows:

Ingot casting, jobbing	13@—
Ingot " wholesale	12½@—
Sheet copper	—@16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½

TIN.—The market is strong for both pig and plate. Shipments of plate are being made from the East to Europe, which, like shipment of pig iron from the Atlantic seaboard for Europe, will increase in volume and importance.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

LEAD.—The market was held to fairly firm prices throughout the week.

Our market is quoted in jobbing lots as follows per pound:

Pig	—	@	4 80
Bar	5 00	@	5 25
Sheet	—	@	6 25
Pipe	5 25	@	5 50

SHOT.—The market is steady.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs			$1 35
Drop, B and larger sizes,	"	"	1 60
Buck, Balls and Chilled, do,	"	"	1 60

POWDER.—The market is steady and active.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17½c, according to strength and quantity; No. 2, from 9c to 11c, according to strength and quantity.

IRON.—The weakness reported at the East is disappearing, owing to a belief that the coal strike will be over soon. The high rates of freights to Europe are still against some grades of pig sent abroad.

COAL.—The market is steady to firm. Advices of higher charters at Australia are in favor of sellers here. The demand for all grades is increasing.

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	9 50	@	— —
" spot, in bulk	10 00	@	— —
" in sacks	11 00	@	12 00
Cumberland	— —	@	— —

ANTIMONY.—The market is steady.

Our market is quoted at 8¾c in a jobbing way. New York mail advices quote 7¾c for Cookson's, 7¼c for Hallett's and 7c for Japanese.

NAILS.—The market is lower.

Wire, carloads, basis per keg			....
" jobbing, " "			$2 10
Cut, carloads, " "			....
" jobbing, " "			2 00

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4½

PLATINUM.—The market is quiet.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is steady.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

Chemicals.

Notwithstanding the new tariff increasing duty on several lines is in effect, still the market does not respond, and what is more, it is not expected to move up any until present stocks are exhausted. The East reports that importers have advanced prices slightly on every line affected by the tariff, but from second and third hands the goods can be had at the old prices, and as they carry liberal stocks, it looks as if it will be some time before jobbing prices are higher.

SULPHURIC ACID.—The demand is fair We quote in a jobbing way at 1¾c per lb for 66%.

ACETIC ACID.—The market is firm at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported steady from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is firm.

We quote in a jobbing way at 4½c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is firm.

Our market is quoted in a jobbing way at $1.50 a pound.

BONEASH.—The demand is good.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is firm.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firm at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is firm at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—There is a fair demand at 2½c a pound from stores.

NITRATE OF SODA.—Market is stronger.

Our market is quoted from store at 4c for 95%.

The Roessler & Hasslacher Chemical Company review the changes in some products brought by the new Tariff, which became a law on July 24th, as follows:

Benzoic Acid remains on the Free List.

Carbonate of Ammonia has a fixed rate of 1½c per lb., against 20%, an increase of about ½c per lb.

Carbonate of Potash is on the Free List; with the old Tariff a duty of 25% was exacted, a reduction in price averaging ¾c per lb.

Chloral Hydrate has a fixed rate of 55c per lb. against 25% old rate, making an increase ranging between 40c and 45c per lb.

Chloride of Zinc remains with increase; fused, 2-5c per lb.; granulated, 1-5c per lb.

Caustic Potash remains on the Free List; no change.

Cyanide of Potassium has been reduced in rate of duty, but selling prices remain unchanged, on account of the higher rate of duty on the raw material, Yellow Prussiate of Potash.

Hydrochinon at 20% duty against duty free brings an increase equivalent to about 35c per lb.

Hyposulphite of Soda—The duty is a specific one of ½c per lb., an increase of more than ¼c per lb.

Naphtole, Beta remains on the Free List; no change.

Oxalic Acid remains on the Free List.

Yellow Prussiate of Potash now pays a specific rate of 4c per lb., which is about 1 2-5c per lb. higher than the old rate. The market price has taken the benefit of this change gradually.

Red Prussiate of Potash has the fixed rate of 8c per lb., an increase of 1¾c per lb.

Sal Ammoniac, granular, now pays specific rate ¾c per lb., an increase of 35-100c per lb.

Salicylic Acid has been advanced from duty free to 10c per lb.

Sulphate of Alumina has been increased 1-10c per lb.

Sulphate of Zinc has been advanced from 25% ad valorem to a specific duty of 1c per lb., an increase of almost 4-5c per lb.

Sulphide of Sodium has been advanced to ½c per lb., an increase in duty of 3-10c per lb.

Zinc Dust is being rated at 1½c per lb., against 1c per lb. of the old Tariff, ½c per lb. increase.

In our market the tone seems to be stronger, but owing to liberal supplies in jobbers' hands, an advance cannot be established. It will be only a question of a short time before better prices will rule, particularly as the East begins to show signs of strengthening in both first and second hands.

Mining Share Market.

SAN FRANCISCO, August 12, 1897.

The market has been spasmodically active the past week, with no material changes in the low prices current with the preceding week. The market price for quite a number is so low as to make them attractive for the general run of operators, regardless of reports from or work in the mines. It has been the history of the Comstock, and will continue to be so long as the shares are a gamble, that when prices go down to low figures they are a buy, for sooner or later they recover and leave a good margin of profit to investors not buoyed up by visions of a great big deal at hand. In buying it is always well to keep within conservative lines, for one or more assessments may have to be paid before there is much of a move. The cry on the street is: "If only ore can be found." This cry, it is needless to say, is put out by persons interested in a freeze-out game, and is invariably raised before a deal and when the market is low. Insiders are noted for not giving their business away until they are positively sure that everything is so arranged that they can carry to success what is contemplated. At this writing the general business and financial interests of the country are favorable for a large speculative movement in Comstock shares; for the people are ripe for a gamble, business is improving, money is more active and speculation at the East increasing; but whether the moneyed inside pool is ready for a bull campaign it is hard to say. It is reasonably certain they will not make one unless shares are well concentrated, for with large holdings, not by chippers and chronic traders, by the outside, it would take a very large sum of money to stand under the market, so as to take the shares thrown on it at advancing prices. There is nothing, so far as we can learn, to warrant asserting that a movement for a big move is under contemplation, only enough to keep interest in the game and induce the paying of assessments.

The following mining companies report having had money on hand August 1, 1897, with July expenses paid: Andes, $2008.08; †Alta, 172.07; Bullion, $2644.11; *Caledonia, $1381.21; *Chollar, $7075.33 in cash, unsold bullion at the Mint valued at $6333.41 and a clean-up shipment of bullion to be received; *Confidence, $2877.43; Con. New York, $201.70; *Challenge Consolidated, $2876.35; *Consolidated Imperial, $2143.57; Crown Point, $446.81; Exchequer, $1127.46; Gould & Curry, $3950.27; Julia Consolidated, $663.99; Morgan, $1356.46; Ophir, $61.88; *Overman, $5755.65; Potosi, $1753.78; Savage, $1244.74; Segregated Belcher, $735.39; Sierra Nevada, $2516.27; Standard Con., $21,452; Syndicate, $882.02; Union Consolidated, $11,176.25; Utah Consolidated, $213.72.

*July expenses unpaid. †July expenses partly paid.

The following mining companies report having had an indebtedness August 1, 1897, with July expenses paid: Alpha Consolidated, $882.07; *Best & Belcher, due bank, $3500, less $641.77 cash on hand; †Belcher, $3933.65; Consolidated California and Virginia, due bank $26,000; Hale & Norcross, $2475.78; Lady Washington, $2000; Mexican, due bank $500, less $127.11 cash on hand; Occidental Consolidated, due bank $2500, less $280.07 cash on hand.

*July expenses unpaid. †July expenses partly paid.

Reports from the Comstock mines continue about as heretofore. Strikes of ore are losing interest, for when there is ore the shares go down, leaving the longs with assessments to pay, for during the past few years ore taken out does not cover expenses. Whether the reports of Flood and others visiting the mines will put ore in one or more remains to be seen. Some persons who visit mines now-a-days might possibly tell the difference between a horse in the mine and a truck horse. It is money down here to back up a proposition at Virginia City is what is wanted, and, until this comes forward, shares will sell—unless to make shorts fill and to sell a few shares long—only on merit and a fair percentage for prospects of finding something of value. The letter from Utah is about the same as published last week. In Sierra Nevada they have extracted from the main north drift thirty tons of ore, assaying about $24. In the winze low grade ore is found. Evidently there

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Deling't and Sale.	Secretary.
Alpha Con M & M Co, Nev.	19	10c	July 8.	Aug 12..Sept 2.	C E Elliott, 309 Montgomery
Altoona Q M Co, Cal.	1	75c	Aug 3.	Sept 6. Oct 11.	C Allenberg, 206 Sansome
Belcher S M Co, Nev.	55	10c	July 19.	Aug 23..Sept 13.	C L Perkins, Mills Bldg
Best & Belcher M Co, Nev.	62	25c	July 1.	Aug 5..Aug 26.	M Jaffe, 309 Montgomery
Brunswick Con G M Co, Cal.	12	3c	June 22.	July 22..Aug 14.	J Stadtfeld, 309 Montgomery
Bullion Con G M Co, Cal.	11	22c	June 22.	Aug 2..Aug 23.	C A Grow, Mills Bldg
Con Cal & Va M Co, Nev.	9	25c	Aug 3.	Sept 8..Sept 29.	A W Havens, 309 Montgomery
Crown Point G & S Co, Nev.	71	10c	July 27.	Aug 31..Sept 21.	Jas Newlands, Mills Building
Eureka Con D M Co, Cal.	9	2c	June 30.	Aug 7..Aug 28.	D M Keat, 330 Pine
Gold Ridge Con M & M Co, Cal.	5	4c	Aug 3.	Sept 18..Oct 9.	H Sylvester, 43 Sixth
Horseshoe M Co, Cal.	3	40c	July 12	Aug 23..Sept 20.	C E Green, 532 Market
Inyo Marble Co, Cal.	30	10c	July 27.	Aug 28..Sept 20.	M A Cahn, 323 Phelan Bldg, S F
Jamison M Co, Cal.	9	5c	Nov 27.	June 23..Aug 18.	Sam W Cheyney, 120 Sutter
Marguerite G M & M Co, Cal.	7	10c	July 28.	Sept 10..Oct 11.	F Mettman, 237 Twelfth
Mexican G & S M Co, Nev.	57	20c	July 28.	Sept 1..Sept 23.	C E Elliot, 309 Montgomery
North San Juan G M Co, Cal.	3	7c	July 16.	Sept 8..Oct 4.	H W Morris, 141 First St
Nth G & C G & S M Co, Nev.	18	10c	June 26.	July 28..Aug 14.	E W Sichel, 337 Pine
Occidental Con M Co, Nev.	28	10c	Aug 3.	Sept 7..Sept 30.	A K Durbrow, 309 Montgomery
Osborn Hill G M & M Co, Cal.	6	35c	Aug 4.	Sept 6..Sept 27.	R R Grayson, 331 Pine
Osceola Con M Co, Cal.	6	1c	June 30.	Aug 2..Aug 21.	Holland Smith, 307 Montgomery
Rose Creek M Co, Cal.	1	15c	June 28.	July 28..Aug 30.	J M Wilmans, Crocker Bldg
Thorpe M Co, Cal.	7	2½c	June 9	Aug 14..Sept 4.	A F Frey, Phelan Building
Utah Con M Co, Nev.	25	5c	July 6.	Aug 9..Aug 30.	A W Havens, 309 Montgomery

WILL NEGOTIATE with owners or their duly authorized agents only.

WILL INVESTIGATE only thoroughly bona-fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

E. N. BREITUNG,
Marquette, Mich., U. S. A.

Operator and Dealer in

Mines, Mining Properties and Mineral Lands,

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MONEY LOANED ON BONA-FIDE MINES.

WILL EXAMINE on reasonable terms all kinds of Mines, Mining Properties and Mineral Lands as to their value, method of working and the condition of their titles.

WILL GIVE Options, Leases, Bonds and Contracts on all kinds of Mines, Mining Properties and Mineral Lands.

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T. R. MILLER, Vice-Pres't. JOHN D. FLEMING, Counsel.

CAPITAL STOCK, $100,000.

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DENVER, COLO.

Branch Office, - COLORADO SPRINGS.

Gold and Copper Properties Wanted. We have prospective purchasers for developed and producing mines and desire to correspond direct with owners of such properties. We handle properties on legitimate commission only and prefer to deal with owner or authorized representatives.

$33,189,500

Paid in Dividends by Utah Mining Stocks.

Weekly Market Letter on Application.
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JAMES A. POLLOCK, Mining Stock Broker,
SALT LAKE CITY, UTAH.

are too many shares out and not enough shorts to find much ore. In Union they are still working on the 900-foot level, with no change reported. In Mexican, No. 1 east crossdrift is showing clay seams. They are not likely to show much ore, unless too many short sellers should get on the market. It is west where the work would be more interesting. In Ophir the west crossdrift Central Tunnel has improved, for the ore is said to assay $2 a ton, which is double former assays. This may help to collect assessments. The work on the 1000-foot level is unchanged, being confined, so far as the public know, to the west crossdrift. In Con. Virginia, on the 1000-foot level, the west crossdrift got into quartz assaying 50 cents. The east crossdrift on the 1550-foot level is also in 50-cent rock, as is one part of work on the 1650-foot level. At another point on the latter level they extracted seven tons of $18.50 ore. The work in Best & Belcher and Gould & Curry is practically unchanged. In Savage they are working south on the 500-foot level. No work in Hale & Norcross or Chollar. It is singular that the shares of the former are called on the exchanges, for no one knows who has a right to issue them, and will not until the lawsuit is settled. In Potosi they are working both north and south on the upper levels. On the 550-foot level, jointly with Chollar, they are repairing the drain tunnel, while on the 750-foot level they are driving west. From Bullion nothing new comes to hand. The same remarks apply to Alpha, although they are stoping on the latter. There is nothing new to report from Con. Imperial, Confidence or Challenge. No news is allowed to leak out from the work that is being done in Yellow Jacket. The joint southwest enlarged drift of Yellow Jacket, Crown Point and Kentuck is out about 900 feet. They are drifting southwest on the 800-foot level in Crown Point. The quartz is low grade, going about $5 to the ton. In Belcher more active work is being done, as also in Seg. Belcher, but nothing new is reported. In Overman work is continued on the 900-foot level.

From the Brunswick lode nothing of importance is reported in official letters on file. The joint work of Gould and Curry, Best & Belcher and Con. Virginia is practically the same as given in last week's issue. In Occidental work is confined to the 550-foot and 650-foot levels. Nothing new is reported.

Standard Con. reports a net profit last month of $10,000.

The following illustrates the changes of the week:

MINES.	Aug. 5.	Aug. 12.
Alpha	$ 10	$ 16
Alta Consolidated	.....	06
Andes	20	.....
Belcher	23	.....
Best & Belcher	77	69
Bodie	.....	.....
Bullion	.....	.....
Challenge	37	.....
Chollar	72	72
Confidence	.....	1 10
Consolidated California and Virginia	1 30	.....
Consolidated New York	.....	.....
Crown Point	28	.....
Exchequer	.....	.....
Gould & Curry	46	41
Hale & Norcross	.....	1 00
Justice	.....	.....
Mexican	29	26
Ophir	62	64
Overman	.....	06
Potosi	36	35
Savage	33	25
Sierra Nevada	96	72
Union	44	39
Utah	05	09
Yellow Jacket	48	31

San Francisco Stock Board Sales.

SAN FRANCISCO, August 12, 1897.

9:30 A. M. SESSION.

300 Alpha	16	800 Savage	25
100 Alta	06	350 Sierra Nevada	72
300 Chollar	69	300 Standard	1 85
100 Gould & Curry	41	400 Union	37
100 H. & N	1 00	400 Utah	09
50 Mexican	26	100 Yellow Jacket	31
400 Overman	06		

SECOND SESSION—2:30 P. M.

100 Ophir	64	300 Alpha	16
100 Mexican	26	200 Union	39
200 Best & Belcher	69	200 Caledonia	15
400 Chollar	72	1000 Silver Hill	01
500 Potosi	35		

Rainfall and Temperature.

The following data for the week ending 5 A. M., Aug. 11, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

CALIFORNIA STATIONS.	Total Rainfall for the Week.	Total Rainfall to Date.	Total Seasonal Rainfall to Same Date Last Year.	Average Seasonal Rainfall to Date.	Minimum Temperature for the Week.	Maximum Temperature for the Week.
Eureka	00	.03	.04	.19	48	68
Red Bluff	00	00	00	.05	58	108
Sacramento	.....	.....	.....	.....	.....	.....
San Francisco	T	T	.04	.02	49	65
Fresno	00	00	00	.01	56	104
San Luis Obispo	00	00	00	.....	50	82
Los Angeles	T	00	00	.03	54	86
San Diego	00	.01	00	.04	64	82
Yuma	.08	.08	.41	.28	78	110

ANNUAL MEETING.—The Regular Annual Meeting of the stockholders of the Marguerite Gold Mining and Milling Company will be held at the office of the company, No. 327 Twelfth Street, San Francisco, California, on MONDAY, the 23rd day of August, 1897, at the hour of 8 o'clock P. M., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Saturday, August 21st, at 2 P. M.

F. METTMANN, Secretary.

Commercial Paragraphs.

E. BENNER of the Union Iron Works has completed the installation at the Diamond Hill mine, Montana, of an unusually large mining plant, reported to be the most complete in that section.

THE Colorado Iron Works Co. of Denver, Colo., have shipped the Sunnyside mine, Eureka, Colo., a carload of tramway material, and the Arkansas Valley Smelter Co., Leadville, Colo., a carload of water jackets for smelter, and two large elliptical bowl slag trucks.

THE Denver Engineering Works of Denver, Col., last week shipped to the Esperanza Mining Company of El Oro, Mexico, one of their patent mine timber framing machines, which cuts the tenons on mine timbers round or square, cutting both ends at one operation any size up to 16 inches in diameter and 10 feet long between shoulders. The machine can be operated by one man and a boy, and it is said will do the work of 22 men in getting out mine timbers. The Denver Engineering Works are also building a 100-ton crushing and concentrating mill for the Yellowstone Mining Company.

Books Received.

The Stone Industry in '96: An extract from the 18th annual report of the survey of 1896-97, Mineral Resources of the United States, calendar year 1896; David T. Day, chief of division of mineral resources. Carefully prepared and of equal value with the admirable reports of this branch of the Government service, giving correct, up-to-date statistics of the stone industry of the country. The aggregate value of different kinds of stone produced in the United States in '96 was $31,346,171, California's quota being $371,015, of which $215,883 was for granite. The statistics show a general falling off, but not to the extent noticeable in other industries during the long-continued depression.

Mr. A. S. Hallidie of the California Wire Works has issued a concise pamphlet—the Dingley tariff—in its entirety, handy for reference.

FOR SALE CHEAP.

Machine for Making Slat Fence.

Good opportunity. CALIFORNIA WIRE WORKS, 330 Market Street, Corner Battery, San Francisco.

FOR SALE CHEAP.

Gold Wet Washing Machine,
MAIT'S MAKE.
Capacity, 8 Tons Per Day.

Good order. Can be carried anywhere by prospector.

Address T. L., this office.

Valuable Silver and Lead Mining Property for Sale.

The property is known as the **Montezuma Silver Mining Co. of Utah**; is situated on the Little Cottonwood, Alta, Utah, comprising the "Montezuma," "Savage," "Hiawatha" and "Last Chance" locations, also the "Buckland" tunnel, 1500 feet long, and over it the "Savage" tunnel, 800 feet long, with openings connecting the tunnels. The mine is in good working order, with considerable ore in sight. The ore is rich in lead and in good demand by the smelters.

For terms and any other information, address David R. Pelree, Sec'y and Treas., 210 West Larned St., Detroit, Mich.

FOR SALE.

23,000 Feet 10 5-8 Inch Steel Pipe,

Lap welded and screw joints. Weight about 27 lbs. per foot. Will stand about 600 lbs. pressure

Three Compound Duplex Worthington Pumping Engines,
Several Pumps and Heaters,

And everything pertaining to a plant capable of elevating 3200 gallons water per minute 550 feet. Plant only operated one week. Address

LEE CHAMBERLAIN & CO., Los Angeles, Cal.

FOR SALE.

The Following Machinery, Nearly New. Now Located in State Agricultural Exposition Building at Sacramento:

One 16x42 R. H. Poppet-Valve O'Neil Automatic Cut-Off, 100-Horse Power Horizontal Engine, built by the Union Iron Works, with Band Pulley, 22 in.x124 in. Pipe Connections and Valves complete, as it now stands.
One 22 in. Double Leather Driving Belt.
One 18 in. Union Exhaust Steam Feed Water Heater.
One Buffalo Duplex Boiler Feed Pump 6x4x6.
Two Tubular Steam Boilers, 54 in. diameter, 16 ft. long, in good order, with Furnaces, Grate Bars and Settings complete; one Injector for each Boiler, and all the necessary Checks, Valves and Gauges.
One Stack, 48 in. diameter by 80 ft. long.

For price and particulars, address

EDWIN F. SMITH, Secretary, Sacramento.

SPECIMENS!

Gold and Silver Specimens...
BOUGHT AT HIGHEST PRICES.

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IMPORT AND EXPORT.

Assessment Notices.

ROSE CREEK MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Star, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of June, 1897, an assessment (No. 1) of 15 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 163, Crocker building, junction Post, Montgomery and Market streets, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 21st day of August, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 14th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. M. WILMANS, Secretary.

Office—Room 163, Crocker building, San Francisco, California.

MARGUERITE GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of July, 1897, an assessment (No. 7), of 10 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, 237 12th street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of September, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 11th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

F. METTMANN, Secretary.

Office—237 12th street, San Francisco, California. The Secretary will also receive payments from 12 to 5 P. M. at his business office, 225 Sansome street.

INYO MARBLE COMPANY.—Location of principal place of business, San Francisco, California; location of works, Inyo, Inyo County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of July, 1897, an assessment (No. 30) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 328 Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 28th day of August, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 20th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

M. A. CAHN, Secretary.

Office—Room 328 Phelan building, San Francisco, California.

OSBORN HILL GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Grass Valley, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 4th day of August, 1897, an assessment (No. 6) of 35 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, room 11, No. 331 Pine street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of September, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 27th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

R. R. GRAYSON, Secretary.

Office—Room 11, No. 331 Pine street, San Francisco, California.

CONSOLIDATED CALIFORNIA AND VIRGINIA Mining Company.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 3d day of August, 1897, an assessment (No. 9) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to to Secretary, at the office of the company, room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of September, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 29th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office—Room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 3d day of August, 1897, an assessment (No. 28) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of September, 1897, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 30th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 3rd day of August, 1897, an assessment (No. 5) of 4 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of September, 1897, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 9th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 9th day of June, 1897, an assessment (No. 7) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of July, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 9th day of August, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors, the day of delinquency of the above assessment has been postponed to July 31st, 1897, and the day of sale to SATURDAY, August 21st, 1897.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors, the day of delinquency in the above assessment has been postponed to August 14th, 1897, and the day of sale to SATURDAY, September 4th, 1897.

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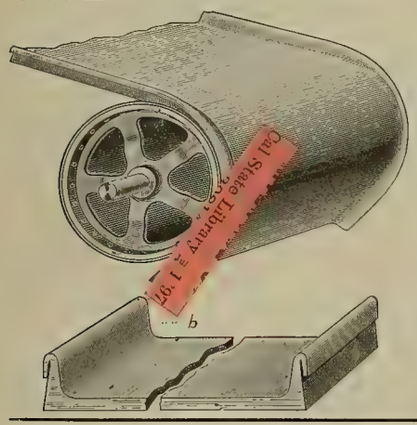

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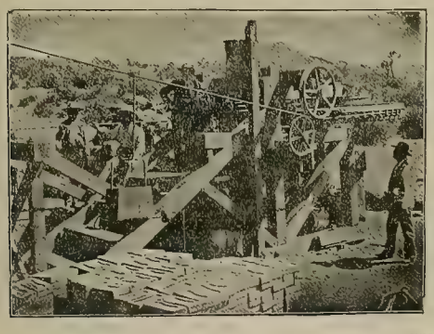

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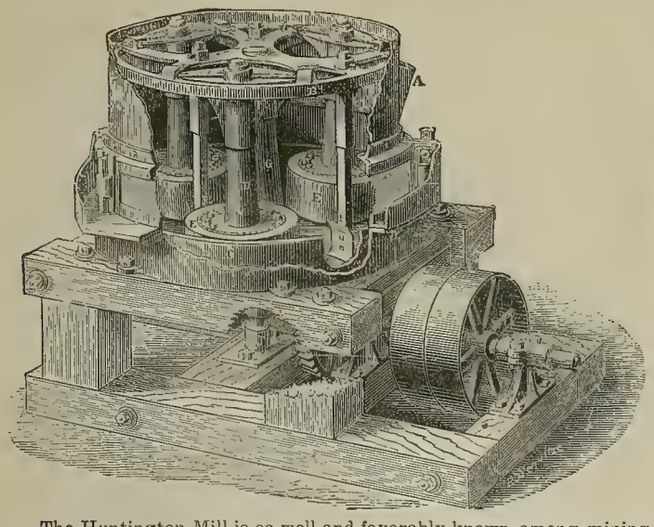

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No. 1937.—VOLUME LXXV. Number 8. SAN FRANCISCO, SATURDAY, AUGUST 21, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

In Farthest Alaska.

Herewith are presented some engravings from Alaska views taken specially for this paper; one being of Forty Mile Camp, looking from Ft. Cudahy across Forty Mile creek; another showing the laborious method of whipsawing lumber to build boats. The four men have a hard time of it getting out a little sawed stuff, and one can readily understand why $200 is charged is for 1 M feet. The timber is from five to seven miles from the shore of the lake, and, when laboriously got out, has to be carried that distance. Probably were they back in civilization they would find it cheaper and easier to have a boat built according to their own designs here, and taken up there all ready for use. The picture of the Alaskan party and dog team gives a good idea of how experienced Alaskans are accoutered. The photo is of Capt. MacLyon and party, who have made several trips through that region. In this regard it is of interest to note that Prof. S. C. Linderman, after whom Linderman lake was named, tells how he dressed when there. He says: "I wore silk underderwear and red flannels, which I steeped in lard oil. Outside my woolen clothing I wore Hamburger overalls of corduroy. I never sufered from the cold in that dress."

The steamship Queen, at Douglas Island, (see page 169), is a familiar sight, and the interior of the miner's tent, with a primitive map on its walls and ceiling, as portrayed on the same page, shows that in his case the naming of lakes and rivers is a matter of private judgment.

It is to be borne in mind that that country is not so "new" as some would have us believe. Since 1875 California miners have been bringing out gold from almost as far northwest as the discoverers of the '96 bonanzas. In '93 the Alaska gold yield was given by this paper as aggregating $1,035,823.

The Yukon section may be divided into three divisions: the Upper Yukon division, lying entirely in the British Territory and embracing the White, Stewart, Pelly, Salmon, Lewis and Hootalinqua rivers, which branches form the headwaters of the main Yukon; the middle division embraces Fort Reliance and down to the mouth of the Tananah; the lower division from the mouth of the Tananah to Norton sound and Bering sea. It is in the middle division that the principal discoveries have been made, or on Forty Mile, Sixty Mile, Miller, Glacier and Birch creeks and the Klondike river with its tributaries. Very little prospecting has been done in the lower division, although gold has been found in paying quantities along the Koyoukuk and Tananah rivers and a few of the bars profitably worked.

As far back as '87 published accounts in these columns read very like the columns of description now appearing all over the country. According to the *Alaska Mining Record* G. Carmach is entitled to the credit of discovery of the now famous Klondike placers. Last August this individual, who since 1887 had been a prospector in the section above Forty Mile, secured a contract to supply logs for the sawmill there and was looking for suitable timber along the Klondike. Vague reports had been previously put in circulation by the Indians of that region as to the existence of coarse gold along the several tributaries of that stream, but these rumors were regarded as valueless. Carmach, however, true to his mining instincts though driven by ill fortune to other temporary pursuits, prospected at odd moments and about the middle of the month found $1.60 to the pan on the high rim of Bonanza creek, which enters the Klondike from the south a short distance from the confluence of the latter with the Yukon. He was obliged, however, to continue logging operations for a time to get provisions, but in the last days of August returned to his claim with a few weeks' supplies, in company with his wife, her brother and another, all Indians. As he was very short of appliances he could only put together a very defective apparatus with which to wash the gravel, and the dirt itself he had to carry in a box on his back a distance of from 30 to 100 feet to his primitive sluices. With all these disadvantages the three men, working very irregularly, succeeded in recovering $1200 in eight days, and Carmach asserts with reason that with proper facilities a greater sum could have been taken out in a fourth of the time, for much was lost in the tailings from his defective apparatus. He reported his find to the people at Forty Mile, but the news was received with incredulity, for the Klondike had been prospected several times before without encouraging results. His dust, however, was incontrovertible evidence and the rush to the new fields began; returning Yukoners brought the news to Juneau and men began preparations for a start in the spring for the new fields; mail carriers and parties coming out during the winter and early spring brought confirmatory reports and a few hurried away; but it was not until the early part of last month that the richness of the placers was realized, and when their real value was confirmed the mad rush set in and has continued until it already has assumed proportions greater than any known in the world's history in such a remarkably short period.

This paper has given all the facts from a scientific mining standpoint, discussed the chances and possibilities, and advised that those who are determined to go should at least wait till next spring. Thousands are still rushing in, many of them poorly provided. Some are already returning, and when they read of the horrors experienced the coming winter will congratulate themselves on being out of it.

FORTY MILE CAMP, LOOKING FROM FORT CUDAHY.

ALASKAN PARTY AND DOG TEAM.

WHIPSAWING LUMBER TO BUILD BOATS.

MINING AND SCIENTIFIC PRESS.

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TO THE PUBLIC.

No one is authorized to solicit business for this paper unless in possession of proper credentials and regularly numbered and stamped blank subscription receipts.

San Francisco, August 21, 1897.

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Amending Federal Mining Laws.

At various times efforts have been made to amend the federal mining laws, or rather, to get into some kind of practicable working shape the cumbersome mass of conflicting memoranda known as the federal mining statutes. In the last twenty years several attempts have been made to secure some satisfactory federal action, but each time senatorial courtesy allowed Senator Stewart of Nevada (who has a copyrighted mining law of his own) to sidetrack any and all efforts in that direction. He annually introduces his own law and occasionally has it passed by the Senate, which is as far as it gets.

Last November the California State Miners' Association appointed a committee whose duty it was to prepare such legislation as was deemed necessary to be submitted to the annual convention which meets next October, and, if reported favorably, to be presented at the session of the 55th Congress next December. It is understood that that committee is now preparing such report.

At the recent International Gold Mining Convention held in Denver, Colo., a committee was appointed to take up the matter. Under date of the 17th inst., the California member of that committee writes as follows:

TO THE EDITOR:—Having been appointed by the Transmississippi Congress a member of the committee to formulate suggestions to the Congress of the United States with a view to the alteration or amendment of the Mineral Land law as it now exists, I have the honor to lay before you the amendments which, to me personally, seem necessary and to ask for criticism and suggestion on the part of miners and of those taking an interest in the mining industry. I assume that all will agree that the present statutes are cumbersome, fruitful of litigation and altogether unsatisfactory to the legitimate miner. As far as the laws touching placers are concerned, I am of the opinion that they may be left about as they now are. I would amend them simply by extending the list of minerals, subject to location under the "placer act," and inserting all the useful metals and earths, as well as the coal oils, hydrocarbons, bauxite, monazite, etc., etc.—in a word, all the natural substances used in the arts and the subject of commercial utility. As to the laws touching veins or lodes:

1st. I would do away with the extra lateral right altogether. But, in order that those who prefer to keep this right may have their choice, I would permit patenting under the present law until Jan. 1, 1900.

2nd. I would make the unit of location 1000x1000 feet in the form of a square, or, if there be not available ground to that extent, then any amount less and of any form. In order that flat or low dipping deposits may not be too soon lost by passing beyond the lines of surface location, I would allow the same person or persons to take up an additional claim of 1000x1000 feet on the side of the dip—the same person to be allowed not more than two such claims in the same district.

3rd. I would do away with the annual expenditure ($100) as now, and in its stead require a payment to the U. S. Surveyor-General, or to some proper officer, of the sum of $50 for each claim, in cash, every year until patented. If less than 1000x1000 feet, then a less proportional amount. In consideration of this payment, a deputy of the Surveyor-General shall, upon call, be sent to the district and authoritatively fix the location. Further, in order that no "snap judgment" be taken, I would have a district recorder appointed whose duty should be simply to take the names of the locators in the order presented to him so that "first come should be first served"—the recorder to be obliged to forward such list or lists to the office of the Surveyor-General at least once in each and every month.

There are other minor details which can be attended to before finally passing the amendments. The above-mentioned three will, I think, furnish matter enough for the present. I would add that persons wishing to criticise or alter might address their replies to you. The matter is pressing, as the committee meets on September 7th next.

W. S. KEYES, M. E.

There are, probably, very few miners in the United States who will not heartily concur in the suggestion of Col. Keyes that the extra lateral theory and practice be abolished altogether, and with it the apex, parallel end lines, etc., which have done more to make vexatious and expensive mining litigation in this country than anything else. With the exception of Bolivia, no other country has a similar statute.

In a very short time the California member of that important committee will meet with his colleagues, and any criticism, adverse or affirmative, will aid him in placing these matters before the conference at Denver.

Dark Days for Silver.

The report of the Ontario and Daly Mining Companies of Utah for 1896 is of present interest.

Dividends were paid monthly during the year, 10 cents each, and amounted to $180,000 for the twelve months. The cost of mining for the year was $8.37 per ton, a reduction of $1.23 per ton compared with 1895, this reduction being because of the small cost of handling the water through the drain tunnel. The cost of prospecting (dead work and sinking shaft No. 2) increased, and the total cost for operating expense for 1896 was $21.51 per ton, $1.02 per ton less than the like cost for 1895.

The mine product was 662.23 fine ounces of gold, 1,094,425.07 fine ounces of silver, the whole selling for $741,593.77; ore sales, $35,259.90; grand total, $776,853.67. Ore, gross tons, 35,029; ore hauled to mill, 30,190. The ore milled averaged 39.28 ounces.

The recapitulation of operating expenses shows the following:

Net tons ore—per ton cost.			
Mining	28,912 tons at	$8.47	$241,951.32
Prospecting	28,912 tons at	4.38	126,759.90
Sundries	28,912 tons at	1.16	43,719.90
Hauling	28,380 tons at	.44	12,475.93
Milling	30,370 tons at	6.16	186,459.72
Bullion expense	30,270 tons at	1.00	30,265.75
		$21 51	$641,632.61
Ore expense, 532 tons ore sold			1,190.27
Total			$642,822.88

The fiscal statement shows a cash balance on hand at the beginning of the year of $462,638.44; at the close, $366,342.13; decrease during the year, $96,296.31.

A final table closes the report, showing that since the incorporation of the company it has produced 538,283 tons of ore; 33,095,117.30 fine ounces of silver; sold for $30,988,510.93; dividends, $13,355,000. Total value of all assets, $2,176,163 29.

President Chambers of the Daly makes a detailed report, recites the operations of the year, tells of the drain tunnels and the workings, and of the reduced coal prices.

The Marsac mill saved values up to 96.55 per cent; the average yield of ore per ton was in 1894, $21.65; in 1895, $23.01; in 1896, $20.46, the decrease being due entirely to the decreased price of silver. Bdt "notwithstanding the cost of drain tunnel and other improvements, and the extremely low prices of silver, we have added to our surplus."

Ore milled during the year, 20,327 tons; ore sold, $2168.18; this yielded 861.947 ounces of gold and 714.373.05 fine ounces of silver, the two selling for $497,657.51; net, $491,063.02.

The cost of ore extraction was $10.21 per ton for the 20,259 tons extracted, $206,791.23; hauling, $16,779.45; reduction, $145,659.76; marketing, $6572.58; prospecting, $38,849.36; sundries, $32,377.84.

The operating expenses were, per ton, $22.01, or $447,030.16; half cost of drain tunnel, $33,896.51; dividend No. 76, $37,500; balance cash on hand December 31, 1896, $160,725.47; and other items bring the total expenditures to $694,340.61.

Receipts—Cash balance December 31, 1895, $196,721.31; bullion sales, $462,333.27; sulphide sales, $33,156.06; ore sales, $2146.22; outstanding checks, $983.75; total, $694,340 61.

The output and dividends since incorporation were: Ore produced, 270,002 tons; ounces silver, 11,158,929.66; ounces gold, 11,202.80; sold for $9,451,661.67; dividends, $2,887,500. Total value of all assets, $984,826.06.

The above is the showing of two great properties that during the week have been compelled to close; 600 men in the town of Park City, Utah, are thrown out of employment. From Montana, Idaho and Colorado come similar reports. Silver 24 pence in London is the cause. The cause of that price has been heretofore discussed.

During the last seven years the great silver mines of the country have one by one put out their lights; now, even those who have so far been able to produce silver as a sort of by-product are closing down, in the fear that bedrock has not been reached, though some mine managers say that even at 60 cents product will not pay. It is a business proposition; there is no spite work nor political effect; in many cases it simply ceases to be possible to operate except at a loss under present conditions.

The only thing to do under the circumstances is to make the best of a bad situation. Co-operation of all interests involved will insure the best results. At Creede, Colorado, the smelter companies, the railroad officials, the mine owners, the working miners have got together and have outlined a plan whereby the mines can be kept going. The smelters and railroads make concessions, the mine owners make certain sacrifices, the working miners say they will accept a reduction in wages from $3 per day of eight hours to $2.75 in wet mines and $2.50 in dry, rather than to have the mines close down. With such mutual determination a community dependent upon its silver mines for support can do much toward pulling through in these dark days for silver.

In this connection it is to be noted that a year ago to-day silver was quoted at 66⅛ cents per ounce, and lead $2.67 per 100 pounds. To-day, while silver is 52 cents its baser brother is $3.70. From this it is evident that where a property is producing ore 20 per cent lead and 20 ounces silver per ton the yield is better than one year ago. Of course, ore yielding say 35 ounces silver and 16 per cent lead would not make so favorable a showing.

World's Production of Precious Metals.

M. de Foville, Director of the French Mint, has published a report of the world's production of gold and silver. Like preceding investigators he divides the history into four unequal periods. The first ends with the Middle Ages, and is of purely historical interest. In the fifteenth century Europe possessed a slender stock of gold and silver, whose total has been usually estimated at one thousand millions of francs—$200,000,000. The second period begins with the discovery of America and closes in the middle of the present century; the third extends from 1850 to 1875, comprising the third quarter of the century, and the fourth, beginning in 1875, extends to the present time. In constructing any approximately accurate table of the production of gold and silver during the 402 years which have elapsed between the date of the discovery of America and the last year of complete returns—1896—it is evidently necessary that some uniform terms should be used both of quantity and of value. The director of the French mint favors the usual standard of comparison of 15½ to 1, estimating the value of each kilogramme of gold at 3,444 fr. 44 cent., and of each kilogramme of silver at 222 fr. 22 cent. A kilogramme, it may be noted, is equal to 2.6803 pounds, or 32.16 ounces troy.

Beginning with the period between 1493 and 1850, comprising 358 years, he finds that the total production of gold was 4,752,070 kilogrammes, valued at 16,368,200,000 francs, and of silver 149,826,750 kilos, valued at 33,294,800,000 francs. The average annual production of gold, which begins with 5,800 kilos, reaches at the end of the period 54,759 kilos, while the average annual production of silver, which begins with 47,000 kilos, closes with 780,415 kilogrammes. But, while at the beginning of the period, the average annual value of the production of gold is double that of silver, it is less than 10 per cent in excess of it at the end of the period, and, but for the gold discoveries in this State the average annual value of the silver product would have been very much the greater. In the second period—1851 to 1875—is reached a time in which the gold production greatly exceeded in value that of silver, except as to the one or two years with which it closes. Between 1856 and 1860 the annual average of gold production was 201,750 kilos, valued at 694,900,000 francs, and of silver 904,990 kilos, valued at 201,100,000 francs. For the entire period the production of gold was 4,775,625 kilos, valued at 16,449,400,000 francs, or a little over the entire value of the preceding 358 years. Of the 73,000,000,000 francs of gold and silver produced between 1493 and 1875, South America yielded 26,000,000,000, Mexico 18,000,000,000, and the United States 8,000,000,000; the contribution of the New World amounting in all to 53,000,000,000 francs.

In the period between 1876 and 1895 there is a steady increase in the production of silver, accompanied by a temporary decrease of the gold product from its highest point, which was followed by a rapid increase to figures greatly in excess even of those reached during the early days of the Australian and Californian discoveries. As compared with 1876, the production of gold in 1895 was twice as great, while that of silver had increased 2½ times. In the 402 years over which this review extends, it appears that there have been produced 45,000,000,000 francs in gold and 55,000,000,000 francs in silver, making for the whole period an average annual production of the precious metals of about 250,000,000 francs. But the annual averages of our time, as compared with those of previous centuries, show an extraordinary rate of progression. For example, the average annual product of the sixteenth century was 80,000,000 francs, that of the seventeenth 115,000,000, and of the eighteenth 193,000,000 francs. For the first half of the nineteenth century the annual production of both metals averaged about 227,000,000 francs, but for the twenty-five years following, between 1851 and 1875, there is a leap to the annual average of 930,000,000 francs, two-thirds of which was in gold. But even this average is exceeded between 1876 and 1885, in which ten years, however, the production of silver reaches a nominal value about equal to that of gold. Since 1886 the increase in the annual production of the precious metals has been still more rapid than in the ten years preceding. The average between 1886 and 1890 was 1,340,000,000 francs per annum, of which 750 millions represented silver at its nominal coinage value. Between 1891 and 1895 the annual average was 1,934,000,000 francs, and during these five years the course of progression has been so rapid that we pass from a gold product in 1891 of 677,000,000 francs to one of 1,030,000,000 francs in 1895, while of silver the annual production has advanced from 939,000,000 francs of nominal value in 1891 to 1,144,000,000 francs in 1895, the production of the precious metals between 1851 and 1895 being almost exactly equal to that of the whole preceding period since the discovery of America.

Concentrates.

TRINITY is but one of the 57 counties of California.

THE price of gold in London is 77s 11d per ounce standard.

MINING helps every other business and competes with none other.

AT 59⅜ for silver, the bullion value of a silver dollar is 42⅝ cents.

CRIPPLE CREEK, Colo., figures on a million a month as its gold output for '97.

THE Hope mine, Basin, Montana, now gives promise of becoming a copper producer.

BRITISH COLUMBIA mines are petitioning the Dominion Government for an export duty on ore.

THE Helena-Frisco M. Co., Gem, Idaho, resumed operations August 1st. The mill is running smoothly.

THE low price of silver is shutting down the few remaining silver mills. The Sioux mill at Robinson, Utah, closed this week.

IN the Klondike to-day the sun rises at 4:24 and sets at 7:36. In four months from to-day it will rise at 10:13 and set at 1.47.

THE De Lamar, Nev., mill is now treating 300 tons per day. It is locally asserted that the ore is being put in the mill at a cost of 35 cents per ton.

COLORADO'S State Mining Bureau is issuing special bulletins from various parts of the State and publishing mining data as fast as collected.

NO BETTER method of getting gold from black sand is known than the old-fashioned system of sluicing, using quicksilver, copper-silvered plates, etc.

THE exports of gold from Western Australia during July amounted to 48,811 ounces, valued at £185,482, against 16,258 ounces, valued at £61,782, in July, 1896.

THE nomads of '97 unlike the argonauts of '49 can not fall back on the agricultural resources of the country, if unsuccessful. They must get gold, get out, or starve.

SAYS a London dispatch: "The heart of the British empire has been touched by the Klondike placer gold-digging news." Later on its pocket will be "touched."

NEW YORK CITY dailies are publishing Klondike advertisements by the page, mostly from those who figure that "there is a sucker born every minute"—and sometimes twins.

ORE has been struck again in the Custer, near Wallace, Idaho, which probably means more for the Coeur d'Alenes than any strike that has been made there for ten years.

ALL mining notices for publication—notices to co-owners, applications for patent, etc.—must be published in the newspaper of general circulation published nearest the property.

FORTY men threw up good jobs in the Everett, Wash., smelter to go to the Klondike; one stack of the smelter has had to be closed, the company being unable to get men to operate it.

THE Bullion-Beck, Utah, at its last meeting passed its dividend and virtually concluded that, unless the railroads make concessions in charges, the company must at least temporarily shut down.

THE number of mining locations now being recorded in this State is very large. This week in looking over some California mining papers "Concentrates" counted seventy-eight filed for record in five counties.

IN all probability New Mexico will acquire statehood during McKinley's administration. The bill for admission will be introduced in the House at the next session by Representative Ferguson.

THE old Pennsylvania mine, Brown's Valley, Cal., twelve miles from Marysville, has been unwatered and modernized. A 20-stamp mill will be built by Chas. Webb Howard of San Francisco and associates.

UNDETERRED by the fate of Andre, a scheme for reaching the Klondike has developed in Oakland, Cal., where an organization is being effected to start a balloon service between Juneau and Dawson City.

THE Kennedy mine, Amador county, Cal., is over 2100 feet deep, 400 feet below the level of the sea. The deepest gold mine in the State is 2400 feet, on dip of the vein, the Sierra Buttes, Sierra county, Cal.

THE capital stock of the New Idria Quicksilver Mining Company of this State—100,000 shares, par value $5 each—has been listed on the Boston Stock Exchange. The company paid a dividend of 10 cents per share last June.

EARLY copies of the State Mineralogist's reports, that is, issues of former years are out of print and cannot be supplied, and from present appearances there will be none published to follow the 13th, which is the last of a valuable series.

THE Trail, B. C., smelter turned out its first gold ingot on the 10th. It bears the initials B. C. S. & R. Co. It was the first time refined gold has ever been produced in the Dominion, and the first refinery north of the 49th parallel.

UNDER the new State mining law, $50 in work must be done on a claim within sixty days after posting the preliminary work. Ordinarily, it will be found cheaper and easier to do the work than to start making a "test case" of its constitutionality.

DURING the week ending August 10, there was entered at Nelson, B. C., for export 1,136 tons of ore and matte valued at $126,938. The week's exports make the total for the current year $4,372,060, including the Slocan ore exported via Revelstoke.

THE Anaconda, Montana, copper mines give employment underground to 3000 men, whose wages amount to $10,500 a day. Six thousand tons of ore are daily handled, yielding at the smelters between 10,000,000 and 12,000,000 pounds of copper monthly.

FIRE from an overturned oil can on the 800-foot level of the Stickle mine, Angels, Cal., last Tuesday, required the flooding of the property, which will cause a cessation of operations for some weeks. No lives were lost. The extent of the damage is as yet unknown.

IT is the opinion of Judge Goodwin of the Salt Lake *Tribune* that, "if the Klondike boom continues, the chances are that it will not be five years before they will be running hoisting and reduction works up there by electric power generated from the Aurora borealis."

SEVERAL wealthy mining men of San Francisco state their intention to visit the Klondike region next season, going with complete outfits and in a comfortable manner. It has long been the fashion to take a trip to Alaska, and they will extend their travels a little farther than the ordinary tourist.

EL DORADO Co., CAL., hears of a plan to build a big power station on the American river to supply every mine and mill in the county with such cheap power that a good many of the low-grade propositions now lying idle can be worked at a profit. The scheme is a feasible one.

IT is believed that in parts of Utah the same condition will develop in silver properties as did on the Comstock, Nevada, as depth was attained, viz., an increasing percentage of gold in the ore. It is even now declared in the case of the Mammoth that 70 per cent of the ore value is in gold.

J. H. BURFEIND of Salt Lake City, Utah, has a patent described as "an improvement in the extraction of precious metals from their ores, which consists in the treatment of the cyanide product or precipitate containing the metals preparatory to melting the product with sulphurous acid."

IF anything is to be done toward the celebration next January of the fiftieth anniversary of the discovery of gold by Marshall at Coloma, Cal., it is time to go about it. So far as erecting a monument is concerned, the $1,300,000,000 in gold contributed by California is a pretty good monument itself.

BRUCE WHITE, manager of the Slocan Star mine, B. C., denies the report that the mine will shut down. J. C. Eaton, manager of the Whitewater, says that with lead at or near its present figure the leading Slocan mines could produce at a profit, "even if silver were to fall to 40 cents per ounce."

"PROSPERITY" is when people spend money with reasonable expectation of return. The 77,000,000 people of the United States, if they each saved only 10 cents a day for the last four years, would now have accumulated nearly $11,000,000,000. This sum put out would create prosperity enough to make it a continuous fact.

IT is none too soon to call conventions in the several California mining counties to select delegates to the October State convention and discuss the policy and acts of that meeting. Upon the interest manifested by the interior counties depends largely the success of the convention and the advancement of the mining industry of the State.

SOME funny mining decisions are occasionally made. New Zealand's highest legal tribunal recently decided that "a stamp-mill is not machinery for gold-saving purposes or processes." The learned judge who gave the decision solemnly asserted that shoes and dies were unessential thereto. The case came up at Auckland on a question of admission free of duty.

TACOMA reports that agents of the Alaska-Treadwell Gold Mining Company have been there securing men to take the places of those who left the Douglas Island mine for the Klondike. Three to four dollars a day and expenses got about twenty-five men. The Alaska papers report a dearth of good miners, several having left their jobs in the rush up the Yukon.

AT Creston, Minas Prietas, Sonora, Mexico, the roasters and cyanide plant are treating 100 tons a day, and are said to be the only ones adopting that method. The tailings are mixed with low grade concentrates and then passed through the roaster with salt, in order to convert the silver into the form of chlorides. From the roaster the pulp goes on to the cooling tanks, each tank taking 100 tons. Good results are reported.

COUNTLESS columns of rot are still being written about the Klondike. It is a little wearisome to have interviews wired from New York from men who never crossed the Alleghanies. "Official" guides to the Klondike are being issued by enterprising Chicago and St. Louis publishers, and are daily received at this office "for notice." They are made to sell, and are noticeable only for the varied assortment of misinformation contained.

IN the illustrated notice of the Bannack, Montana, dredgers last week the fact was omitted that the elevator dredge is operated solely by electric power generated by water power from a stationary shore plant, conducted by wires to the floating dredge, which carries the various motors, hydraulic lifts, elevators, dump boxes, sluice heads, etc., required in digging, moving, sluicing and disposing of the auriferous gravel and underlying bedrock.

CHIEF ENGINEER NURSE of the Department of Public Works says the borings demonstrate that the Newtown shoals can be easily removed. A good dredger, aided by well constructed jetties to concentrate the force of the water, would remove the obstructing shoals and increase the carrying capacity of the Sacramento river to such an extent as to improve navigation, and solve, in a great measure, the problem of controlling the flood waters of the lower Sacramento.

A MINER suggests that now that silver is slumping out of sight holders of silver claims should be exempted from the required assessment work for '97. Under the circumstances it is not likely that even in the absence of the required amount of work that any one these times would be in feverish haste to jump a silver claim. Government relief is, however, impossible this year, even were the idea favorably received, as Congress will not meet till December next.

TWO HUNDRED tons of pig lead were exported on the 14th by the Pueblo Smelting & Refining Company to Liverpool via Galveston. Most of the ore from which this lead was extracted by the Pueblo company was imported from British Columbia during the interval which elapsed between the time that Congress passed the Dingley tariff bill and the time that President McKinley signed it, but the ore was taxed under the new law. The company has appealed the case.

THE ordinary British mining prospectus is useful sometimes as showing what should be avoided. It often contains little but the glorification of the properties which adjoin the mine that is to be acquired by a privileged public. The regularity of the ledge, the consistently high grade of the ore, and the low rate of working expenses in the next-door neighbor, are brought forward as incontestible arguments that the same conditions will be found to prevail on the new company's side of the boundary, the fact being that close contiguity to a paying mine is often viewed by practical miners as opposed to certainty of extensive continuance.

A GOOD deal of useless and misleading statement has been made during the last two weeks regarding Trinity county, Cal. A rich find was made, as has been the case hundreds of times before, and that is all there is to it. Gold is there in abundance the same as in other sections of the State, but it is not to be picked up. Any one going to Trinity must remember that conditions there are no different from anywhere and everywhere else—nothing is to be had except by hard work. Several valuable articles have appeared in these columns on the geology, working, practical value, etc., of Trinity county. The most recent was in the issue of Feb. 6, '97.

AT the La Cigale mill, Mercur, Utah, President Mackay and Assayer Packard have been experimenting as to a change in the method of applying the cyanide solution to the ore, and say that when the solution is forced through a false bottom in the tank into perforated pipes rising through the ore the values are leached out much quicker than by the ordinary way of allowing it to percolate through the ore. In their experiments 68 per cent of the gold was taken out in twenty-four hours and 92 per cent in forty-eight hours. With this method the solution is drawn off from the top of the tank and is then filtered before going into the precipitating boxes. In this way all the slime is taken out and does not check the action of the zinc in precipitating the gold.

PROF. EMMENS of New York City has a better thing than the Klondike. He takes Mexican silver dollars, compresses them in a vacuum, causes a rearrangement of the molecules, thus converting the mass into argentaurum, which the United States Mint buys for gold, the profit being $4 per ounce. It seems that both metals were originally alike and that the difference between them was due to the fact that the white metal had gone through less vibrations than the yellow. That is, the particles composing silver had not, at a certain stage, received as much electric agitation as had the yellow particles. This beats the plan of getting gold from sea water as proposed by Prof. Pearce, and is even easier than prying out $40,000 nuggets in Trinity or Tuolumne counties.

AT the excavation for the Golden Gate mill at Mercur, Utah, last week, a big blast was fired. For a week fifty men operated machine drills, sinking 200 holes to an average depth of 20 feet, the extremes being 300 feet apart. When the holes were all sunk, each was sprung by giant powder; then the chambers thus created were filled with black powder, about 6500 pounds being used. When every hole was primed, the entire series was exploded by electric current generated by cell batteries. The explosion threw a mass of rock estimated at 6000 tons a distance of 60 feet, or within a few feet of the point where the retaining wall of the foundation is now being built. So nicely was the quantity of explosives regulated that the mass was moved without material disintegration, and the rock will be cut into blocks for the masonry in the retaining wall.

SEVERAL recipes for cleaning copper plates have been published herein. Smith & Irving furnish the following: When copper plates are stained with verdigris, which prevents their amalgamating with and saving the gold, the plates can be cleaned in the following manner: Thoroughly scrub the plates with fine sand and water, using a coarse gunny sack or scrub-brush. Wash off the sand and then scrub thoroughly with a solution consisting of one part oil vitriol and four parts of water. The acid disintegrates the verdigris, dissolving the oxide of copper, and leaves the plate clean, when it will readily amalgamate with mercury without the use of cyanide solution, except the acid solution should have been made stronger than herein prescribed, in which instances the plate should be washed off with water, and then dressed with a solution of cyanide as usual.

THE latest idea in metallurgy is an ore reduction works on wheels—a reduction plant on a train of cars, each car being devoted to the process or carrying necessary machinery for treating ore; cars containing the business manager, assayers and others. As embodied in the scheme of the Railway Gold Mining Company, headquarters at Chicago, Ill., the president of this concern writes that the plant will be in Prescott, Ariz., about September 1st next in the interest of another equally gorgeous company, with a view of purchasing gold properties. The cars will be run to any specified railroad point in good mining districts. The first cars will contain amalgamation and concentration plants, but the company can and will, if necessary, send out special cars, covering all forms of lixiviation, chlorination, cyanide and other processes; also a car for smelting, a car containing a diamond drill outfit, a car containing an assay outfit; the whole accompanied by a mining expert, business manager, etc. Some of the Arizona miners ought to be able to have some fun out of this thing.

IN New Zealand considerable attention is given to river dredging for gold, where it is considered the cheapest method of mining. A yield of 1.28 grains of gold per yard (30 cwt. to the yard) of gravel—equal to one part of gold in 19,000,000 parts of earth—has been made to pay in Otago with a steam-driven dredge, using coal costing $6.25 per ton. The newest dredges are supplied with two parallel revolving cylinder screens, instead of one, as heretofore, ensuring a more rapid and complete separation of the coarser gravels from the finer gold-bearing sands. Another dredge is being fitted with endless, traveling, self-washing, concentrating tables Several of the dredges now working there have a lifting capacity of ninety tons of material per hour. A modern dredge can by means of its elevator stack its tailings 40 feet above the water line. Nearly all the principal dredges are driven by steam power; there is one exception in Otago, where electrical power generated from a neighboring stream is used. A few of the earlier dredges were operated by current wheels, and it is possible that this plan of obtaining motive power will be resorted to again.

A PRACTICAL formula for estimating the percentage of sulphurets in quartz is given in a recent catalogue issued by the Risdon Iron Works, of San Francisco, as follows: Take 10,000 grains or 20.8 ounces of crushed ore which will pass through a 40-mesh wire screen. Wash the ore very carefully in batea or pan, and rewash as long as sulphurets appear. Dry and weigh. Each grain of sulphurets will equal one-hundredth of one per cent. If the sulphurets weigh 175 grains, the quartz contains one and three-fourths per cent of sulphurets, or, if twenty grains, one-fifth of one per cent. If the sulphurets are worth $100 per ton, the value of sulphurets in each ton of ore is $1.75, or, if one-fifth of one per cent, 20 cents per ton. To test tailings, dry and weigh 10,000 grains. Wash as above. Dry and weigh the sulphurets. Each grain will represent one-hundredth of one per cent, and a loss of one per cent per ton if the sulphurets are worth $100 per ton. Thus if the 10,000 grains of tailings yield three and one-half grains of sulphurets, the loss is 3½ cents per ton in sulphurets. If the sulphurets are worth $60 per ton, multiply sixty by three and one-half, and 2.1 cents is the value of the sulphurets in one ton of tailings. If they are worth $375 per ton, multiply as above and the value in each ton of tailings is 13.12 cents per ton in sulphurets.

Monazite From Idaho.

Written for the MINING AND SCIENTIFIC PRESS by WALDEMAR LINDGREN.

The Idaho Basin is an intermontane valley, situated twenty-five miles N. N. E. of Boise City, Idaho, in the great granite area of the southern part of that State. Its placer mines have been of extraordinary richness; a considerable proportion of the gold production of Idaho has been and still is derived from this relatively small district. The sand of the gravels and lake beds of the Idaho Basin is entirely derived from the granite and associated dike rocks. It consists of relatively angular and sharp-edged grains, indicating its manner of formation by extremely rapid accumulation from the deeply disintegrated rocks. The heavy minerals found in the granite are also found in the sand, and may be easily separated by washing in the miner's pan; they are always deposited in the sluice boxes together with the gold.

In all parts of the Basin a yellow or brownish yellow mineral forms a considerable quantity of the heavy substances remaining with the gold. It is usually referred to as "yellow sand," and is also given the picturesque name of "Bummer Hill sand," from a locality near Centerville, where it was particularly abundant, but I am not aware that its true character has ever been investigated.

The mineral has been shown to be monazite, this being the first time its occurrence has been noted from the Western States. As well known, it occurs in the granite and gneissoid rocks and gold placer mines of the Southern Appalachians and in several of the northern Atlantic States, also in Brazil, the Ural mountains and other places. There is no doubt that it forms an original constituent of the granite of the Idaho Basin.

One of the samples was obtained in washing a few pans of the sandy lake beds occurring as "false bedrock" in a gravel bench at the junction of Moore creek and Granite creek, three miles east of Idaho City. The heavy residue largely consisted of small yellow grains, and amounted to about two grms. per pan of eight kilograms, which would correspond to 0.025 per cent. Examined under the microscope, the following minerals were noted: Ilmenite, in sharp hexagonal crystals, but no magnetite; zircon, also in extremely sharp crystals of a slightly brownish color; and abundant yellow or greenish-yellow grains, rarely showing crystallographic faces; the refraction and double refraction of this mineral were very high, the hardness not much over 5. The ilmenite was eliminated by the electro-magnet, and the remaining powder, containing about 70 per cent of the yellow mineral, was analyzed by Dr. W. F. Hillebrand. The result showed it to be a phosphate of the cerium metals, the approximate amount of the oxides of the latter being 48 per cent; in these approximately 1.20 per cent of thoria was found. This result identifies the mineral with monazite, the only other similar mineral being xenotime, which is mainly a phosphate of yttrium with but little cerium. The samples also contained a considerable amount of titanium, which would indicate that some titanite is present. Practically, all of the ilmenite was extracted by the magnet.

Another sample, furnished me by Dr. T. Myer of Placerville, Idaho, came from the alluvial gold washings in Wolf creek, near that town. Cleaned from quartz, etc., it appeared as a heavy dark sand, consisting of a black iron ore (ilmenite), rounded crystals of red garnet, sharp crystals of zircon, and irregular grains of a dark yellowish-brown mineral, with waxy luster, sometimes showing crystallographic faces. It was found impossible to extract but a small part of the iron ore by the magnet; there was practically no magnetite present. This sand was examined by Dr. Hillebrand qualitatively with the result of finding phosphoric acid, cerium metals and thorium. The yellowish-brown mineral is therefore in all probability monazite.

Monazite has, as well known, a certain economic value, as the oxides of the rare earths contained in it are used for the preparation of the incandescent gas lights of the Welsbach and other burners. A considerable amount of monazite sand has been produced during the last few years in the southern Atlantic States, chiefly in North Carolina, and in Brazil. The prices have varied between 3 cents per pound up to 25 cents, according to the purity and the percentage of thoria. The North Carolina monazite contains between 0.17% and 6.20% of this rare earth. Mr. Waldron Shapleigh, chemist for the Welsbach Light Company, in a letter of March, 1897, kindly gives the following information in regard to the present production and price:

"At present the monazite sand market is very dull; hardly any demand, and only in lots of a few tons. The present price in North Carolina is 6 cents per pound, but it can be bought a little lower than this. Brazilian sand is quoted in New York at 4¾ cents per pound, fully equal to the North Carolina sand, in five or ten-ton lots. Larger orders can be placed in Brazil at a much lower figure. The price has been steadily downward, as the supply from the mines now opened is far greater than the consumption. It is not generally known that during the first eighteen months or two years of this new industry enough sand was mined and purchased by the largest manufacturers to last several years to come, as so far it has but the one use. The manufacturers did not know how extensive the sand deposit was; therefore were desirous of securing a large and safe stock at the start.

"The largest purchasers are the Welsbach Light Company of Vienna, supplying Europe, and the Welsbach Light Company of Philadelphia, which supplies America. I should hardly think that Western localities could compete with North Carolina and Brazil, unless it is of a very superior quality or a by-product.

"At present there would be no difficulty in placing an order for several thousand tons per year in Brazil and having it filled."

The widespread occurrence of monazite in considerable quantities in the Idaho Basin raises the question whether the deposits can be profitably worked. The present low price and the high cost of transportation and labor makes this very doubtful, unless it can be saved as a by-product in the placer mines. It will be necessary to extract all ilmenite by strong electro-magnets; in this manner a comparatively pure product may be obtained. It is not practicable to entirely separate the zircon and garnet from the monazite. The purest material was obtained from near Idaho City, while that from Placerville and vicinity contains a large amount of ilmenite and garnets. Many data in regard to the character and production of monazite may be found in a paper in the Sixteenth Annual Report, 1894–95, U. S. Geological Survey, by Mr. H. B. C. Nitze.

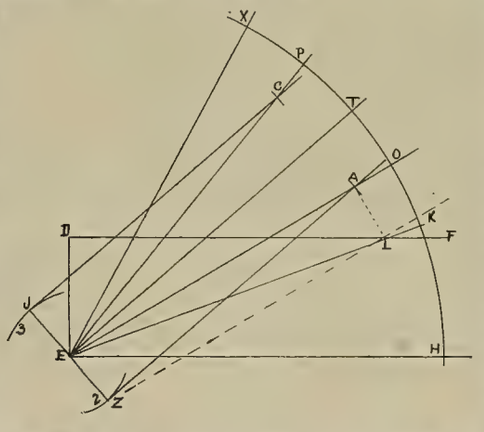
Trisecting an Angle by Ruler and Compass.

TO THE EDITOR:—In the Standard dictionary I find the following:

Trisection of the Angle.—The famous problem of dividing any angle into three equal parts by the ruler and compass; now proved to be impossible of solution.

The Century dictionary also adds to its definition: Now proved to be impossible of solution. Neither of these dictionaries gives any authority, but one of the good professors of mathematics at our State University says that Professor Felix Kline of Gottingen University has lately published a mathematical work in which is found a demonstration of the insolubility of this problem.

Now I am not an angel, but I "fear to tread" in the presence of these great authorities. Nevertheless, let me give to the intelligent readers of your excellent journal the following solution:



To Trisect an Arc of Any Angle.—Let the given angle be XEH and XOH the arc bisected in EO. Perpendicular to the base erect from E any line ED and from D parallel EH draw DF and with radius equal ⅓DE describe arcs 2 and 3.

Now tangent arc 2 and parallel EO draw ZK cutting DF at L; and from L perpendicular ZK draw AL cutting EO at A; and also tangent arc 2 and through A draw ZA.

Then tangent arc 3 and parallel ZA draw JP, and perpendicular ZA draw JZ and on JP lay off JC= ZA, and through C draw radius EP and through E and parallel JC (and ZA) draw ET. Draw also EK bisecting arc TH. Then will arc XOH be trisected.

For since the two right-angled triangles CJE and AZE with sides CJ and JE in the one equal sides AZ and ZE in the other each to each and the included angle in each a right angle, the two triangles are equal in all their parts; hence we have the angle CEJ equal angle AEZ.

Now it is known that radius EO since it bisects the given angle, bisects at the same time the middle third of that angle; and since it does so at the angle ZEA, EP at the opposite but equal angle JEC must bisect the first third.

Again, since the triangles CJE and AZE are equal in all their parts as has been shown, the angles at C and A are equal; and these being alternate C with TEP and A with TEO, TEP=TEO; hence arc PT= arc TO being arcs of equal angles. Arc PO is therefore bisected in T, thus indicating the common limit of the first and middle third.

We have now XT the first third of the arc XOH, and on drawing EK bisecting the remaining arc TH the arc XOH of the given angle is trisected, and with it the given angle. C. P. STANFORD.

S. F., Cal., July 20th, '97.

Innovation in Stamp Practice.

Recent mention of an innovation in stamp practice has occasioned considerable inquiry. It is an English idea, in which the stamps are lifted by levers instead of cams. The experimenter, D. B. Morison, says:

"The experiments were made on a stamp head of the following dimensions:—Stem, 3½ inches diameter; length, 13 feet. Depth of guides: top, 14 inches; bottom, 14 inches. Distance between guides, 6 feet 2 inches. Combined weights of stem, tappet, head, and shoe, 900 pounds.

"Diagrams were taken on a drum 7 inches in diameter, driven at a uniform velocity by a pulley on the cam shaft. A recording pencil was attached to a washer on the stem, this washer being loose on the stem, and held in position by a collar on either side, to that the rotation of the stem was not interfered with. Careful records of the number of revolutions per minute were made by three independent operators, each experiment was repeated at least three times, and the utmost care was exercised throughout to obtain reliable and correct data. The first series of experiments were made under the conditions of dry crushing, or without water in the mortar box; in the second series the heads were immersed in water, as in wet crushing, just sufficient material being kept on the dies in each case to prevent metallic contact. Half the experiments were made with the tappet set to a 6½ inches drop, and the remainder at a drop of 8 inches. Diagrams were taken under the condition of wet crushing at 82, 88 and 97 drops per minute, with the tappet at 6½ inches, the cycle of movement being—(1) raising the weight, (2) dropping the weight, (3) the time during which crushing takes place. When the cam comes in contact with the tappet, the weight is not raised gradually, but is supposed to acquire instantly a velocity corresponding to that of the cam, or, in other words, a blow is struck on the tappet by the cam; and it is this blow which is the cause of much of the intense noise and vibrations which are inherent defects in a cam stamp mill. This vibration may be, of course, minimized in intensity by constructing the framework with heavy scantlings, and providing deep foundations; but the tendendy to vibrate due to the action of the cam still remains, and the mechanical efficiency cannot be increased by simply adding weight of material, but only by removing the cause. In a properly constructed cam, designed to give a drop of 8 inches, for example the vertical component of the velocity of the cam is for 80, 90, and 100 drops per minute, about 1.601, 1.8, and 2.01 feet per second respectively, and having acquired a velocity of 2 feet per second, a weight will continue its upward movement ¾-inch unaided—due to its momentum—less, of course, the retardation through friction. It is principally on this account that a cam stamp has such a low limit of available speed; as it is evident that if the uniform upward velocity is such that the weight travels beyond its normal stroke, then before it has time to reach the die, the second cam meets it, and by receiving the full force of the blow, an accident is very liable to result. A diagram was taken at this critical period, and evidence of the great vibration is shown by the very wavy line made during the upstroke. When the highest point is reached, the fall takes place under the action of gravity, retarded only by the friction of guides and passage through the water. On the terminal velocity depends the energy of blow, and this may be obtained from the diagram by taking a trigonometrical tangent to the curve. Compared with the energy due to theoretical gravity, this loss amounted to 17 per cent, which was the mean of twenty-four experiments, including those with an 8-inch drop, as represented by diagrams. The critical speed, with the latter drop, was found to be about ninety-four per minute, but the vibration was so severe at this speed that difficulty was experienced in obtaining reliable diagrams. The loss in energy with light weights naturally shows a greater percentage than with heavy; and in order to prove this, the head and shoe were removed, and the resulting diagrams gave a loss of 24 per cent. The dry crushing experiments showed a los of 5 per cent less than wet crushing, this being the mean of twenty-four experiments. It will be observed that no fractions of a drop are taken, so that the terminal velocities are correct to within a maximum of one drop per minute."

IN a recently patented clutch to throw a wheel into action on a shaft or connect two shafts, a pair of electro-magnets are attached to levers, which force the jaws to grip the shaft as soon as electric current is turned on; the wires being strung on the shaft with a metal ring at the end to connect them to the switch.

Change in Promotion Methods of London.

A recent letter to the Denver *Mining Record* on the ways and doings of London promoters says that a change has occurred in the promotion methods in that city, and one that may have effect on those who are interested in the sale of mines:

"First of all, the craze for limited liability companies seems to be at its height, and almost everything that can be so transformed is being made into a limited liability company. The consequence is that the day of the small syndicate of wealthy men who took up mines as an investment is going, and instead thereof these folks are distributing their money over a number of limited liability companies, and not in the large sums they did formerly. That is one change that I have noticed. This will make a difference in the sales of mines, for formerly one could almost put a mine in one's pocket, or rather the reports, etc., run over to London and go home again with the money in a satchel. That cannot be done nowadays except in the very rarest cases. Other changes are in the methods of promotion.

"The method of promotion that existed and flourished here last year and for some years before was on this wise: You had a claim to sell which was worth we shall say £20,000. Well, you went to a promoter, and he had the matter looked over, and, if all satisfactory to him, he agreed to float your company on this basis: One-third of the capital to go to him for his trouble, one-third to you and your friends as vendors and one-third for working capital. Out of the one-third which the promoter received he paid all expenses of promotion, which are quite heavy in London, and would easily run into $25,000 or $30,000, besides paying you a certain sum in cash for your mine, for it was only in rare instances that he paid all in cash, the usual method being part cash and part shares. The promoter, therefore, took the risk of the money he expended for promotion expenses, plus the amount he paid you in cash for your mine, and for this he received one-third of the stock. In order to decrease the risk, which would be large if the public did not come in, there arose the system of underwriting, in which certain firms and individuals made a contract with the promoter to take so many of the shares, the price to them being really less than to the public, though, as the law does not allow shares to be sold in such cases below par, the method adopted was to give a bonus. Of course, in the case of a company of say £100,000 that was subscribed for entirely the promoter made a fat thing of it, for he received £33,000 in return for an expenditure of say £10,000. But the public? Well, they paid about three times the real value of the mine, for the vendor was willing to sell at £20,000, and it was not often that a company came out for less than say £75,000, and in such cases, as some of the Anglo-Cripple Creek companies, claims were bought at $140,000 and floated at the nice figure of £120,000—about four times the price paid for the property.

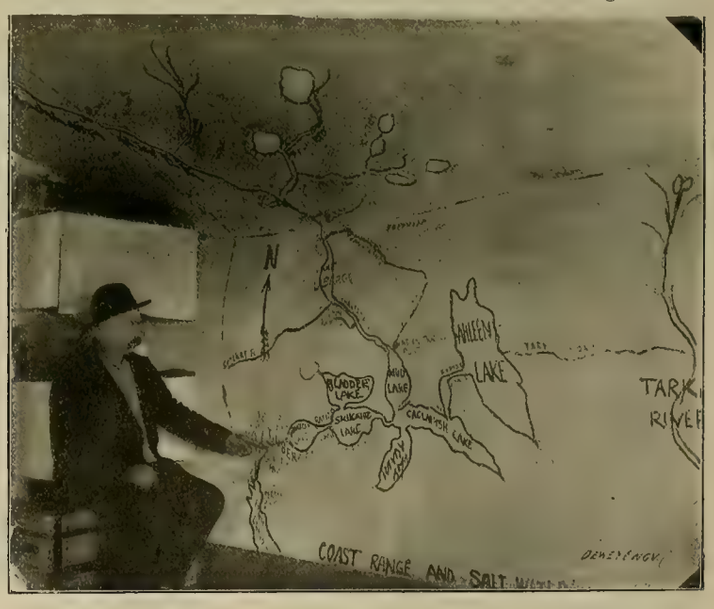
"Of course, this style of business could not last forever. The public had to catch on some time, and they have done so, largely because the companies so overcapitalized and floated have not returned any dividends or been much of a success, so that it is not so easy to float a company, and the promoters do not find the public so quick to bite as they were in the days gone by. The consequence has been that advertising and other such expenses have increased, as it needs more pushing nowadays to get a company floated, and the promoters do not, generally speaking, take kindly to the idea of shouldering all the risks, so that in the case of nearly all the companies that have come out of late, including the Caledonia of Cripple Creek, all the promotion expenses have been paid by the vendor, and that fact is so stated on the prospectus. The public seems to be comforted by this announcement, for it suggests to them that the vendor believes in the property he sells, and also that the huge expenses of promotion and the large fees have not been paid, all of which supposition may or may not be true, by the way.

"However, the point is that if you have a mine or a claim to sell, you will not find your pathway so easy as it was one year ago and before that date; and if you really want it floated here, and the capital so raised, you may find it necessary to put up all, if not part, of the promotion expenses."

THE QUEEN AT TREADWELL'S WHARF, JUNEAU ON THE RIGHT, DOUGLAS ISLAND ON THE LEFT.—(See page 165.)

A Russian Idea.

A Tokio journal is responsible for the following: "Vladivostock, being the terminus of the Siberian railway, is a most important port in Russia. Notwithstanding this fact, for over four months during the cold season the port is blocked up with ice, and the shipping traffic is entirely impossible, and therefore the railway loses much of its advantages. The Russian authorities have been endeavoring for many years to conquer nature, and some years ago ice-breaking ships were introduced to break open the ice, but it has been found that the operation is practically useless. A certain engineer has hit upon the idea of reclaiming the narrowest part of the Tartar strait between Sahgalien and the Russian mainland. He is of the opinion that if this is done the cold current that enters the Japan sea from the Arctic via Bering straits will be checked, and the passage of the warmer tide coming from the south through the Tshuma strait will make the water on the coast of Japan as warm as Vladivostock, and the latter will be warm all the year around. This scheme was presented to the Russian Government for its approval, and it is now engaged in its investigation. There is a probability of this pice of engineering being entered upon after the completion of the Siberian railway."



MINER'S TENT AT YUKON GOLD FIELD.—(See page 165.)

"CAST STEEL" is a term that was introduced to distinguish crucible steel from "blister steel" or "weld steel" at the time crucible steel came into use, and once indicated the highest quality. To-day the term means nothing definite, for Bessemer and open-hearth steels, both basic and acid, now are all "cast steels."

Mining Summary.

CALIFORNIA.

Amador.

Ross E. Browne has resigned the general management of the Oneida mine. Foreman John Truscott remains in local charge as heretofore. The shaft is down 1140 feet and good progress is being made.

At Volcano the *Dispatch* reports the Monte Cristo mill running steadily. The ledge is in porphyry and broken quartz and has been crosscut 60 feet from the footwall and no hanging wall reached yet.

The Iron Mass, a quarter of a mile above the Monte Cristo, is owned and worked by McLaughlin, Richards & Rennie.

The Horseshoe will work what is above their present tunnel, then drive a tunnel to tap the ledge 200 feet deeper and erect a 5-stamp mill.

C. A. Love is the new superintendent of the Weiland mine, where drifting on the 500-foot level is being pushed.

The Amador Queen mine is now down to a depth of 650 feet. Sinking goes on. A drift is being run to the eastward which is now 75 feet from the station at the 500-foot level, and is in the footwall rock.

Butte.

General Manager Evans at Oroville is putting in 40 stamps on the Banner. In the early part of the month he cleaned up from sluicing in the Feather about $2500 from about 180 feet river bed, most of which had been previously worked. He will have another cleanup September 1.

Calaveras.

At the Three B gravel claim on the Calaveras river a shaft will be sunk 80 feet, from which drifts will be run to tap the cement gravel. A mill may have to be erected. C. Page, Mokelumne Hill, is superintendent.

(Special Correspondence).—At Railroad Flat, in the 350-foot drift, north, of the Pettycoat mine, the old shoot has been cut and found rich rock. In the extension south, the Keystone, they have uncovered a new ore shoot that goes $250 to $300 to the ton. The veins of the section are all rich in black metallic slate, with a good graphite gouge.

It has been charged that the veins of Railroad do not carry their gold down, but the showing now in the Pettycoat will contradict this.

El Dorado.

At the Taylor mine the Idlewild Company has the shaft down 1225 feet. Seventy men are at work.

The Saucerman mine, a mile below Garden Valley, has a 5-foot ledge of good grade ore. J. B. Somers is in charge.

W. T. Henson of Placerville and J. D. Bancroft of Chicago have bonded the Golden Stream gravel mine, three miles from Placerville. A tunnel has been run 500 feet. The owners propose building a mill.

The Two Channel Mining Company at Volcanoville employs twenty-five men. The 10-stamp gravel mill is in constant operation. Ten more stamps will shortly be added.

A gravel strike is reported from the Grizzly gravel mine at Grizzly Flat, some going as high as $30 to the pan. A. A. McDonald is superintendent.

At the Grand Victory mine new machinery, pumps and hoisting engine are being put in. Twenty men are employed.

Nugget: The Minnehaha, adjoining the Pocahontas, has been sold to E. W. Roberts of Oakland. Work on a two compartment shaft has begun.

At the Black Jack one hundred men are on the pay-roll. The mill reduces about 700 tons of ore per month.

The Trade Dollar is mining and milling high-grade ore. A winze is being sunk from the Blaine tunnel, 2000 feet from the tunnel mouth, to open up their ore bodies at depth.

The *Avalanche* says the big deal which was to take place in the Trade Dollar, Black Jack and Boonville groups has been declared off. It is the supposition that the Standard Oil Company was the prospective purchaser.

Fresno.

L. Rabordore on Black creek is reported to have uncovered a 2-foot vein of unusual richness.

Kern.

The Randsburg *Miner* says the shaft on the J. I. C. is down about 270 feet with good indications for the future. The crosscut at the 170-foot level is in 60 feet.

At Randsburg the Little Butte Mining Co. at the depth of 280 feet has ore $471.90 in gold, 14 inches wide.

At Randsburg nearly 200 claims are being worked. The Magganetta drift has been extended 65 feet along the ledge. Small streaks of ore have run nearly the whole distance. The Merced has just shipped another gold brick. There are 30 men working on the Winnie.

Los Angeles.

At Old Baldy there are now about 100 men prospecting on the mountain. The new finds made in the George L. mine attract considerable attention.

The Red Rover at Acton is making another run on its high-grade ore from the 700-foot level.

Madera.

J. B. Peaks and J. C. Wilbur have sold the Syndicate gold property, twelve miles from Raymond, in Madera county, to J. W. Chipman of Indianapolis, who will build a 10 stamp mill, put in a complete electrical plant and run a tunnel to tap the vein 140 feet below the present tunnel. The ore is said to run from $10 to $18 a ton, the vein being 18 feet wide. The mine will be turned over to Mr. Chipman on September 1, at which time he will have returned from New York.

Mariposa.

Oakland men who have developed a property fifteen miles northeast of Mariposa report a rich 5-foot ledge that justifies them in the belief that it will compare favorably with the best strikes of the year in the State; fourteen men are employed, and several thousand dollars are said to be in sight.

(Special Correspondence).—The Merced Gold Mining Company has closed the Malvina mine and is now operating only the Mary Harrison, from which sufficient ore is being taken to keep the 40-stamp mill in operation. About thirty men were thrown out by the closing of the Malvina, of whom about one-half were re-employed at the Mary.

At the Virginia a number of additional men have been put on during the past week.

On the Red Banks properties three shifts are engaged in extending the Daisy tunnel to cut the ledge on the Crown Lead claim of the McCrellish properties. The distance to be run is about 300 feet, which will make the total length of the tunnel about 900 feet. Progress is being made at the rate of 15 to 20 feet weekly.

At the Louisiana the new prospecting mill is running and the work of pumping out the shaft is in progress.

On the Intervenor drifting is in progress both ways from the tunnel. Both faces are in a good quality of milling ore.

The Lucky Bill mine, near the south line of the county and owned by Sheriff R. A. Prouty, under bond to J. B. Peakes and J. S. Wilbur, is sold to Eastern parties for $100,000. So far as opened, the mine shows great value, the vein in the tunnel, which was about 15 feet, had widened to 20 feet at the depth of 20 feet in the winze, and 400 tons of this ore milled in the old Mammoth mill at Grub Gulch yielded a little over $17 per ton. Mr. Prouty retains an interest in the property with the new owners.

The opening of the Sierra railway has been of considerable value to this section. The length of wagon haul has been reduced one-half, the passenger time between Coulterville and San Francisco via Dom Pedro station is now twelve hours, instead of thirty as by the old routes, and a saving is effected in freight rates of about 33 per cent, the latter a very material item to the low-grade mines of this district.

An unusual number of properties in this vicinity have been under examination during the past two weeks, with a good prospect of some extensive operations resulting.

Coulterville, Aug. 17.

Mono.

At the Montecito, Goleta and Sterling twenty men are employed, opening up ground in the Sterling, 150 feet north from the lower tunnel, which extends 1200 feet into the hill, the face being 700 feet vertically below the surface. They are in a body of ore 40 feet wide. The material assays, on an average, $8 per ton.

Nevada.

At the Orleans, Supt. Brockington will put in a new two-drill compressor. A crosscut in the hanging wall is to be run in the No. 8 level and another driven in the footwall to strike the Huston Hill vein. This was very rich in the early days, paying $240,000 in dividends from 1864 to 1869.

The *Union* reports that Buck Bros. of Moore's Flat have struck another quartz ledge with considerable gold at the mouth of New York ravine.

The *Union* says preliminary work for opening up and developing the Diamond mine, recently sold to A. C. Widber, treasurer of San Francisco, has begun. A hoisting and pumping plant will be put on the property. An incline shaft will be sunk several hundred feet in depth. J. Deasy from San Francisco will be superintendent.

Placer.

Sentinel: Two carloads of machinery have arrived at Colfax for the Hidden Treasure Mining Company above Forest Hill. One car contained the dynamo for the $15,000 electric plant and the necessary wire, about 24,000 feet for the circuit. A second car was loaded with 11-inch pipe for the new blower.

Plumas.

National-Bulletin: Eomaldo & Co. have recently tapped the gravel channel. The gold secured is very heavy and lies mainly on the bedrock. Pieces weighing from $5 to $20 are numerous. Two thousand dollars taken from the property was taken to La Porte a few days ago. The mine is now bonded to an English company for $15,000.

F. E. Thomas at the Fairstake mining property, Emigrant Hill, after sinking a shaft reached bedrock and began to drift. The first day's work in taking out and washing gravel gave $50. If plenty of water were to be had at the mine larger returns could be secured.

San Diego.

The Du Quesne Mining Co. has twenty men working on the old Escondido mines day and night.

Capt. W. R. Farnsworth has purchased the North Star mine, an extension of the Ranchita, at Banner.

In the Mesquite district, six miles from Glamis, the Bay Horse reports averaging $25 per ton. M. S. G. Todd of Los Angeles is secretary.

Shasta.

An additional force arrived at Mule mountain last week from Cripple Creek, Colo., to assist in the development of the London Gold Tunnel Company's property. From Sec'y E. W. Sebben the *Searchlight* learns that it is expected the tunnel will be driven 400 feet. It is thought that some small veins will be encountered, besides penetrating the large ledge many feet. An assay from the four ledges already cut gives an average of $21. The fourth contains 5 per cent copper.

Supt. Hanley of the Niagara reports the vein 5 feet wide, carrying $15 free-milling ore and 1 foot of $60 smelting ore. The O'Neil tunnel 2300 feet in length crosscuts the vein, and at that point either electricity or compressed air will be used to aid in sinking upon the ledge. If, on sinking, it is demonstrated that the ledge continues to carry pay to a greater depth, a new tunnel will be run to serve both as main and ultimate working tunnel. This tunnel will be over a mile in length and will tap the ledge at a vertical depth of 1800 feet, or about 900 feet below the O'Neil level.

Sierra.

In the upraise at the Butcher Ranch mine the *Enterprise* reports a vein of ribbon quartz showing well in free gold.

At the Gold Bluff ore is being taken out of the upper levels that will average $6 per ton. The intention is to extract 600 tons before starting the mill.

Siskiyou.

The Lucky Hall has a ledge averaging 16 inches in width, milling from $14 to $20 a ton.

The hydraulic claims on the Klamath have closed down on account of a scarcity of water. It is said that creeks and gulches that had a big supply of water a year ago at this time are almost dry now.

The Siskiyou mine, on the Klamath river, opposite the Bunker Hill mine, is one of the best paying properties in that locality, although it is now closed down, owing to a scarcity of water. It is said that for some time previous to closing down they took out an average of $500 a day.

The Klamath River Flume & Mining Company are employing a large number of men at their property near Happy Camp, and will be ready for operation by the first of next year.

The river mines on the Klamath are about all that can be worked at present, owing to the scarcity of water. They are all busy taking out as much gravel as possible before the storms commence, when they will have to stop work, and when the hydraulic mines can commence.

The Katie May mine on Greenhorn, owned by Bailey & Carrick, will be worked this fall and winter by its owners, who expect to take out a large quantity of quartz.

A 300-foot tunnel was recently run in the Commodore mine, on Barkhouse, by Quigley & Humphreys, and a 5-foot ledge was struck, from which 300 ounces of gold has been taken out.

Jones & Daniels of Quartz valley have bought the Pinkham quartz mine.

The Green Mountain mine in Quartz valley, owned by the Allen brothers, has closed down. The machinery, hoisting works and pump have been taken out.

At Happy Camp, Superintendent Stanley of the Minnetta B. mine, Nolton, has nine men cutting away and piping the top soil to the depth of 60 feet, and will put in an elevator to remove the bottom gravel. The company pay from $2.25 to $3 per day.

Dr. McArdle of Portland has bought the property twenty miles below, owned by Rolls & Co.

The Klamath Flume & Mining Company are surveying the final location of the big ditch.

Mr. Schuler, Scott river, near Scott's Bar, this week showed the *Journal* a nugget he had taken out which measured about 3 inches square and 1 inch thick, comprising gold and tellurium, the gold being valued at $400. He also had several other nuggets varying in size from value of $5 and less. Scott river has been noted for rich nuggets, such finds being of common occurrence during the '50 period, with occasional strikes ever since, besides many rich pockets of quartz.

The miners who took out 117 ounces from a pocket at Ash Creek, Klamath river, nine miles north of Yreka, a short time ago, are still at work realizing good prospects, with the expectation of finding a permanent ledge.

Humphreys & Quigley brought in about $4500 from the Commodore mine, on Barkhouse creek, last week.

Since the recent strikes at Coffee creek, Scott river, Ash creek, Barkhouse and other places, numerous prospectors have started out hunting mines in every section of Siskiyou.

Trinity.

R. R. McCleod, representing San Jose men, has men building a mill on the East Fork of Trinity river, eight miles east of Trinity Center. The company have a large ledge of low-grade rock.

The Strode mine is turning out good rock and milling goes on day and night. It is five miles above Trinity Center.

Coffee creek has been worked for many years by placer miners with varying success. The gravel is very rich; but, owing to the nature of the ground, its extraction has been costly. The Nash Mining Company are working on an extensive scale at the head of Coffee creek and are having good success in their gravel mines. D. Duncan, working on Hickory gulch, recently made a discovery of decomposed quartz, 300 feet wide, which will yield from $25 to $30 to the pan. This gulch is a tributary of main Coffee creek.

A carload of machinery, including a large horizontal boiler, hoisting machinery and wire cable, has arrived for the Altoona Quicksilver Mining Company at Cinnabar.

The *Journal* reports that the Cle Fse Company at Junction City are making preparations to work the Keno and Pickett mines the coming season. They have dug trenches and will lay 6000 feet of iron pipe to convey water from the bluff to the mines. The work will be completed this fall.

Good reports come from the new finds on Coffee creek. There are a large number of visitors and prospectors going into the country.

J. H. Carroll from Coffee creek tells the *Searchlight* that he and J. A. Riley were the original locators of the vein from which Burgess and Murphy took out twelve ounces in one day last week. It was reported that they took out $80,000, mentioned only to show the unreliability of reports circulated by space writers on city dailies. The total taken out up to last Sunday by these miners, when Mr. Carroll left the creek, was about $1200. Carroll and Riley sold their claim to Pitts and Manning of Oro Fino. The Burgess & Murphy mine is an east extension, while D. Donovan has a promising claim on the west extension.

Tuolumne.

In the Rawhide mine they struck the ledge on the 1100-foot level. The Rawhide is credited with a July yield of $250,000.

The Dutch Mining Company will soon put up a brick building 30x40, the first brick building in Quartz Mountain.

The Andy Johnson will be started this week. At the Helena, one and a half miles below Stent, a tunnel has been run 100 feet on the lode and crosscutting begun. The three compartment shaft on the Trio is now down 73 feet. At shaft No 1 drifting on the ledge is being carried ahead. At the Golden Rule the drift on the 300-foot level shows free gold in the quartz. The other drifts being driven are all in good pay rock. A station is being cut on the 300-level of the Alabama. A mill will soon be built.

The Excelsior, 15 miles from Sonora, is to be reopened. Supt. Ogden of the Providence hopes to soon be able to start a 3-compartment shaft 300 ft. north of the present tunnel and build a 20-stamp mill. At the Lady Washington the mill has proven a failure. Supt. Fisher will put up a 5-stamp mill. Supt. Jose has resumed work on the Green. Supt. Summers has begun sinking a shaft on the North Carlotta.

(Special Correspondene).—The old Soulsby will start up as soon as the rain comes. The mine was closed down on the first of June, the last shots put in the night before showed up the vein 14 inches wide with visible gold all through the ore. The mine in its past has taken out over $3,000,000 from the old Soulsby shoot, 1200 feet north of the present Pennsylvania shaft.

NEVADA.

Near Silver City a gold brick weighing four pounds, worth $12.86 per ounce, was produced last week from the Cosmopolitan mine on the 100-foot level.

The National Nickel Company in Cottonwood have started their electric plant on ore averaging 15 per cent nickel. Forty tons of machinery and mining implements are in the freight depot at Lovelock.

Seven carloads of machinery, billed to the Chainman Company, have arrived in Eureka.

McDonald and Rice, from El Dorado canyon, Lincoln county, say the largest bodies of ore ever found in southern Nevada are now opened up in the Techaticup and Wall Street mines, owned by the Southwestern Mining Company. One of the ledges shows a 50-foot breast of ore that will mill $20 per ton in gold. In another ledge an 8-foot body of ore runs over five ounces in gold to the ton. Charles Gracey, the new superintendent, has opened the two mines in excellent shape and has enough ore in sight to keep the 15-stamp mill pounding away for five years. The June output of the mill was $15,000.

At Carson this week, in the United States Circuit Court, Judge Hawley in the case of A. Garrard against the Silver Peak mines, an action in ejectment to recover from the Silver Peak mines lands in Esmeralda county, with mill tailings, found for the defendants. Defendants had been using the land since June, 1895. A mill and other improvements had been built by the defendants to the value of $120,000. The contention arose through a mistake of the Surveyor-General of Nevada at the time the land was taken up. The land should have been in plat 22, but by the error it was recorded as in 58. Garrard, who was a surveyor, together with others, then attempted to get the land. The court decided that the State had no title to the lands under the 2,000,000-acre grant, this land being of a salt or saline character and exempt from grant.

John Mackay had arranged to take the mine in case the defendant won the suit, and his representatives, Womble and Roberts, are to assume charge. The mine is in the southern part of Esmeralda county.

OREGON.

There are twenty men on Silver creek, Josephine county, some making $10 a day; there is still considerable unprospected ground in that district.

The quartz mill on the Golden Fleece mine, Talent, was destroyed by fire last week; loss $3000, no insurance.

At Pleasant creek there are four hydraulics rigged. Calvert & Stevens are to put on an 11-inch and No. 2 giant. Chaney & Ruefly have an 11-inch pipe and No. 2 giant. G. Leason has an 8-inch pipe and No. 1 giant.

Borden & Howell, Evans creek, are taking a twelve-mile ditch from Evans creek and expect to be working thirty men in a short time.

The Red Boy mine, Baker county, last week cleaned up $12,000. But six tons of ore are crushed daily. It is intended to increase the milling capacity.

C. S. Rutter of Spokane has been appointed receiver of the Bonanza mine, Baker county, pending the settlement of differences arising out of the distribution of the proceeds of the sale of the mine, which took place recently, for $750,000.

The Seven Devils Anaconda Copper Company has incorporated at Baker City; capital stock, $1,000,000; M. Fuchs, A. E. Beard, C. F. Hyde.

The Prescott *Courier* reports the sale of the Fuller group of mines, on Squaw creek, Yavapai county, to Mr. Reeves of Denver and Mr. Thurston of New York for $35,000.

WASHINGTON.

Flodin & Morrison this week sold their mine on Cougar gulch, Swauk district, for $40,000. The incorporation was known as the Cougar M. & M. Company. The purchaser is Frederick Hagerman. He will build hoisting works within three months and erect a stamp mill inside of six months. The ore has been handled by arastras.

BRITISH COLUMBIA.

At a meeting of the Cariboo Mining Company, Camp McKinney, held recently in Spokane, Manager Monahan made the following

statement regarding the operations of the company during the past year: During the past twelve months there has been 6742 tons of ore milled, producing 8035 ounces of bullion and 170 tons of concentrates; the ore milled has averaged $17.45 per ton. There has been 855 feet of drifting on ore and 100 feet of raising on ore; 200 feet development crosscutting; 175 feet development shafting; 50 feet development winze sinking, making 425 feet of developing. The company has recently put in a lot of new machinery, and the mine is now thoroughly equipped in every respect. Since operations were first commenced $156,964.76 has been paid in dividends.

Rossland reports that its mines are producing double the quantity of ore that they were seven months ago, and there are more men working underground than ever before. The force at the Le Roi is nearly double of what it was one year ago, and Supt. Hall says he has still room for thirty more first-class machine-men.

At New Denver apprehension is felt for that silver-producing camp since the decline of the white metal. The general opinion seems to be that, if the price of silver remains low, the Slocan will experience a repetition of the panicky days of 1892-93. No evidence is yet given by the large working mines that they have considered the matter in a serious light, and work is progressing as usual.

Secretary Liftchild of the Poorman mine of Rossland gives the following statement regarding the expenses and receipts since its reorganization—January 1, 1896, to July 15, 1897: Receipts—Returns from ore shipments, $5489.52; assessment No. 1, $4864.92; total, $10,354.42. Expenses—Mining account, $6895.67; general expenses, including organization and 1897 license, $652.22; office expenses, $511.22; assaying account, $239.50; hauling account, $602.48; cash on hand, $1453.33; total, $10,354.42.

James Breen, manager of the Le Roi smelter, tells the Rossland *Miner* that one of the principal reasons for selecting Northport, Wash., as the site of the smelter was that, in the operation of a smelter of 300 tons capacity, it will require approximately forty tons of limestone daily to flux the excess of silica contained in the Le Roi ore. This limestone now costs the B. C. S. & R. Company, whose smelter is located on the Columbia river at Trail, $3.50 per ton. The Le Roi Company at Northport can deliver a superior quality of limestone to any found in Kootenay in their works for 25 cents a ton, saving approximately $50,000 a year in this item alone. They can lay down coke in Northport for $2.50 per ton less than in Trail; and, using about forty-five tons of coke per day, makes a saving in this item of $45,000 per year. They will also save $1.50 per ton on coal—twenty tons per day, making a saving of $10,000 a year. The cost of the plant will be reduced 25 per cent by reason of cheaper building material and freight rates, without considering the innumerable articles entering into the construction of a smelter which have to pay duty notwithstanding that the machinery comes into Canada duty free. On renewals and repairs there will be a monthly expense of $2500, on which there will be a saving of $2.50 per ton in freight and 30 per cent in duties as against any point on the Canada side of the line. The saving in this item will approximate $15,000 per year. They will save $1.50 per ton on outgoing freight. On a basis of twenty tons per day this will amount to $15,000 per year. These items represent roughly a saving of $150,000 per year, or $1.50 per ton of ore smelted. The erection of the Northport plant secures a freight rate on ore of 75 cents per ton instead of $2, as heretofore charged.

A Nelson dispatch says the reverbatory furnace of the Hall mines smelter has closed down for repairs. The furnace now idle, No. 1, will be converted into a lead furnace. On the 11th the new smelter turned out 496,000 pounds of ore, 39,500 pounds of lime rock and 34 tons of coke. Add to this charge 19¼ tons of refining slag and 25 tons of blast furnace slag, and 321¼ tons were smelted.

ALASKA.

Thousands of senseless people, ignorant of where they are going, are still heading for the Klondike. There will be appalling accounts of suffering and death in horrible form from all along the route before long. This journal tried to stem the silly tide by publishing the truth, but those whose imaginations were inflamed by reading the countless columns of rot spread all over the country would see nothing but that which their fancy created.

Regarding the geology of that region, Prof. Lindemann, who explored the upper Yukon in 1871 and 1873, says that "the mineral zone extends east and west, instead of northeast to southwest. The formations are of an earlier period in the earth's history than are those familiar with the limits of the United States proper. I noticed five different strata, the upper and thinnest one being 30 feet thick.

"I think that the entire country is mineral territory, and the entire Alaskan range gold-bearing, the placers being found on every stream leading from the range on either side. The ledges are of tremendous width, but the gold-bearing rock is of low grade and cannot be profitably worked without the aid of capital.

"The geological formation where gold is found is a black slate of the Carboniferous age. I found there also a lime, a quartz and a quartzite, but no ashen granite. I found a granite about 236 miles west of Cook's inlet, and I found hematite 130 miles northeast of the Alaskan range.

"In the Kaihum hills, which were first explored by Russians, there are copper and coal. About 60 miles north of Mount Lake I found oil. I crossed and examined fifty-two streams and rivers and panned gold in all of them. I found many small nuggets, some of them weighing as much as five carats. I took gold out of the Katrin hills, where no other white man has ever visited. That point is about 230 miles north of Cook's inlet and probably 600 miles north of the Klondike field. But all my explorations showed low-grade values. The Klondike placers are undoubtely rich in spots, but they will be found to be a great exception. On Porcupine river I found flour gold and some small nuggets. Along the exposed ledges I made many careful analyses, but always to find low values.

"The dip rock varies greatly—from 11° to 7°. Some quartz fissures I noted and they were all knifeblade seams. There were tremendous ledges, however, that would be very profitable workings for big mills, backed by an abundance of capital."

UTAH.

The Mercur *Mercury* says the underground force at the Golden Gate is being added to steadily and will continue to be increased until 130 miners are on the pay-roll.

A Frisco report to the Salt Lake *Tribune* states that in the bottom of the shaft being sunk on the Kate Sackett claim, the property of the Beaver Lake Copper Mining Company, a vein is being cut that carries large quantities of black sulphurets of silver, estimated to carry 700 or 800 ounces silver.

(Special Correspondence).—By reason of the price of lead keeping up the Bingham district is doing what may be considered fairly well under existing conditions. In general terms the camp is one of silver and lead, but in many of the mines the lead is such a predominating element that the discouraging slump in silver is not as severely felt as in other places which might be named.

But the fact that a first-class gold property is being developed and equipped in Bingham district, and that a well-defined, valuable copper ledge has been uncovered on the same property, shows that the precious metals are oftentimes more equally distributed than many suppose is the case. I refer to the Highland Boy property in Carr's gulch, near Bingham. Here is a property developed by several tunnels, connected by drifts and winzes, carrying silicious ores, running in values from $10 to $12 per ton in gold. These are oxydized and will be milled on the ground. In other portions of the property are large bodies of sulphide of copper ores, which must be smelted. The Highland Boy mill is practically complete and will be in operation prior to September 1. It is a combination mill, panamalgamation and cyanide, having a total capacity of 250 tons per day. All the ores are to be crushed to an 8-mesh. The coarser material will be cyanided and the finer passed through the pans and settlers. There are 10 leaching vats, 22 feet in diameter, 10 feet deep, six pans and three settlers. The mill was equipped without regard for the treatment of the copper ores, but the copper ledge is showing up so well that the problem of extracting the copper therefrom will be soon taken up.

The Old Jordan and Galena, whose pyritic ores carry good values in silver, lead and gold, is steadily operating with a concentrating mill, the tonnage being about 60 per day. Near the surface these ores were oxydized, but now it is purely a concentrating proposition.

The Spanish cyanide mill is treating about 40 tons of ore per day of medium values.

The Rogers mill and the North Last Chance are operating as usual, as is also the Winnemuck mine near town. J. G. Forrester, who formerly had charge of the Bullion-Beck mill at Eureka, has charge of the Winnemuck.

Bingham, Utah, Aug. 7, '97. WASCOTT.

IDAHO.

Lemp & Falk, of Boise, have bought the Star mine, at sheriff's sale, in Hailey, for $45,000.

The cyanide works at Camas No. 2 are about completed.

A contract has been signed for three sixty-ton barges for the Snake river-Seven Devils trade. One seventy-five ton capacity smelter now at Huntington will be put up immediately on the river, eighteen miles down the grade from the ore mines. Placers are paying better than ever since '68.

At Salmon, Idaho, on the 16th, all of the Yellow Jacket Gold Mining Company's property—consisting of a 50-stamp mill, forty-seven mining claims and other property—was sold at sheriff's sale, under an execution from the district court, to J. S. McChestney of New York, the judgment creditor, for $175,000.

MONTANA.

Butte *Miner*: The Boston & Montana Company has given a contract for replacing the iron pipes at the 1200 level of the Mountain View mine with others with a wood finish on the inside. The copper water in this mine for some reason has lately become so strong that it eats up any sort of metal pipes in a manner that is astounding, and has caused the management of the company a good deal of concern. The water from this mine will be precipitated, and it is expected that a good percentage of copper will be saved.

The cyanide plant at Pony is ready for work. The process will be under the supervision of Morris & Field.

Wetzstein & Eisenberg of Livingston have taken a six-months' lease and bond on the Gold Ring. The bond is for $150,000; $2000 down.

The drop in the market value of silver is a matter of consequence to the great Anaconda mines, whose output of this metal last year amounted to 5,433,826 ounces. Comparing the commercial value of silver to-day, which is 55½, with that of a year ago, when it was 68½, it is seen that the shrinkage in price on the Anaconda's production of argentiferous product alone, quality equal to that for 1896, would be $706,397. This is equal to fully 6-16 of 1 cent per pound on 125,000,000 pounds of copper.

The Anaconda has been getting out a very large copper product lately, that for May being about 12,262,000 pounds. It is necessary to produce heavily in order to pay its 10 per cent dividends on capital stock of $30,000,000. The whole plant and equipment, as it now stands, is fitted and arranged for an enormous production, and no curtailment in output should be expected. As it has depended on the silver and gold from its mines to furnish the bulk, if not all, of its profits, with the decline in bullion value of silver, the Anaconda would have to produce 1,250,000 ounces more silver than it did last year, with the market price 55½c, to obtain an income equal to that on its 1897 output of silver. Every cent that silver declines in price means a loss to the Anaconda of $54,338 on basis of last year's output. During 1896 the Anaconda produced nearly one-third of all the silver produced in the State of Montana. It would require very nearly the entire silver output, at present prices of bullion, to pay the Anaconda's dividends of $3,000,000 per annum. Both the argentiferous and auriferous yield of the Anaconda were somewhat less in 1896 than in 1895, notwithstanding an increase of over 25,000,000 pounds in the copper output.

E. Berthmet of France has purchased the Lexington Company's property, a mile north of Buttee, for $50,000. The Lexington was once owned by A. J. Davis. He bought it for $20 and a horse, but, not having any particular use for it, he sold it to the Lexington Company for $1,000,000. The property has not been worked on an extensive scale since the drop in silver.

The Gold Dredging Company, at Bannack, made a shipment of gold to the Helena assay office last week valued at $18,000, representing two weeks' work.

At Libby the Silver Cable Company has finished hauling 150 tons of machinery for their concentrator on Silver Cable group. They will handle about seventy tons of ore and ship daily one car of concentrates.

At Gaylord, on the Jefferson river, the Parrott Silver & Copper Company of Butte are erecting a smelter plant, expending $1,000,000. They have built a ditch eighteen miles long.

COLORADO.

W. S. Stratton is contemplating the erection of a 100-stamp cyanide plant on the top of Globe hill to handle low grade ores from his properties on the hill.

At the Isabella, Manager Freeland has been engaged mostly in dead work. The three-compartment shaft has been sunk 600 feet, in all the levels from the old incline shaft drifts and crosscuts driven and to connect with it; bodies of ore has been blocked out.

The statement of the Pharmacist Company for the quarter ending July shows receipts $15,000, disbursements $16,148, including payment of $4,000 on notes.

At Cripple Creek the July output from the Anchoria-Leland was 775 tons, all going to the smelters. Much dead work is being done. None of the milling grades are being broken in the mine. It is understood that the Anchoria-Leland mill will soon be built at Colorado City in connection with the electric railway from Colorado Springs to Cripple Creek to be built as the main stem of the Cripple Creek district road now under construction.

At Yankee a contract has been let to entirely overhaul the Alice mill and increase its capacity to 250 tons of ore daily. The mill will be remodeled on the principle of the Mayflower mill at Idaho Springs, as that has given the best results of any mill in which the ore of the Alice mine has been tested. A large air compressor is also to be erected at the mouth of the tunnel and a number of air drills will be used in breaking ore.

The Alice vein is probably the largest in the State, the ore body being 310 feet in width, and has been uncovered a distance of 800 feet in length, beyond which point it has never been prospected. So far the property has been worked by a series of tunnels run in different directions and from a pit resembling a large stone quarry.

The Holy Cross Gold Mining & Milling Company, operating at Holy Cross, during the past year has driven a drainage and development tunnel 1,600 feet in length and erected and put in operation a cyanide mill of a daily capacity of 75 tons.

At Ouray, F. W. Bushman of the Sky Rocket mine, arranged with the Fowler smelter to supply his plant with pyritic ore enough to keep it in operation constantly. The Sky Rocket contains apparently an unlimited body of pyritic iron, just what the smelter needs. The smelter people are to mine it themselves, and perhaps pay a nominal price for the ore. It will help the smelter out and develop the Sky Rocket mine.

NEW MEXICO.

Hornbeck & Osberg will erect a 100-ton chlorination plant within ninety days at their mines, three miles northwest of Elizabethtown.

The Gold Nugget Company of Wichita, Kan., has twenty-two acres of placers in Big Nigger gulch, where hydraulic operations will commence next week under the management of J. T. Bellow.

The Mesa del Oro Company, L. B. Tully superintendent, A. M. Dobbie engineer, will work the Hillsboro placers on a large scale never attempted before. The area includes 1,500 acres. The *New Mexican* says: The prospect shows between 60 cents and 80 cents a cubic yard in gold. A part of the work will be a ditch 20 miles from the Rio Animas to Animas Peak; the construction of a pipe line 2,600 feet spanning the Animas, and an extension of this pipe line 1,900 feet crossing a canyon. The ditch will be 4 feet wide at the bottom and 7 feet at the top and will be 3 feet deep, capacity 2,000 miners' inches per second; fall will be 10 to 1½ feet to the mile. The water to be used in washing the placers will come from a dam on the Animas. The estimated dimensions follow: Three hundred and thirty feet on the bottom, 8 feet on the top, and 100 feet in height. The estimated cost of fitting up the placers and putting every thing in readiness for operation is about $500,000. The company's principal place of business will be at Hillsboro. Surveys are now under way.

TAOS COUNTY.

Sixteen claims were located and filed upon in the Red River district in the last ten days of July.

A strike has been made on Red river about six miles below the town of Red River. It is said the vein will run about 300 ounces of silver to the ton.

The Climax at La Belle is shipping ore. In the drift a distance of 75 feet from the surface the vein is about 3 feet wide, all milling ore, accompanied by a pay streak about 9 inches wide that runs $120 in gold.

In Cabresto canyon, eight miles northwest of Red River, a tunnel is being driven into an abandoned working of the Spaniards. The fill-in has been cleared out for 110 feet, and the tunnel at that point dips at an angle of 25°. The loose dirt and gravel assay $27 to the ton, and occasionally pieces of ore are found which run $300 to the ton.

GRANT COUNTY.

The Driscoll Company has twenty men at work on the Carrasco dump in the Santa Rita district, and is shipping the product to Silver City.

Twenty-five men are working on the old Hanover mine for N. S. Berray. At water level a large body of 16 per cent copper ore has been struck.

About forty men are at work in the Confidence mine, in the Mogollon district. The company's mill started up two weeks ago.

Thirty-five men are at work on the Gilchrist lead, Guadalupe Oxide, and Clineo mines in the Santa Rita mountains, producing about 200 tons of high-grade copper ore per month, which is shipped to the Silver City reduction works for treatment.

Mrs. Hearst, who recently purchased the Pacific group of claims at Pinos Altos, is making many improvements on the property. The shaft on the B. & S. is down 100 feet below the old workings.

SIERRA COUNTY.

The July shipments from the Snake mine lease amounted to seventy-five tons, mostly over four ounces of gold and none under three ounces per ton.

ARIZONA.

The eleven copper claims of E. Hughes, in the Santa Ritas, three miles from Rosemont, are bonded to Denver men for $30,000. Work on the property is to be commenced within thirty days. At the expiration of ninety days $15,000 is to be paid and the remaining $15,000 is to be paid within ninety days thereafter.

At the Congress Gold Mining Company the cyanide plant handles 100 tons daily, producing about $600 per day. The capacity is to be increased to eighty stamps during the year. W. F. Staunton is superintendent.

The Yarnell 20-stamp mill, thirty miles east of the junction, will soon renew operations under a new contract. At Stanton a 10-stamp mill is expected to begin by September 1st. Fool's Gulch is closed up as a camp. There is some work being done at the Harqua Hala district, sixty miles southwest of Congress.

The White Hills mill last week shipped 800 pounds of bullion to Denver by express. The July output of the 10-stamp mill was $15,000.

The Arizona Onyx Company has been incorporated at Phœnix, capital stock $1,000,000, principal place of business Jersey City, N. J. T. J. Norris of Prescott is agent. The corporation was formed for the mining and manufacture of onyx.

General Agent Helm of the Denver & Rio Grande says the Phœnix & Globe Railroad will extend ninety miles. The work is to be done by the Santa Fe, Prescott & Phœnix road, at the present time operating a line running from Ash Fork to Phœnix, a distance of 196 miles. Construction will begin in a few weeks.

J. B. Young of Pasadena, Cal., has sued the Volcanic Copper Mining and Smelting Company of Arizona for $49,000 worth of their bonds. He alleges that he was offered $149,500 worth of the company's bonds to erect smelting works for them, he to receive all that was left after paying for the works. He made a contract by which the works were to be erected for $100,000, and asserts that the mining company failed to keep its promises.

AUSTRALIA.

The gold yield of Victoria for the last half-year was distributed among the following districts: Ararat, 12,300 ounces; Ballarat, 85,500 ounces; Beechworth, 54,900 ounces; Castlemaine, 25,900 ounces; Gippsland, 54,800 ounces; Maryborough, 28,600 ounces; Bendigo, 91,000 ounces; 4400 ounces, unspecified; total, 349,400 ounces.

The Broken Hill Proprietary half-yearly statements show a profit for the six months ending May 31st last of £147,000. The net assets amount to £602,000, and the profit and loss account shows a credit balance of £630,000. The average price obtained during the half-year for lead was £11 11s 3d per ton, and for fine silver 2s 7¼d per ounce. About 206,000 tons of ore were treated of an average assay of 17½ ounces silver and 8½ per cent lead. It is proposed to pay dividends quarterly on and after January next. The concentrating plant is expected to be started in three months. Acting upon the general manager's recommendation, the board have determined to take steps to purchase West Australian gold ores for the purpose of treating same. Such an operation would appear to be profitable, and the present existing plants are sufficient for the purpose.

NICARAGUA.

The Nicaraguan Government has suggested to Congress the enactment of an export duty on gold of $1 an ounce when from quartz, and of $1.50 when from placer mines, with a penalty of forfeiture of twenty times the amount of the duty and the loss, in certain contingencies, of the mining titles.

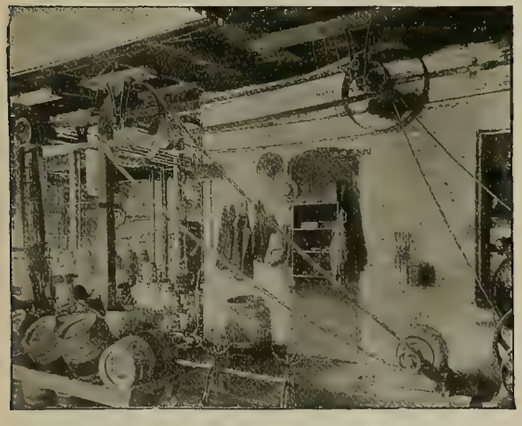
Electrical Progress.

Electric Installations at Sacramento.

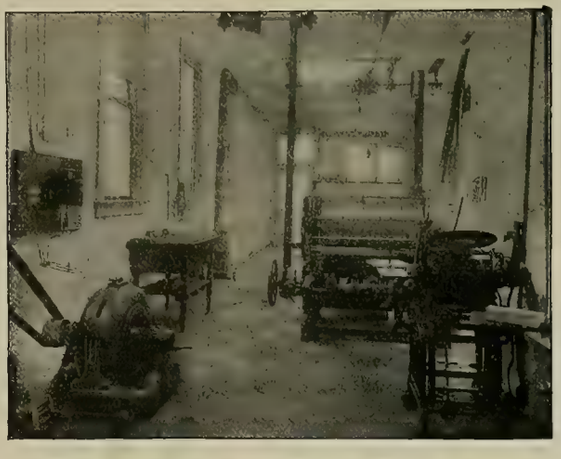
Since the introduction of the electric current generated at Folsom, twenty-four miles away, electricity is now used in Sacramento to drive machinery of all kinds, and is entering largely into what may be called the household life of the city. One of the most important motor installations is that driving the machinery in the shops of the Southern Pacific Railway Company. The Buffalo Brewing Company of Sacramento has recently installed motors, its present equipment consisting of one 5 H. P., one 10 H. P., one 20 H. P. and two 30 H. P. motors. They are all of the General Electric Company's three-phase induction type, without brushes, collector rings or moving contacts, and run almost without attention beyond an occasional oiling. They are driven by 200-volt current supplied from the 1000-volt circuit running from the sub-station a distance of two miles, the pressure being transformed down at the brewery. The smallest motor is used in the bottle-washing house; that of 10 H. P. in the keg-washing department. The three others are used to operate the blowers, the malting house and the machine shops. The large ammonia pumps in the brewery will also shortly be driven by electric motors. The printing presses of Day & Joy, in Sacramento, are also driven by motor. In this case the motor is of similar type to those in the brewery, but of 10 H. P. capacity. It was one of the first in the city to take current of the long-distance transmission. In installing the Buffalo Brewing Company motors, the question of the probable economy of the change was naturally uppermost. The guarantee was that electricity would show a saving of 40 cent. After the motors had been running for some time a series of tests were made, with the result that the saving, instead of 40 per cent, was shown to be a little over 50 per cent. Results almost similar have been obtained in other installations in Sacramento. It is hardly a matter of surprise that, with such showings to do missionary work, the use of electricity is rapidly extending in that city.

BUFFALO BREWING COMPANY'S BREWERY.

FIVE H. P., G. E. INDUCTION MOTOR IN BOTTLE WASHING HOUSE.



TEN H. P., G. E. INDUCTION MOTOR IN KEG WASHING DEPARTMENT.



TEN H. P., G. E. INDUCTION MOTOR IN THE PRINTING ESTABLISHMENT OF DAY & JOY.

Electro-Chemistry at Niagara.

Interesting developments in the electro-chemical line go on at Niagara Falls. Electro-chemistry, or properly electrolysis, was until recently a comparatively little understood science. The greatest development has been made in Germany and France, and to-day large plants are profitably operated in those countries making a number of chemicals entirely by electrolysis. As one of the main expenses in electrical processes is the power, those plants which generate their electricity from a waterfall have proved financially the most successful. To-day the city of Niagara Falls has more factories making chemicals by electricity than any other city in the world, says Frederick Overbury, in *Cassier's*. One of the several new works of this kind located there is that manufacturing chlorate of potash. The uses of this product are constantly increasing. From five to six million pounds of potash are imported annually into the States. A large part of this amount is used in calico dyeing as an oxidizer. It is also used in making parlor matches, blasting powder and some of the smokeless powders. Medicinally it is taken, in the shape of pellets, for various ailments.

The company's plant is the first one to manufacture chlorate of potash in the United States, and it thus marks the advent of a new industry there. The first step in the process consists in dissolving in large wooden tanks, from 10 to 12 feet in diameter and 6 feet high, chloride of potash, commonly called muriate of potash. This salt is found in large quantities at Stassfurt, in Germany. The solution from the dissolvers is pumped to storage tanks on the second floor, and from them led through pipes by gravity to the electrolyzing tanks. These are made of cast iron, porcelain-lined, 8 feet long, 4 feet wide, divided by porous partitions into positive and negative compartments. The cells rest on pipe standards and insulated from the floor.

The chloride solution is kept circulating through the cells from the positive to the negative compartments, and is electrolyzed in its passage, evolving chlorine gas at the positive pole and forming caustic potash at the negative pole. The chlorine gas is led under pressure from the positive into the negative compartment, where it combines with the caustic potash, forming hypochlorite and chloride of potash. There is considerable rise in the temperature of the solution during the operation, and the heat thus formed changes the unstable hypochlorite into chlorate and chloride of potash. These chemical changes are very rapid and continuous, the arrangement of the cells requiring very little attention from the men in this part of the work. By suitable pipes the solution of chlorate and chloride of potash is led to the floor below, to large porcelain-lined iron tanks containing lead steam coils, and is there evaporated down to the concentration point of chloride of potash when cold. From these tanks the concentrated liquor is run, boiling hot, into lead-lined wooden tanks, where it is left to slowly cool. Any disturbance of the liquor at this period of the process results in breaking up the crystals into minute particles, and hence great care is taken to keep it perfectly quiet. As the liquid slowly cools off, the chlorate crystals can be seen forming in square, flat shapes of different sizes. Very little of the chloride of potash in the solution is crystallized with the chlorate, as the two salts form at different densities.

After the crystals have all dropped to the bottom of the tanks, the mother liquor is pumped back to the storage tanks to be used over again in the cells. The chlorate crystals are gathered up with long wooden rakes and conveyed to a centrifugal dryer. The moisture is here driven off and any chloride present is dissolved by spraying water into the dryer while in motion. After this operation the crystals are loaded into a car and transferred to the dryroom, where they are spread on shelves to more thoroughly dry before packing. This is the last operation in the process. The chlorite crystals are put up in kegs holding 100 pounds. The electrical processes differ from the old methods only in the chemical part of the work; the crystallizing and drying are practically the same.

Soon it may be possible to dissipate thick fog by a charge of electricity, and the atmosphere of smoky cities can thus be kept clear and bright. A modification of the principle has already been applied by Oliver Lodge, who precipitated both smoke and dust on the walls inside a chimney or flue by static electricity. A patent has been taken out in Germany for an apparatus for smoke prevention by means of wires stretched inside a flue or chimney, and rendered incandescent by an electric current. There is no doubt that this extremely simple electrical method will completely consume the blackest smoke possible, but it is at the present time too costly to be commercially profitable.

Mechanical Progress.

Manganese Bronze.

In much of the manganese bronze used by foundrymen the manganese is added in the shape of ferro-manganese, which necessarily introduces considerable iron into the bronze; this is injurious; the bronze so made is more readily corroded and not so strong, tough, and ductile as bronze that does not contain iron. A rich alloy of manganese and copper, containing no iron or other impurities, is now on the market, and by using this alloy a very pure manganese bronze of any desired grade can be produced. One of the best and cheapest bronzes can be made after the following formula:

	Per Cent.
Copper	53.00
Zinc	42.00
Manganese	3.75
Aluminum	1.25

This makes a strong, tough metal, suitable for propeller wheels, gears, and pinions, mining machinery, etc. As the bronze contains no iron, a much greater quantity of zinc can be added than when ferro-manganese is used without danger of making the metal brittle. In the above mixture it is important that the aluminum be present, as without it difficulty will be experienced in obtaining solid castings; in fact, it is necessary to add a small amount of aluminum to all the manganese bronzes, as without it they will not cast solid, but no trouble is experienced in obtaining solid castings when a small amount is used. Manganese bronze in the form of sheets is used extensively for mining screens, as the acid mine waters have no action on it. For rolling into sheets a mixture containing more copper and manganese and less zinc is used.

A substitute for german silver can be made by the use of manganese, the different metals and their proportions being as follows:

	Per Cent.
Copper	67.25
Manganese	18.50
Zinc	13.00
Aluminum	1.25

The color of this metal is very good, resembling german silver closely. It is fully as strong as the best german silver, and has superior casting qualities, which will be appreciated by foundrymen who have experienced some

difficulty in casting german silver. It does not corrode as readily as either german or nickel silver. A test of the electrical resistance of this metal shows its resistance to be nearly four times greater than that of german silver, and is therefore a matter of importance where a metal of very high electrical resistance is required.

Hydraulic Dredging

The recent boring of Newton shoals near Marysville, Cal., demonstrates the feasibility of Government dredging, and the present conference of officials may result in beginning the work. In this regard the work of a hydraulic dredge on the lower Mississippi is of interest.

It sucks up sand and muck from the bottom of the stream and discharges the material 1,000 feet away. It is a clumsy misshapen affair, and at a distance looks as though some factory had slid in the river and had struck a snag. Two smoke stacks belch forth black smoke, and running back of it is a steel tube through which thousands of gallons of water rush, carrying with it the sand which the queer-looking craft sucks up from the bottom. In the center of this boat are centrifugal pumps with 175 revolutions a minute. Each of the two pumps has its own system of pipes, the suction pipes being 33¾ inches in diameter and the discharge pipes 33 inches. A battery of cutters hangs over the bow. The six cutters and their suction pipes are grouped in two sets, each set feeding one of the two principal suction pipes. The cutters are used to loosen the sand, which then is caught in the current of water drawn into the suction pipes, carried up through the centrifugal pumps and out through the discharge pipes. Each of the six suction pipes is 19½ inches in diameter, and carries at its lower end a revolving cylindrical cutter 5 feet in diameter. The cutter has twelve cutting blades, and it is made to revolve through suitable gearing and shafting which is driven by large engines in the dredge. The battery of cutters is so arranged that it can be raised or lowered, and can be brought entirely out of water if necessary. In operation the six cutters whirl around in the sand bar through which the dredge is eating a channel, loosening the sand and feeding it to the great pumps. The raising and lowering is done by a separate engine, which is reversible, and operates the drums, each of which has enough rope to permit the cutters to work to a depth of 20 feet. The cutters whirl around twenty-five times a minute, and cutters, drums and all are controlled from the pilot house of the dredge. To carry the dredge material away from the dredge steel pipes, 33½ inches in diameter, are floated on the water by means of pontoons to the place where the sand is to be deposited. Each 1,000-foot length of pipe is carried by twelve pontoons, of which four are 50 feet long and eight are 100 feet long.

A pontoon is a steel chamber about 7 feet wide and 3 feet deep, in the center of which the discharge pipe lies. It is buoyant enough to float the pipe when the latter is discharging the sand and water forced into it by the centrifugal pumps. Each of the 500-foot pontoons has four water-tight compartments, and the 100-foot pontoons are divided into six water-tight compartments. The pontoons are held together by coupling rods, and the pipes are coupled by rubber hose.

When the discharge pipe is empty the pontoon draws 14 inches of water, but when the pipe is in service and is carrying its regular working load the pontoon sinks until its deck line is but 2 inches above water. The pipes and pontoon are painted inside and out with black asphaltum paint.

The hydraulic dredge can be operated up stream or down stream, pushing with the cutters against the sand bar, or dragging them backward. In the stern of the dredge are two "spuds" or piles, which are driven down into the river bed to act as pivots, permitting the dredge to swing in the arc of a circle, sucking up all the sand which comes near the cutters. By swinging on one of the spuds as a pivot the dredge can remove 1,300 cubic yards of bottom without moving forward. It can move forward at the rate 5½ feet a minute and suck up sand at the rate of 8,000 cubic yards an hour, and in a short time it can cut a channel the full width of the battery of cutters across a sand bar.

This enormous sand sucker requires only seventeen men to operate it. It is 172 feet long and 40 feet wide, and weighs, with its machinery, 1,200 tons. It carries ninety tons of coal and has water ballast to equalize the draught. It has a battery of four 375 H. P. boilers, and the "runners" of its centrifugal pumps are 7 feet in diameter. The engines driving the pumps are triple expansion, and are of the vertical, inverted, four-cylinder tandem type.

The Washington Gun Foundry.

The Washington gun foundry is one of the landmarks of the national capital. Inasmuch as it is there all of the high-powdered guns and their mounts for the equipment of our modern ships of war are manufactured, it is a place of special interest to visitors. Originally established as a navy yard for the construction and repair of warships, it was long since abandoned as such, and is now devoted almost exclusively to the manufacture of guns and ordnance materials. The entire gun plant and appurtenances have cost $2,000,000, and comprise machinery for turning, boring, rifling, jacketing and finishing the immense rifles required for modern battleships, as well as the smaller rapid-fire guns which form such an important part of the secondary batteries of the cruiser gunboats, and, in fact, all vessels of war. The largest lathe in the shop, commonly called the "sixteen lathe," was built for turning out a gun 16 inches in diameter of barrel, 48 feet 7 inches long and weighing 110 tons. The size has been found too large for practical use, however, and the largest guns made for the navy are but 13-inch caliber. The lathe which is to be used for boring the interior of this gun is about 115 feet long and cost nearly $100,000; small lathes are used in the case of smaller guns. Traveling over these lathes, 40 feet from the ground, is an immense crane, capable of raising and carrying from one lathe to another a dead weight of 125 tons. In the center of the building is the shrinking pit, in which are located furnaces for heating the jackets and hooks for use in shrinking the gun tubes. These furnaces are heated to between 600 and 700 degrees; the heating power is naphtha oil with an air blast. A separate building is devoted to the manufacture of gun mounts and carriages.

ALUMINUM "gold recovery" is the latest. The vast interests involved in recent electro-chemical developments of the gold mining industry act as a piquant stimulus to inventors. Another innovation in this sense is recorded in the July "Aluminum and Electrolysis." The idea is to use aluminum cathodes in the electrolyses of weak cyanide solutions. The economic advantage of aluminum over carbon does not appear; but, on the question of novelty, the fact may be adduced that aluminum steamships have been constructed—and that it has been proposed to make the metal hulls of such vessels "cathodic," with the double object of preserving them from oxidation and of recovering gold dust from its native solution in the sea. Neither idea seems of sufficient importance to warrant serious discussion.

BALES & JERRY of Springfield, Ill., claim to have discovered a secret solution by which they coat leaden cartridges, rendering them superior to steel cartridges. The ordinary leaden cartridges, when used in the Krag-Joergensen rifle, have been found to be too soft, and the lead has clung to the barrel of the rifle until the barrel was finally clogged, and the steel cartridges which have succeeded the lead ones have eventually torn the barrel. These cartridges do neither. They offer to sell the Government bullets coated with the secret preparation.

Scientific Progress.

Scientific Prospecting.

By THOS. SMITH.

Prospecting or searching for metalliferous ores is a business of itself, separate and distinct from mining proper, and should never be undertaken without first learning all that is known of the means and conditions of ore depositions. As the greater number of the prospectors now engaged in hunting for the mineral wealth of this and other countries have not had the opportunity to study the subject, it is not surprising that so many failures are made. When we take into consideration the fact that our acknowledged authorities on geology are themselves entirely in the dark on the subject, it is surprising that so much success has been attained.

In prospecting, the archæan or granite and the eruptive rocks are of most interest, the sedimentaries of whatever age being only the recipients of any ores which may be found in them. To explain the manner and causes of ore deposition, I should have to attack some of the pet theories of the acknowledged authorities on geology, a great many of which are stated as facts.

In the first place, metalliferous ores come from the interior of the earth and are ejected by dry volcanic heat, and not by aqueous igneous solutions. When the earth first commenced to cool, all the water was far above its surface in the form of steam. The first rocks formed were the lower crystalline, archæan granite, which were the lightest fluids in specific gravity of the molten mass; as it solidified, cracks were formed, through which volumes of the molten material poured, which cooled and solidified on the suface of the first crust. This continued happening for a long time, until the earth's crust became so thick that it would not pull apart by its own contraction.

When this surface cooled sufficiently, the water, which does not belong, nor cannot stay below the surface of the earth, except in cavities, descended in the form of rain and formed the upper stratum. As the surface continued to cool, its contraction caused immense pressure on the imprisoned fluids, until the weakest part gave way—not in a gentle, quiet manner, occupying a long period of time, but in a sudden, paroxysmal manner, similar to a boiler explosion, the effect being to upheave a long line of crust on its edge, and to make two or three fractures paralleling one another and some distance apart, through which the imprisoned fluids discharged, until the pressure was relieved. Water and steam generation could have had nothing to do with it until the vent was made, as it is absolutely impossible to make a fluid of a lighter specific gravity stay below one of a heavier, so the water must have been above the earth's crust.

These upheavals have taken place at different periods and places, and in some places a number of times, all over the known surface of the world, and our minerals have been ejected from these lines of fracture with the eruptive rocks. When I first studied geology with a view to utilizing it in prospecting, I read that the earth's crust had been crumpled, folded and faulted by the contraction of the interior, and that eruptive rock (porphyry) had been intruded or forced between the bedding planes of sedimentary rocks, the same as it is taught to-day. It was pretty hard to swallow, like Jonah and the whale, but, believing that the authors had evidence which would prove the facts and having no contrary evidence, I accepted it and endeavored to utilize the knowledge in my practice. My experience from that time to the present in actual field work is that both the theories are untenable; that the evidence proves that the upheaval of the granite has not been gradual by means of crumpling, folding and faulting, but sudden, violent, and extending over long lines, and invariably accompanied by a large outflow of eruptive rock, and I find also that the lacolite or intrusive theory is disproved by the fact that where an intrusive sheet (so-called) is examined, the evidence of heat is very marked on the surface of the sedimentary rock on which it rests, but is not visible on the rock above, proving that the upper sedimentary rock was not deposited until the igneous rock had cooled. As most of the sedimentary rocks of which our geological textbooks mainly treat have been deposited through and from water in a similar manner to the deposition of snow and water through air, let us take a few simple illustrations from snow:

Suppose, after a storm had ceased, we were to find a gate or section of fence had vanished and was hidden by the snow, and, in digging it out, found it was lying half way down between the surface and the ground, as much snow above as below, which would be the most unreasonable theory? That it was blown down when the storm was only half over, and covered by that which fell, afterwards, or, as our geological friends would explain it, that it had waited till all the snow had fallen and then intruded itself between the upper and lower layers?

Again, if we noticed that a layer of snow 1 foot in depth was lying on top of a house, and that a layer of the same thickness was lying on the ground alongside, would it be necessary to explain it to state that the earth and house and house-top were on the same level when the snow quit falling, but that it had faulted and the earth had slipped down between that time and the time of our observation?

I would pay no attention to these theories, considering them unworthy of notice, if they had not been used so extensively to explain the manner of ore deposition and the geology of our different camps.

When we read that it is necessary for thermal springs, solfataric action and intrusive porphyry to be present in a camp before it can be an ore producer, and that this nonsense is believed in, indorsed and acted on by the mining engineers, geologists and so-called experts, who are sent down by capitalists to examine our properties, we can understand what are the causes which retard the development of so many of our camps.

Prospecting and ore deposition are comparatively simple matters if we dispense with preconceived theories, and formulate our theories on the facts we find in the camp under investigation in accordance with known natural laws. When we find the granite cropping above the sedimentary rocks, as the axis of a mountain chain, we know that it was upheaved by some seismic action, which also ejected a large quantity of eruptive rock, but that a large quantity did not overflow, but was retained in the crevice forming a dike. If we examine a large surface of the granite (several miles, if possible) we can obtain its true trend and dip, the trend being always taken on a level. This will give us the trend of the fracture fissure and dike therein.

With this as a basis we should examine the opposite side of the ridge or axis to see whether both sides of the fracture fissure were upheaved alike, or whether one side only had been upheaved. When both sides show the same upheaval we shall probably find the eruptive rock spread over both slopes and a depression or trough at the point where the granite takes the opposite dip, following the trend of the granite, and generally filled in with lake (fresh water) sediment. This is the dike, which contracted by cooling and formed a basin or lake on its surface.

If we examine the overflow which we find in the vicinity, not only on the surface, but also that which we find imbedded between the sedimentaries, and also the upper surface of the rocks on which they rest, we will find whether the eruptive rocks are sufficiently mineralized to make it worth while

continuing our work in the vicinity.

In examining the granite we frequently find that after one upheaval had taken place other seismic disturbances had occurred, breaking through the granite floor and upheaving it with all sedimentary and eruptive rocks then lying thereon in a different direction from the first and leaving its dike in the trend of the last fracture. Under these circumstances it is necessary to examine all the eruptive rocks in the vicinity to ascertain which one, if any, of the various eruptions was the mineralized one, or mother of the country, or where there are more than one which will pay to work.

This preliminary work is almost invariably omitted by the common prospector, who, consequently, has no data on which to base a belief that an ore body he may discover will be either permanent or valuable, and as it is also omitted by expert mining engineers or geologists who may be sent to examine a property, their deductions have no more scientific accuracy than the prospector's.

Having ascertained the fact that mineral exists on the surface in reasonably paying quantities, our next step should be to discover where and in what form we may expect to find the ore in the best paying quantities, and in this connection we must study the process of concentration carried on by nature.

All igneous rock and metals occupy a larger space when molten than they do when cooled. Their contraction causes cavities to be formed along their lines of contact with other rocks, and also through their mass, and through these cavities or fissures the water from the surface percolates, carrying with it all soluble substances with which it is impregnated, and also all insoluble substances which it can carry down into the crevice.

(To be Continued.)

THE geology of the Klondike placers will be scientifically determined at as early a date as possible. It is already well understood that the gold-bearing rocks constitute a distinct broad belt running northwest into Alaska from British territory. They are in their lower portions schists and gneisses, with intrusive rocks, and in their upper portion somewhat altered sedimentaries. They are all older than Carboniferous, for the Carboniferous and younger rocks overlie them on both sides of the gold-bearing belt. In this belt the gold occurs partly in quartz veins, partly in deposits formed along shear-zones; in both occurrences it is contained in pyrite, and becomes free on weathering. The quartz veins are distinctly older than the shear-zone deposits, and were formed before the alteration of the enclosing rock to a schist; they have, therefore, partaken of this shearing, and have been broken and sheared so that they are typically nonpersistent. The deposits along shear-zones are, however, of later date than the shearing, and can be continuously followed. The younger beds which overlie the gold-bearing belt consist in part of conglomerates, and some of these conglomerates are fossil placers, which give promise of being productive.

THE largest seismoscope in the world hangs through the center of gravity in the great monument at Washington, D. C. It consists of a copper wire 174 feet long which holds a plummet suspended from its lower extremity into a vessel of water. Two transits arranged at right angles to each other are focused upon the wire just above the plummet, and by means of these little telescopes the slightest vibration of this great mass of stone is indicated upon a graduated scale. The expansion of the monument's south face, on a hot summer day, sometimes shifts the apex northward a few hundredths of an inch, and high winds frequently cause a slight variation from the normal position of the wire. Occasionally, however, the plummet swings violently when the weather is calm and cool, its motion under such circumstances being ascribed to vibration of the earth itself.

Chrome Ore.*

By M. A. CLOUET.

This mineral, known by the name of chrome iron ore, chromate or chromite of iron, and industrially employed for the manufacture of the different chromates and their derivatives, is found in almost all the larger divisions of the globe. In Europe it is met with in France, in the department of Var, but the mine located near Cogolin is now exhausted. In Russia it is found in different parts of the Ural mountains; it also occurs in Norway, in Syria, Hungary and the Shetland Islands. In America chrome ore has been discovered in the surroundings of Baltimore, Wilmington, Del., and California. In Asia chrome ore beds are known near Madras, India, and Karahissar, Asia Minor. Finally, an important mine was opened in Australia several years ago.

Wherever the deposits may be located, they all belong to the same formation. They are either in the form of pockets, beds or veins, and always in the same igneous strata which enclose aluminous bisilicates, feldspar, stealite, mica, garnet, talcum, serpentine stone, asbestos, etc., in large quantities. The gangue or surrounding rock is also of the same formation everywhere, and consisting of the constituents of the previously named minerals, viz: silica, alumina and magnesia. These three bodies are always found there closely associated, but they vary in their respective proportions according to locality, deposition of beds or lodes, and the more or less careful sampling in the mine itself.

The gangue is mostly white or gray, but sometimes variously colored, green, rose, peach, violet and blue when a little oxide of chrome is present, or yellow, red and brown by the presence of iron oxide.

Sometimes it is found mixed without connection with the ore proper in more or less rounded grains, as in the deposits of the Ile-a-Vache, Baltimore, Wilmington and Norway. Sometimes it forms a layer of variable thickness separating the metallic strata as in India and Russia, or it is like a paste in which the metallic parts are agglutinated as in Asia Minor and Australia. All the known chrome iron ores are of perfectly defined chemical composition.

In the same manner as the surrounding strata are always composed of silica, alumina and magnesia; the ore itself is always a combination of protoxide of iron and sesquioxide of chrome. This combination of the two oxides, however, is not a single one—that is, it does not consist of equal equivalents. On the contrary, its composition in this respect varies greatly according to the localities where the deposits are found.

1. The chrome ore of the Ile-a-Vache, America, Norway (Christiania), Hungary and France is protochromite of iron.

Indeed, whatever the tenor in metal of samples analyzed may have been, they all consisted of one equivalent of sesquioxide of chrome combined with one equivalent of protoxide of iron. The ore also corresponds to the protoxide of iron and manganese, and can be represented by the formula

$$Cr^2\ O^3\ 2\ Fe\ O.$$

2. The chrome ore found in Russia, in the government district of Orenburg, Smyrna, Norway (Drontheim) and Syria is bichromite of iron. It consists of two equivalents of sesquioxide of chrome and one of iron, corresponding to bioxide of manganese, and represented by the formula

$$Cr^2\ O^3\ Fe\ O.$$

3. Russian ore from the government district of Viatka consists of three equivalents of sesquioxide of chrome and one equivalent of protoxide of iron; hence it is a trichromite of iron, represented by the formula

$$3\ Cr^2\ O^3\ 2\ Fe\ O.$$

4. The ore of Orsova, Hungary, is a combination of five equivalents of sesquioxide of chrome and two of protoxide of iron, or $2\frac{1}{2}$ parts chrome to one of iron. Its chemical formula is

$$5\ Cr^2\ O^3\ 4\ Fe\ O.$$

5. The Indian ore consists of five equivalents of sesquioxide of chrome and four equivalents of protoxide of iron, represented by the formula

$$5\ Cr^2\ O^3\ 8\ Fe\ O.$$

6. The Shetland and California ores consist of five equivalents of sesquioxide of chrome and three of protoxide of iron, the formula being

$$5\ Cr^2\ O^3\ 6\ Fe\ F.$$

7. The Australian ore is a combination of four equivalents of sesquioxide of chrome and three of protoxide of iron, represented by the formula

$$2\ Cr^2\ O^3\ 3\ Fe\ O.$$

Having received several thousand kilograms of chrome ore from the Ile-a-Vache, I examined the grains and found that, although they were partly rounded, they showed plainly a crystalline structure; the color was a brilliant black. Their composition I ascertained to be as follows:

	Per cent.
Sesquioxide of chrome	51.53
Protoxide of iron	48.46
	99.99

It will be seen that this ore is a protochromite of iron. I analyzed other grains together with their gangue, and found always a constant relation of one to the other, and the quantity of sesquioxide of chrome and protoxide of iron.

Analyzing successively chrome ores of different origin, and taking care to take samples differing in appearance and metallic tenor, I always obtained for ore from one and the same locality a constant relation between the oxides of chrome and iron.

The chromites of iron, therefore, are real chemical combinations, corresponding to the oxides of iron and manganese in which the protoxide of iron would represent the metal, and sesquioxide of chrome the oxygen.

Analysis of Iron Chromites.—The natural as well as the artificially produced iron chromites are not attacked even by concentrated and boiling acids when heated to white heat. The same is the case with their gangue, alumina and silicate of magnesia.

In order to analyze the chromites it is, therefore, necessary to first calcine them with an alkaline carbonate which separates the sesquioxide of chrome from the protoxide of iron, and forming a soluble chromate which at the same time makes the decomposition of the silicate of magnesia possible by the action of an acid. Five to ten grams of the ore are pulverized to a fine powder, which, after having been dried thoroughly, is mixed with five to six times its weight of pure carbonate of soda. The mixture is heated in a platinum crucible for five or six hours to white heat. During heating the crucible should not be closed hermetically so as to allow the access of air.

After having cooled off, the crucible is placed in such a position that its cover can be provided with a porcelain capsula filled with tepid water, which is heated to a mild boiling until the yellow, green or brown contents of the crucible are either well detached or completely dissolved. The crucible is washed, and all peroxide of which some quantities often adhere to it, recovered by means of hydrochloric acid.

When the temperature has been very high and calcination prolonged, the chrome oxide is not only converted to chromic acid and the protoxide of iron to peroxide, but the latter have been superoxidized, and perchromate of blue soda and perferrate of red soda have been produced, so that the matter in the crucible is not yellow, as would be supposed, but represents a greenish brown appearance. By treatment with water, the excess of alkali precipitates this perferrate of soda, without changing it, in the form of soft flakes. By boiling the solution, oxygen is disengaged at the same time as perchromate and perferrate of soda are reduced. The peroxide of iron regains its usual aspect and the green color of the solution disappears. Boiling is continued until the solution has become yellow. If this precaution be neglected, the alumina which has to be precipitated later would be of a reddish color, being mixed with peroxide of iron.

The capsula, therefore, contains in solution:

The surplus of carbonate of soda,
Aluminate of soda,
Chromate of soda.

The insoluble part is composed of:

Peroxide of iron,
Silicate of magnesia,

and sometimes a little chrome iron, which has escaped the action of the alkaline carbonate.

The liquor is allowed to settle in the capsula, then filtered. The sediment should be avoided as much as possible, hence it is washed and decanted repeatedly until the washing water is colorless. The liquid obtained (*A*) is put aside in a test tube.

Then crucible and filter are washed with hydrochloric acid in order to remove completely all the peroxide of iron which may adhere to them. This liquor is poured into the capsula. There are then added water, a large surplus of hydrochloric acid and a little nitric acid, and the whole brought to a light boiling. Peroxide of iron is dissolved immediately, but the gray-colored, shining molecules of silicate of magnesia are seen to ascend and descend and trouble the liquor. It takes a considerable length of time until this silicate is decomposed. Then the liquor becomes perfectly clear; and, if a little chrome iron has remained unattacked, it is deposited promptly at the bottom of the capsula. It is easily recognizable by its deep black color and metallic condition. Then the solution is filtered, washed, heated and calcined again with carbonate of soda in order to add the products of the second calcination to those of the first.

The clear liquor and the washing water are slowly evaporated, either in a water bath or a sand bath or a drying stand. The dry residuum is treated with hydrochloric acid, water added and filtered. Thus the silica is obtained.

Then the liquor containing the chlorurets of iron and magnesium are treated with ammonia in order to recover the peroxide of iron (a titrated solution of permanganate of potassium may be used as well) and with phosphate of soda to obtain the magnesia.

Liquor *A* containing the carbonate is diluted with water and poured cau-

ORES AND CORRESPONDING VALUES IN MN.

Ore.			*Corresponding Value.*
Protochromite	Ile-a-Vache, America, Norway, Var, Hungary	one equivalent of oxide of chrome one equivalent of protoxide of iron	Fe O Mn O
Bichromite	Russia, Asia Minor, Syria, Norway	two equivalents of oxide of chrome one equivalent of protoxide of iron	$Mn\ O^2$
Trichromite	Russia-Viatka	three equivalents of oxide of chrome one equivalent of protoxide of iron	$Fe\ O^3$ $Mn\ O^3$
Chromite of Australia		four equivalents of oxide of chrome three equivalents of protoxide of iron	$Fe^3\ O^4$ $Mn^3\ O^4$
Chromite of Orsova		five equivalents of oxide of chrome two equivalents of protoxide of iron	$Fe^2\ O^5$ $Mn^2\ O^5$
Chromite of India		five equivalents of oxide of chrome four equivalents of protoxide of iron	$Fe^4\ O^5$ $Mn^4\ O^5$
Chromite	California, Shetland	five equivalents of oxide of chrome three equivalents of protoxide of iron	$Fe^3\ O^5$ $Mn^3\ O^5$

*Translated from the French for the *American Manufacturer*.

tiously under continuous stirring with a glass rod into a test tube filled with hydrochloric acid. The alumina soon separates and the liquor becomes troubled. Add hydrochloric acid until the liquor is completely clarified and has adopted a red color. Oversaturate with carbonate of ammonia and filter the liquid after boiling it in order to remove the surplus of the precipitant which otherwise might dissolve some of the alumina.

Before filtering, the liquor should be diluted with boiling water in order to facilitate the washing of the alumina which retains the chromate with great tenacity. By stirring the deposit while it is still in suspension in the filter, and by using boiling water, the discoloration of the alumina is accomplished most simply and quickly, but in all cases this washing requires considerable time.

The yellow liquid and the washing water are then evaporated in a porcelain capsula, hydrochloric acid and alcohol added to disoxidize the chromate of soda, whereupon the sesquioxide of chrome is precipitated by means of ammonia.

When the analysis has been executed properly, it will be found that the sum of the weights found for silica, magnesia, alumina, sesquioxide of chrome and peroxide of iron exceed that of the matter analyzed; but when the peroxide of iron obtained is transformed into protoxide, both weights correspond exactly.

ANALYSES (1).

1° Protochromites of Iron: $Cr^2 O^3$ 2 Fe O.

ORE FROM—	Ile-a-Vaches, in grains (octahedral)	Baltimore, in lumps	Wilmington, in grains	Norway (Christiania), in grains	Var, in lumps	Hungary, in lumps
Gangue of silica		3.20	3.00	4.20	2.53	7.30
Gangue of alumina		5.40	6.66	4.80	13.15	16.77
Gangue of magnesia		4.09	2.06	13.23	12.53	14.85
Protoxide of iron	48.46	42.31	42.78	37.77	34.79	29.60
Sesquioxide of chrome	51.54	45.00	45.50	40.00	37.00	31.48
Totals	100.00	100.00	100.00	100.00	100.00	100.00

2° Bichromites of Iron: $Cr^2 O^3$, Fe O.

ORE FROM—	Russia Ural (Ekaterinenburg)	Russia (Orenburg)	Asia Minor (Karabissar)	Norway (Drontheim)	Styria
Gangue of silica	7.07	3.05	2.15	5.00	2.50
" alumina	6.77	8.05	7.62	12.00	8.00
" magnesia	13.40	10.98	12.31	21.28	11.58
Protoxide of iron	23.27	24.92	24.92	19.72	24.92
Sesquioxide of chrome	49.99	53.00	53.00	42.00	53.00
Totals	100.00	100.00	100.00	100.00	100.00

3° Trichromite of Iron: $3 Cr^2 O^3$ 2 Fe O.

RUSSIAN ORE FROM VIATKA.

Gangue silica	2.20
Gangue alumina	10.00
Gangue magnesia	11.62
Protoxide of iron	18.18
Sesquioxide of chrome	58.00
Total	100.00

4° Chromite of Iron from Alt-Orsowa (Banat): $5 Cr^2 O^3$ 4 Fe O.

Gangue silica	5.26
Gangue alumina	12.60
Gangue magnesia	15.09
Protoxide of iron	18.34
Sesquioxide of chrome	48.72
Total	100.00

5° Ore from India: $5 Cr^2 O^3$ 8 Fe O.

Gangue silica	1.50
Gangue alumina	9.30
Gangue magnesia	5.00
Protoxide of iron	35.70
Sesquioxide of chrome	47.50
Total	100.00

6° $5 Cr^2 O^3$ 6 Fe O.

Ore from—	*California.*	*Shetland Islands.* Mine H.	Mine B.
Gangue silica	5.48	6.10	8.85
Gangue alumina	13.60	7.47	10.15
Gangue magnesia	14.88	17.30	16.86
Protoxide of iron	23.84	24.93	23.14
Sesquioxide of chrome	42.20	44.20	41.00
Totals	100.00	100.00	100.00

7° Ore from Australia: $2 Cr^2 O^3$ 3 Fe O.

Gangue silica	8.00
Gangue alumina	18.00
Gangue magnesia	17.40
Protoxide of iron	23.40
Sesquioxide of chrome	33.20
Total	100.00

The Artificial Production of Iron Chromites.—It is easy to produce artificially all the iron chromites that are found in nature. For this purpose a pure concentrated solution of sulphate of protoxide of iron, and another of sesquioxide of chrome, are used in such a proportion as to correspond to the composition of the natural combination that is to be produced artificially. The two solutions are mixed with a slight surplus of ammonia, and the whole quickly filtered in order to avoid the access of air as much as possible. The residuum, together with a little carbonate of ammonia and borax, is heated in a platinum crucible to a white heat, when the chromite of iron appears with all the physical and chemical characteristics of the natural mineral of corresponding composition, viz., gravity, insolubility in strong and boiling acids, color and metallic luster. When roasted together with borax the iron chromite produced corresponds to protochromite. It can be obtained in octohedral crystals, like the ore from the Ile-a-Vache.

These analyses, of course, do not show exactly how much commercial chrome oxide is contained in the different ores, the chrome tenor varying, so to speak, with each lump from the same mine. But they represent the average of numerous analyses of hundreds of thousands of kilograms of ore which I have handled during the last twenty years.

Robinson G. M. Co.'s Report.

From Capt. Thos. Mein, general manager of the Robinson, South Africa, Gold Mining Co.'s property till May 30th, is received the annual report of the company for the calendar year 1896. During the year were milled 177,500 tons, producing:

	Bullion, ozs.	*Value, £.*
Mill	129,627	472,206
Concentrates (by chlorination)	10,655	44,113
Tailings (by cyanide process)	30,985	103,601
Total	171,267	619,920

In all 44 days 12 hours were lost in milling. Of this 16 days were attributable to breakdowns of machinery; about a similar period to the current working of the mill; and 12 days to want of native labor and other difficulties encountered at the beginning of the year. The duty per stamp per diem works out at 4.6 tons, crushing through a 900 mesh screen.

The mill costs were as follows:

	£ s. d.	£ s. d.
Rock Breakers—		
White and native labor and food	1,061 2 0	
Power	989 13 10	
Stores (oil, waste, etc.)	1,870 16 0	
		3,921 11 10
Transport of ore to mill		979 15 2
Milling—		
White labor	2,209 13 0	
Native labor and food	660 3 6	
Mercury, 2500 lbs	277 5 2	
Heads	201 16 7	
Shoes, 83,408 lbs	1,232 13 3	
Dies, 36,969 lbs	542 16 9	
Stems	158 15 0	
Cams and shafting	161 10 6	
Mortar boxes	196 0 0	
Screens	452 11 2	
Belting, tappets, sundries	530 4 5	
Stores for battery and engine	760 13 9	
		7,404 3 1
Fuel, main engine		7,767 5 7
Water—		
White labor	795 13 6	
Native labor and food	129 10 6	
Fuel	2,286 10 2	
Stores	453 14 2	
		3,665 8 4
Mill Maintenance—		
White and native labor and food	1,856 17 9	
Stores	1,065 13 8	
Proportion of workshops' expenses	254 13 9	
Cut timber	149 17 6	
Foundry castings	393 9 6	
		3,720 12 2
Vanner Concentration and Maintenance—		
White and native labor and food	1,000 7 6	
Power and water	1,643 5 5	
Vanner rollers	192 10 0	
Vanner belting	385 0 0	
Cut timber	12 0 0	
Foundry castings	12 13 3	
Stores	423 18 2	
Proportion of workshops' expenses	50 18 9	
		4,620 13 1
Assaying and Smelting—		
White and native labor and food	346 3 6	
Stores (chemicals, coke, fuel, etc.)	362 11 3	
		708 14 9
Total		32,788 4 0

The main feature in the past year's cyanide working is the additional 10 per cent which has been obtained in extraction. It will be seen that, of the total product coming from the mill, the percentage of sands obtained for treatment has increased from 53.7 in 1895 to 56.3 in 1896. As, however, this is still below the average of some of the works on the Rand, every effort is being made to increase the proportion, and it is possible that the figures for 1897 will show an appreciable improvement in this direction. There has been a slight increase in the working cost per ton compared with that of the previous year. The profit resulting from this department amounts to £88,831 8s 6d for the year. By the decision given by the High Court at Pretoria in the "Cyanide" case, the company has benefited considerably as regards both back royalty and that which would have accrued on future productions.

Statement of costs is given below, as well as particulars of the value and quantity of material treated.

COSTS.

	1896. £ s. d.
Wages (whites and natives, including food)	3,486 15 1
General supplies	1,268 9 0
Fuel and power	1,466 7 9
Cyanide, 54,371 lbs	3,371 8 6
Zinc, 22,485 lbs	383 3 5
Filling and discharging vats	4,813 8 4
Total	14,769 12 1

DETAILS OF WORKING.

	1896.	*1895.*
Tonnage milled	177,500 tons.	140,655 tons.
Tailings and concentrates caught for treatment	99,905 tons.	75,825 tons.
Percentage of tonnage milled	56.3	53.7
Contents in fine gold	33,469.33 ozs.	27,585.87 ozs.
Fine gold recovered	24,714.27 ozs.	17,626.03 ozs.
Per cent of extraction	73.8	63.89
Bullion produced	30 985.42 ozs.	22,157.15 ozs.
Value	£103,601 0 7	£72,553 10 1
Profit on working	£ 88,831 8 6	£52,110 4 5

Prior to June the chlorination roasting plant consisted of three reverberatory furnaces. In that month the construction of two more was completed, and the vat capacity increased accordingly. We have still on hand a heavy stock of purchased concentrates, and contracts are running for the delivery of considerable monthly parcels. Since the enlargement of the plant these latter have been promptly dealt with, and the old stock is being steadily renewed. Satisfactory results continue to be obtained as in former years.

The initial start with the treatment of slimes was made at these works about the middle of November, 1895, but no return was made until the end of January, 1896. Up to the close of the year 75,814 tons have been dealt with, for which the company received £11,769 3s 8d, plus £3303 6s 9d for our half share of the profits made in working. This department, in common with the other works, has suffered great inconvenience during the year through the scarcity of native labor, and has also had to contend with many difficulties in raising the product from the dams and delivering it at the works. The original plant was designed to treat sands and slimes in about equal proportions, but in actual working it was found that the percentage of sands was so small as to render it inadvisable to treat this product separately. Half of the plant had, therefore, to be altered and adapted to the treatment of slimes. Owing to the above given causes the quantity handled has been some 20,000 tons less than was expected. The expense of converting the sands portion of the plant has been charged to revenue account, and this, to some extent, explains the high cost of treatment, which has amounted, up to the 30th of November last, to 9s 9.47d per ton, inclusive of royalty, which is 3 per cent of the gold won.

The year's expenses for mining, milling, general charges, cyaniding and mine development, together with the expenditure for machinery, plant and buildings, are as follows:

	£	s	d
Mining, including mine maintenance	110,747	11	5
Milling, including mill maintenance	32,788	4	0
General maintenance	4,387	3	7
General charges (see revenue account)	20,044	13	6
Cyanide expenses	14,769	12	1
Total	182,737	4	7
Mine development	37,091	10	5
Machinery, plant and buildings	28,008	6	8
Grand total	247,837	1	8

NOTE.—The averages are worked out on the basis of the tonnage mined and milled.

There is very little difference in the costs of working compared with those of 1895. The expenses would have been somewhat lower but for the heavy sums expended in obtaining native labor, which, when secured, proved in many instances lamentably inefficient, owing to the boys' low physical condition and their lack of experience. The agreement arrived at by the majority of mine managers to reduce the rate of native wages from the first of October has been steadfastly adhered to by this company since that date, and a saving in wages has been consequently effected; but it by no means covers the outlays which we have been compelled to make to keep the staff at anything like the requisite strength and train the raw material.

Acetylene Gas.

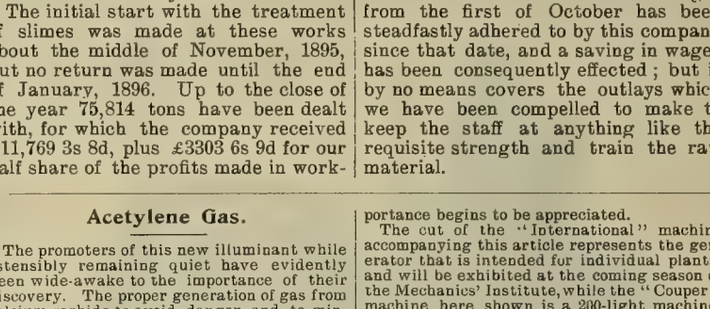
The promoters of this new illuminant while ostensibly remaining quiet have evidently been wide-awake to the importance of their discovery. The proper generation of gas from calcium carbide to avoid danger and to minimize cost has been the object aimed at.

While new factories have been building for the manufacture of carbide, the inventive genius of the American brain has been in operation on generators, burners, tips, etc. The carbide plant at Niagara Falls has just increased its capacity from four to thirty-two furnaces, and now has a capacity of twenty tons per day. In addition to this plant there are factories in Rochester, N. Y., Appleton, Wis., Duluth, Minn., Chicago, Ill., and negotiations are now pending for the construction of a furnace at Sacramento, Cal., where cheap electrical power is obtainable.

When it is realized that acetylene gas is much more brilliant than either coal gas or the incandescent electric light, and can be produced at half the cost, the commercial importance begins to be appreciated.

The cut of the "International" machine accompanying this article represents the generator that is intended for individual plants, and will be exhibited at the coming season of the Mechanics' Institute, while the "Couper" machine here shown is a 200-light machine, being especially constructed for Messrs. Whitaker & Ray for their new hotel, lodge and store building at Galt, California.

There have been from time to time notices of explosions from acetylene gas, notably one recently in Paris, France, but in every instance this has been attributable to the condensing or liquefying of same. As the accompanying generators are automatic and never permit a pressure of over five pounds on the gasometer this danger is illiminated, and the insurance companies are enabled to approve their use for domestic purposes.



GENERATOR FOR INDIVIDUAL PLANTS.

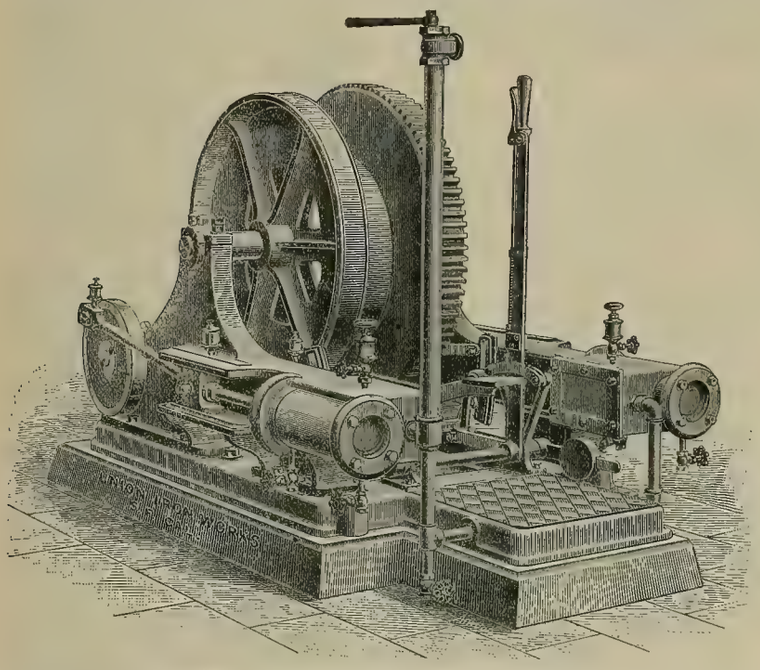
Acetylene headquarters in this city are at room 75, No. 916 Market street. There will be a working exhibit at the Mechanics' Fair. Several machines are in use and giving satisfaction.

UNION IRON WORKS,

★ ★ 222 Market Street, San Francisco, Cal. ★ ★

MAKE THIS SMALL

DOUBLE CYLINDER SINGLE DRUM HOIST



HOIST FOR PROSPECTING.

For Prospecting Purposes or Underground Work,

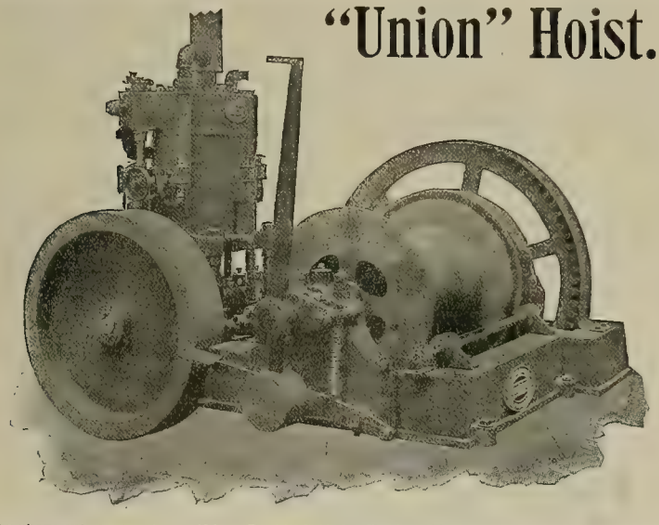
USING COMPRESSED AIR.

The entire hoist is self-contained, being mounted on an iron sole plate or bed which carries all the operating levers and provides a footboard for the operator. The engines are provided with reversible link motion and the drum with a broad strap brake, insuring safe and rapid work.

The general lines upon which this hoist is designed are neat, strong and substantial and all the operating parts are conveniently arranged.

The size herewith illustrated is the 4 in. x 10 in., rated at 15 horse power. The larger sizes, 8 in. x 12 in. and upwards are provided with post brakes.

"Union" Hoist.



The above cut represents our 10 h. p. Double Cylinder Engine of latest type, and Hoist combined on strong iron base. This hoist is designed to raise one ton 125 feet per minute from an inclined shaft, or 1500 pounds at the same speed vertical lift. The drum will hold over 600 feet of ⅝-inch cable. The outfit weighs 3500 pounds.

THE UNION GAS ENGINE CO.

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"Union" Gas Engines,

Which use either Manufactured or Natural Gas, Ordinary Stove Gasoline (Naphtha or Benzine), Distillate or Kerosene.

STATIONARY ENGINES for All Kinds of Work, Built in Sizes from 3 to 200 h. p.
"UNION" COMBINED HOISTS in Sizes from 2 to 40 h. p.
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HOISTS and COMPRESSORS Can Be Built in Larger Sizes to Order.
"UNION" MARINE ENGINES, 4 to 200 h. p., of Single, Double and Four-Cylinder Types.
TEN YEARS' EXPERIENCE Building Gas and Oil Engines.
"UNION" ENGINES Are In Use All Over the United States.
"UNION" ENGINES Are Simple, Durable and Economical.

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—BUILDERS OF—

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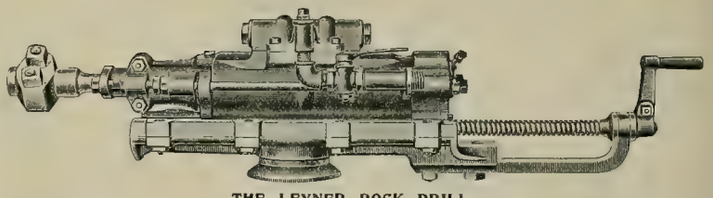

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Calcining Furnaces, Air Compressors, Concentrators, Stamps, Crushers, Rolls, Etc.

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FOWLER'S
Fossil and Asbestos Sectional Covering.
As a Non-Conductor, Unequaled.
Special Rates for Steam Boilers and Drums.
C. G. Fowler, 656-58 Howard St., S. F.

Coast Industrial Notes.

—G. Galbraith of Tulare with a single harvester has cut 3260 acres of grain in sixty-two days, an average of fifty-two acres a day.

—The California price of hay has doubled this week, now being from $11.50 to $16 a ton. The consumption of hay in San Francisco amounts to over 150,000 tons annually.

—There is now only one place where Sequoia timber can be obtained, the Government of the United States having reserved all of it, except that found in one canyon below Fresno, Cal.

—The Central Light and Power Company incorporated in San Francisco this week; F. Pauson, C. L. Ackerman, J. Naphtaly, A. E. Brooke Ridley, J. M. Loewe, G. Gerst; capital stock, $1,000,000; $50,000 subscribed.

—The contract for constructing the coast defense works at Admiralty Head, Whidby Island, has been awarded to Maney, Goerig & Rydstrom of Everett, Wash., for $84,980.50. There is an appropriation of $125,000.

—The Native Lumber Company of San Jacinto, Cal., has sold 4000 cases to the honey men in that vicinity, which means twenty-five carloads, 500,000 pounds, which at 3 cents per pound makes $15,000 in that one valley for honey.

—The Brooks-Follis Electric Corporation has incorporated at San Francisco; capital stock, $25,000, subscribed as follows: James H. Follis, John W. Brooks, $2350 each; Harrison Brooks, Richard H. Follis and E. A. McInerney, $100 each.

—The annual report of the Oregon Railway & Navigation Company for the year ended June 30, '97, shows an increase of $1,015,321 in net earnings over the previous year. Total earnings, $4,718,354; operating expenses, $2,779,047; net earnings, $1,939,307.

—The Columbia river salmon pack is a normal one—470,000 cases of 2 doz. 1-lb tins each. British Columbia papers prophesy that 1897 will witness the largest catch in the history of the Fraser river salmon industry. The catch on the northern coast seems to be a failure.

—The Puente, Cal., oil producers, having drained their wells and wandered away from the oil-bearing stratum in sinking new wells, have, by the aid of a representative of the State Mining Bureau, found the oil stratum again and secured one of the finest flows of oil yet developed in southern California.

—Active work on the tunnel of the Great Northern railroad in the Cascade mountains, in western Washington, began yesterday. The tunnel will be two and a half miles long, 16 feet wide and 23 feet high. It will cost $2,000,000, and require two years in building. It will reduce the ascent by 1000 feet.

—At Corral Hollow, Cal., $1,872,000 has been spent in developing the coal property. F. J. Horswill, the new manager, has changed the system of mining from the "long wall" to the "breast and pillar" method. He calculates ability to extract 1000 tons daily at a cost per ton of 60 cents. Over 100 men are now employed at the mine.

—Eureka, Cal., has decided to accept the offer of C. A. Harp to build a railroad from Eureka to Grant's Pass, Or. Harp asks the citizens of Humboldt to subscribe $375,000, to furnish ten acres of land for a railroad terminus in Eureka, ground for a terminus in Arcata, and free right of way for the road between Eureka and Arcata.

—The East Oakland, Cal., electric railroad was sold under foreclosure this week for $60,500. The road carried an indebtedness of over $250,000, so that all interested except holders of receiver's certificates have lost all they put into it. The purchaser was the Realty Syndicate, which is absorbing all the lines on that side of San Francisco bay.

—The success of the Columbia river timber towing rafts of '95 and '96 lend interest to the similarly constructed one now at Seattle, Washington, about completed. H. R. Robertson will start with it for San Francisco this week. It is 527 feet long, 50 in diameter, and will draw 20 feet of water when finished. There are about 450,000 feet of piling and a number of spars.

—Between 2000 and 3000 men are employed in the construction of the Nelson and Lethbridge railway, between Lethbridge and Macleod, B. C., a distance of thirty miles. The company is also working west of Macleod for 100 miles. Survey parties are strung out to the foot of Kootenay lake. Men are clearing the right of way from Crow's Nest pass to the crossing of the Kootenay at Wardner.

—In commenting on the new tariff and the $2 duty on white pine, Dominion papers say it means a complete lock-out of Canadian lumber, and if they make any sales to the United States lumber buyers they expect it will be for delivery to some outside market for transmission in bond through United States territory; they suggest that the Canadian Government impose an export tax of $3 per thousand feet on saw logs, and $2 per cord on pulp wood.

—The lower Otay dam, twenty miles southeast of San Diego, Cal., has been finished to the 134-foot contour line, and the machinery is being moved to the Barrett dam, thirty miles further on. As the dam now stands, it has an impounding capacity of 13,766,328,500 gallons, or 2918 miners' inches. It is the first dam of the four now under construction by the Southern California Mountain Water Company. The Otay dam has cost thus far $200,000, and the entire system will have cost, when completed, $3,000,000.

—The irrigation system of the Southern California Mountain Water Company comprises three dams, impounding a total of 51,000,000 gallons of water. Lower Otay reservoir, eighteen miles from San Diego, is nearly finished, and will irrigate the country under 400 feet elevation, taking in a good many acres of frostless citrus land now lying waste for lack of water. Barrett dam is thirty-five miles from San Diego, and, with Morena dam, will irrigate every foot of land lying south of the Sweetwater system to the Mexican line. Work on the foundation of Barrett dam has begun.

—The thirtieth annual Mechanics' Fair began last Tuesday evening at their Pavilion in this city. There was a large attendance, 3000 people being present. In the afternoon there were introductory exercises at the Columbia Theater. President Denicke said:

It is my pleasant duty to welcome you to the thirtieth industrial exposition of the Mechanics' Institute. I hope you will agree with me that each exposition is an improvement on the last.

On this occasion, in compliance with a resolution passed at a late congress in this city, our chief feature will be an exhibition of pure food.

The board of Health has undertaken an inspection of foods, with a view to extinguish the trade in spurious foods. This was a wise idea. The prosperity of this State depends largely on the excellence and purity of the articles produced here for sale at home and abroad, and, as this is a food-producing State, upon the excellence and purity of our food products especially. We want to perfect our processes so that the words "Made in California" shall be, all the world over, a guaranty of quality, purity and general excellence.

I am sorry to have to say to you that the successive Mechanics' Institute fairs, while demonstrating the development of the State as a producer, have not illustrated a corresponding progress in manufactures. This has been due to various causes, one of which is the high price of coal. I am happy to express to you my hope that this drawback is likely to be removed; what steam has been to the nineteenth century electricity will be to the twentieth, and I look forward to the time when, instead of bringing coal from the mines, it will be converted on the spot into an electric fluid, which will be conducted by wires to the cities and villages, there to be used for power, light and heat.

Mr. Irving M. Scott delivered an oration on "Labor-saving Inventions." He said:

Man came into the world with undeveloped intellect and unskilled hands, with which to gain a livelihood and to defend himself against his fellow and against beasts of prey, heat and cold, storm and flood. He was but a waif, dependent upon nature for charity. But as her gifts were not at all times ample to meet his requirements for the necessaries of life, and as security from harm was constantly threatened by prowling beasts, necessity stimulated him to invent implements of defense and attack, as the flint, the spear and the bow and arrow. The invention of these implements was a glorious triumph for intellect—saved, perchance, the human race from extinction and made man "lord of the fowl and the brutes."

As population increased and man's requirements multiplied he supplemented the gifts of nature by domesticating the cow, horse, hog, goat and sheep; invented implements of husbandry, as the plow and harrow; also invented the yoke and harness for the ox and horse, and thereby caused them to plow the field and harrow in the sown seed.

The invention of gunpowder was another marked triumph of man over the forces of nature. Obstacles that had hitherto seemed immovable were, by its application, instantly burst into diminutive fragments; fortifications that could have withstood the assaults of the battering-ram and catapult indefinitely were readily demolished, and vast armies armed with their wonted weapons were but chaff in presence of the gale.

In consequence of the invention of gunpowder manifold enterprises that would not have otherwise been were projected and successfully executed.

Thus mines and quarries that otherwise would have remained intact were worked and their material utilized, roadways and canals built, shafts sunk and tunnels driven through mountains and under rivers. If the invention on one hand saved the labor of thousands of men, on the other hand it produced employment for tens of thousands.

The art of printing seems to have been practiced by the ancients, as evidence by the Roman stamp and by every Babylonian brick and signet ring. The first printing press in Europe, however, was invented in the fifteenth century. Prior to this event books were in manuscript.

As inventions multiplied, the need of a better motive power than that of horse and other animals began to be sorely felt, and this led to the invention of the windmill and water wheel. The winds were too inconstant to afford steady employment to labor. The stream or waterfall subject to the effects of drought, was very often too remote for its force to be applied to the work required to be done. In view of these disadvantages necessity stimulated man to invent the steam engine, a device susceptible of indefinite application—no task too delicate nor too mighty for it to accomplish.

Notwithstanding the great efficiency of the stem engine, it, of itself, was found inadequate to meet the requirements of the progress and civilization which it had so largely caused and fostered. To effect the objects required, necessity stimulated genius to invent electrical apparatus by which messages can be conveyed at a speed ten million times as rapid as they can be by the fastest locomotive, and light and power transmitted to points indefinitly distant from the source of energy. So that immense as have been the benefits conferred upon the world by the steam engine, experience demonstrates that the invention of electrical apparatus for the practical purposes of life far transcends that of the steam engine. It may, perhaps, be urged that the steam engine is the prime motor and the electrical apparatus the secondry. That this relation obtains in certain instances is true.

Some may cavil—rail against inventions, to the end that their introduction throws men out of employment and distracts business. If such be the case the inconvenience is only temporary, and the loss quickly and amply recompensed.

Personal.

CLARENCE KING is in Seattle, whence he contemplates departure for the Klondike.

J. W. ROGERS has resigned the superintendency of the Wedge mine, Randsburg, Cal.

HAMILTON SMITH, who has been visiting the Coeur d'Alenes, is in Salt Lake City en route to Colorado.

F. J. HORSWILL succeeds Jno. Treadwell in the management of the Corral Hollow, Cal., coal mines.

SUPT. SIMPSON of the Eureka Mining Co., Soldier Creek, Oregon, is in the city to buy a mill for that property.

T. J. NOLTON has resigned his position of superintendent Klamath Flume & Mining Company, Siskiyou, Cal.

CHAS. A. ROGERS has gone to the Klondike to represent San Francisco, Los Angeles and Denver men who propose investing there.

W. FARISH, formerly superintendent of the Sierra Buttes and Independence quartz mine at Sierra City, is at the G. Reynolds mine near Gold Lake.

C. B. WINGATE, superintendent Feather Fork mine, Plumas Co., Cal., has gone to report to the company's officers the present condition of the mine.

T. S. WOOD, the first man to demonstrate that gold ore of a gross value of $4 per ton could be profitably handled at Leadville, Colo., has gone to Klondike.

C. R. CORNING of New York, is examining and reporting on property owned by the Niagara Mining Co., at Middletown, Shasta Co., and the Yellowstone group, Trinity Co., Cal.

AT Gold Creek, Nev., Schuyler Duryee has been appointed general manager. In the placer mining department W. Stofiel succeeds Capt. Pinder. Col. Church has been relieved of his duties as chief engineer.

A. J. BOWIE, whose departure for the Klondike under engagement for one year at a salary of $25,000 was chronicled in this column last week, does not go "for the Rothschilds" as generally stated. He represents Jas. R. Keene.

PAUL JOHNSON, superintendent of the Hall mines smelter, Nelson, B. C., has resigned to take a similar position with the Guggenheim's in the reduction works at Ajuas Calielpas, Mexico. He will leave as soon as his successor is appointed.

PROFESSOR CHAS. D. WALCOTT, Director of the U. S. Geological Survey, is on his way here inspecting and directing the field work of his bureau, more especially the survey and examination of the forest reserves, for which Congress, at its last session, made a special appropriation of $150,000. He will not return to Washington until October.

AT Santa Cruz, Cal., this week assembled several representatives of electrical transportation companies. Among those present were Mr. Gilbert of Sacramento, representing the Sacramento Gas and Electric Railway Company; J. R. Eastwood, general manager of the San Joaquin Electrical Company; Mr. Balch of the San Gabriel Power Company; Mr. Ensign of the Southern California Power Company; E. W. Sutcliffe and Dr. Charles Van Orden of the Central California Electric Company of Sacramento; Harry Edwards of the Electrical Improvement Company of San Jose; C. N. Beale of Bakersfield of the Kern River Company; W. J. Barrett of Los Angeles, representing John A. Roebling & Sons Company of San Francisco; S. P. Cram of the Electrical Power Company of Chicago; F. M. Pickering and J. A. Lighthope of the Electrical Improvement Company of San Jose and R. S. Masson, coast electrical engineer of the Westinghouse Electrical Company of San Francisco.

Commercial Paragraphs.

THE Colorado Iron Works Company, Denver, Col., report the shipment of six ore cars, made from special patterns, to United Globe mines, Globe, Ariz.; one large round bowl slag truck, capacity 35.16 cubic feet, to Pueblo Smelting & Refining Co., Pueblo, Col.

AT the opening night of the Mechanics' Fair in this city, August 17, the board of jurors upon whom devolved the duty of deciding which exhibit made the best showing and was most completely arranged awarded Washburn, Moen & Co. first prize, $100; in the machinery exhibit, Joshua Hendy Machine Works, first prize, $100; Simonds Saw Company, second prize, $50.

CAPT. J. R. DE LAMAR has awarded a contract to Horace F. Brown of Chicago for six straight mechanical roasting furnaces for the new Golden Gate mill at Mercur, Utah. Two of these furnaces will be used as driers and four for roasting ore, having a capacity of 500 tons per day. Fuel gas will be used and a complete regenerating system for pre-heating the air from the waste heat of the furnaces will be employed, giving the greatest possible economy of fuel. It will require about 450,000 pounds structural iron and machinery, 250,000 red brick, and about 150 tons of fire-brick and fire-clay material for the roasting plant.

WILLIS SHAW, contractors' machinery, 506 New York Life building, Chicago, reports the following sales: A car of hoisting engines to Lantry Sons at Pontoosuc, Ill.; two narrow-gauge contractor's locomotives, to Peppard & Johnson, Minneapolis, Minn.; 30-ton locomotive, for Ganahl Lumber Co., Arkansas; an equipment of Shaw dump cars, to Carey Construction Co. at Fort Worth, Tex.; also pumps and boilers to Christie & Lowe, for their contract at Sabine Pass, Tex. The Pacific Bridge Company, who have the contract for Government fortifications at Narrowhead Point, have also placed an order for a 54-ton steam shovel, to be used on this work.

Recent California Mining Incorporations.

The Anglo-Alaskan M. D. Co., S. F.; capital stock, $1,000,000; $500 subscribed.

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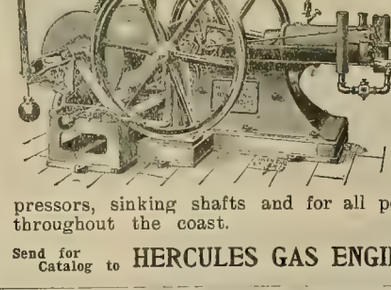

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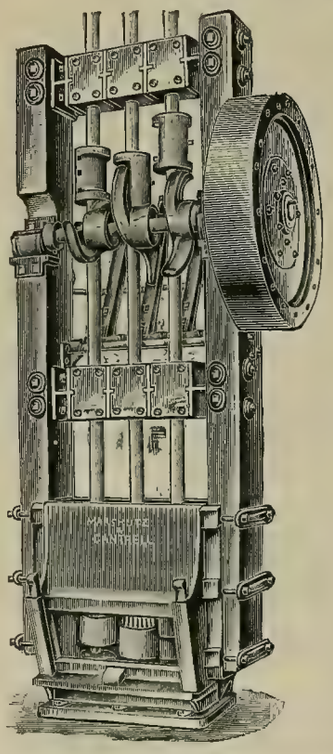

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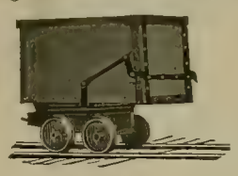

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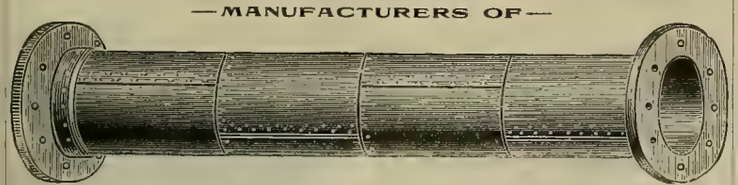

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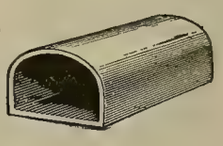

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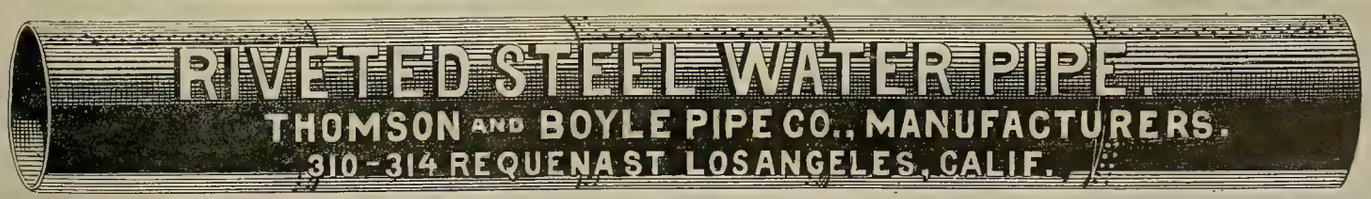

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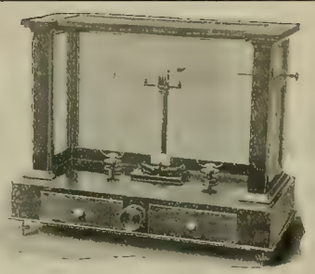

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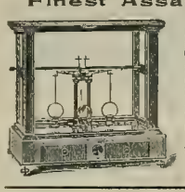

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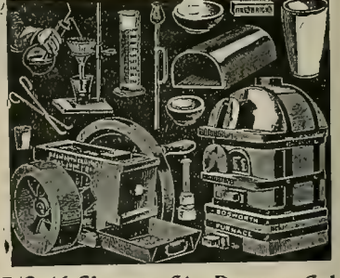

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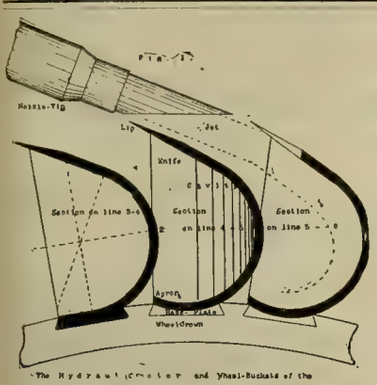

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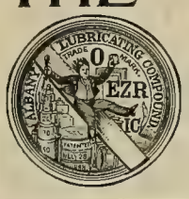

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING AUG. 10, 1897.

587,916.—PIPE WRENCH—J. Bell, Troutdale, Or.
587,781.—MATCH SAFE—John Bond, La Grange, Cal.
587,790.—BOTTLE STOPPER—J. B. Burrow, St. John, Wash.
587,940.—HAND MEASURER—T. C. DeLisle, San Francisco.
587,799.—COMPOSITION OF MATTER—J. Q. Dixon, San Francisco.
587,814.—WATER MOTOR—F. G. Harford, Patalia City, Wash.
587,976.—PULLEY LOCKING DEVICE—W. H. Kirkman, Berkeley, Cal.
587,839.—LEADLINE CONTROLLER—T. Lindsay, Capitola, Cal.
587,993.—BORING MACHINE GAUGE—H. W. McCormick, Centralia, Wash.
587,994.—SURGICAL APPLIANCE—M. McCormick, San Francisco.
587,860.—LEMON SQUEEZER—F. A. Redman, San Francisco.
588,090.—FUMIGATOR—O. Sallady, Los Angeles, Cal.
588,043.—HOT WATER BAG—Z. Yamabe, San Francisco.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

WAVE AND SWELL MOTOR.—Henry Schomberg, Los Gatos, Cal. No. 587,511. Dated Aug. 3, 1897. The object of this invention is to provide a mechanism whereby the rise and fall of a suitable float, produced by the action of the swell or waves, is applied so as to compress air or lift water into a tank which forms a storage and regulator from which the air or water may be applied to drive an engine or any desired machinery at a regular rate of speed. The power is so applied that the least rise or fall observable in the locality where the apparatus is placed will produce a sufficient stroke in the pump to operate it properly. In conjunction with this is shown a disengaging mechanism operating automatically, so that an excessive rise and fall will act to disengage the parts, so that no more than a full stroke of the pump will be produced, and the intermediate mechanism will be protected from injury. This mechanism consists essentially of toothed rack bars pivoted to a rising and falling float, a lever extending transversely across the line of travel of the rack bars, spring-actuated rollers carried by the lever, normally pressing the toothed edge of the bars forward, pawls fixed upon the levers engaging the teeth of the rack bars, bell crank fulcrumed levers and stops so disposed as to engage the arms of these levers alternately when the main lever reaches the end of its stroke.

AUTOMATIC GOVERNOR FOR AIR BRAKE CYLINDER PRESSURE.—Andrew J. Clark, Oakland, Cal. No. 587,643. Dated Aug. 3, 1897. This invention relates to a means for automatically regulating the pressure in railway or brake cylinders, the object being to prevent the wheels of railway cars from sliding. It consists essentially of a governor mechanism depending for its operation upon the rotating parts of the car wheels, a relief valve in connection with the air brake cylinder and an electric circuit by which the governor mechanism operates the relief valve to regulate the pressure in the brake cylinder, whereby the brakes are set up to the wheels with the degree of pressure required, and will be relieved if the pressure is so great as to cause the wheels to slip.

AIR BRAKE SLACK ADJUSTER.—Walter K. Conness, Oakland, Cal. No. 587,519. Dated Aug. 3, 1897. This invention relates to a device which is especially designed for automatically taking up the slack of the bottom rod or car brakes as fast as the wear of the shoes or other parts approaches such slack. It consists in the combination with a car truck, bearing wheels, brake beams and shoes and brake-actuating lever of a rotary shaft having a pulley fixed upon it, a connection between a second brake-actuating lever and the pulley, a holding ratchet wheel fixed upon the shaft and a pawl engaging said ratchet wheel, arms turning loosely upon the shaft having a pin connecting them, a second ratchet wheel intermediate between the arms adapted to be engaged by the connecting pin when the arms are caused to swing upon the shaft, an intermediate mechanism connecting the arms with the live lever rod, whereby the arms are moved and the ratchet shaft actuated whenever the parts become slack from wear.

HAND MEASURERS FOR GLOVES.—T. C. DeLisle, San Francisco, Cal. No. 587,940. Dated Aug. 10, 1897.—This invention relates to a measuring instrument which is especially adapted to take measurements of the hand for the purpose of glove fitting. It consists essentially of an expansible and contractible measuring loop in conjunction with a measuring plate for determining the length of the fingers. The loop is formed of a resilient material adapted to receive the hand, and a device is connected with one portion of the tape to increase or decrease the area of the loop which is formed within it. A bar connected with the opposite portion of the tape is moveable therewith to and from the hand, and a spring-controlled slidable measuring plate is so placed that the fingers lie thereon, having a lug which is engaged by the fork of the fingers, so that the measuring plate is adjusted by the projection of the hand to the proper place in the loop.

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THIS ANNUAL EXHIBITION will embrace a complete representation of the Agricultural, Mechanical and Industrial possibilities of the State.
MECHANICAL DEVICES can be here shown to a better advantage, and, if meritorious, receive recognition of value in placing them on the market.
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THE POULTRY EXHIBIT will constitute a most important division of this year's exhibition, and will offer a most excellent chance for buyers to view the various breeds of fowls in comparison.
THE DAIRY DEPARTMENT will have a complete working exhibit showing the latest methods in dairying, and the working of improved appliances. Competent instructors from some of the leading creameries in the State will be in charge to give instructions to all in this growing industry.
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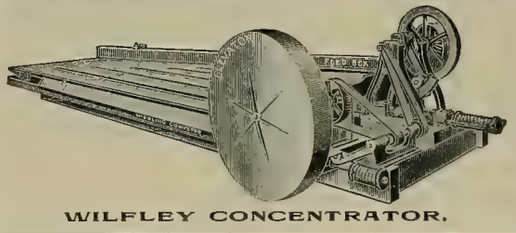
One of these machines will take the place of two or three belt concentrators of any style and do very much better work.



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Extract from letter of July 23d, 1897, from the Mine and Smelter Supply Co. of Denver, Colo., to Messrs. White, Rogers & Co., San Francisco, Cal.:
Mr. Reed, general manager Caroline Mining Co., Colorado, has 34 Woodburys. We have up to date sold him 8 Wilfleys, and we understand that he is to replace all of the Woodburys with Wilfleys.
We have just received a test run made between the Wilfleys and Woodburys at the Iowa Gold Mining and Milling Co., Silverton, Colorado, and give you the results:
WOODBURYS—24 hours; 1 oz. gold; 8.5 ozs. silver; 6 per cent lead; 1¼ per cent copper; 12 per cent zinc; 60 per cent silica.
WILFLEYS—24 hours; 3 ozs. gold; 25 ozs. silver; 13 per cent lead; 6½ per cent copper; 17 per cent zinc; 10 per cent silica.
The Wilfley Table made 750 pounds more of concentrates than machines handling same quantity of pulp on the other side of the mill.
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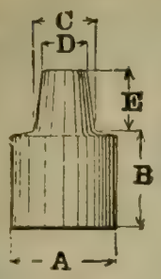

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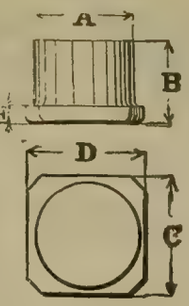

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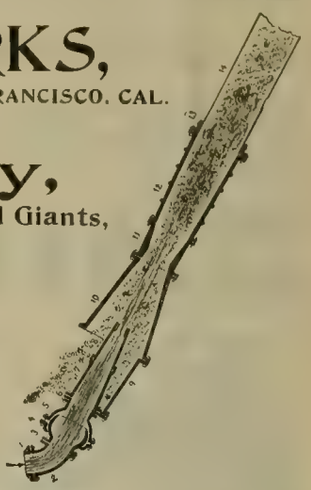

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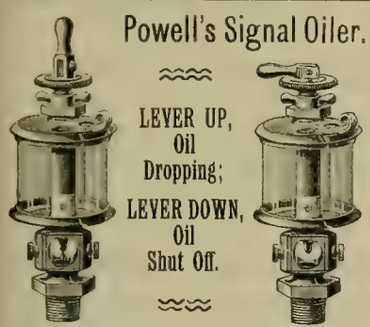

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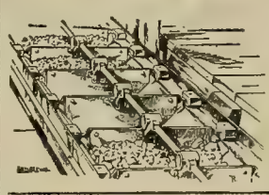

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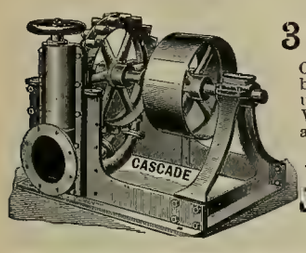

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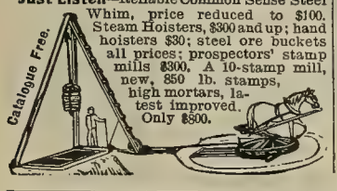

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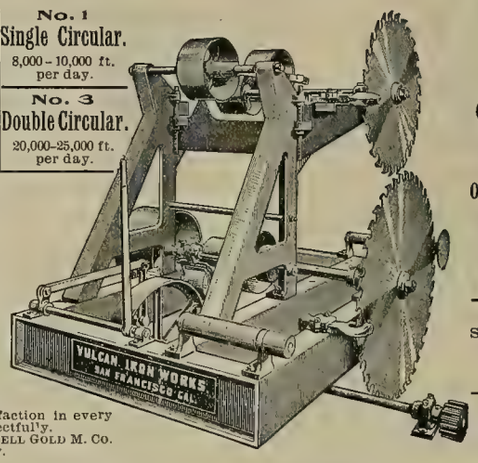

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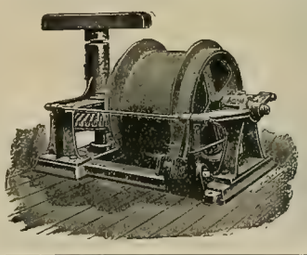

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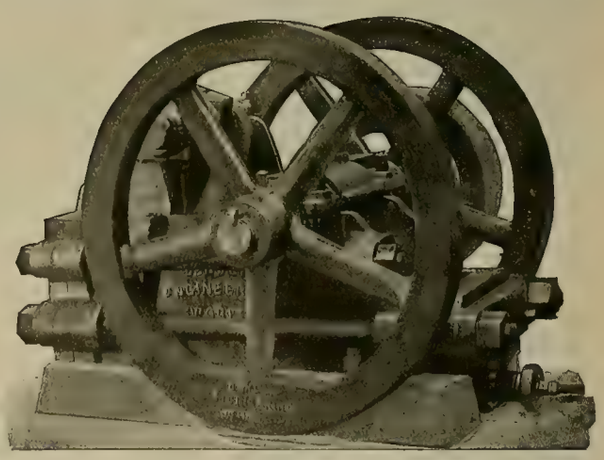

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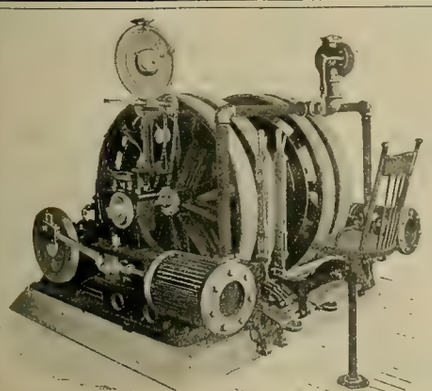

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Market Reports.

The Markets.

SAN FRANCISCO, Aug. 19, 1897.

With a falling off in the demand from Alaska, the market is resuming its normal condition. The expected fall demand has not set in yet, although an enlarging call with increasing orders is reported by jobbers. With machine and ironworkers in general there seems to be a more confident and cheerful feeling regarding the future. The prevailing opinion is that with grain, fruit, feedstuff and dairy products selling at higher prices and a more pronounced boom in gold mining than for over a quarter of a century, there will be a big demand for farm implements and mining machinery. The organizing by capitalists on this coast, at the East and in Europe of companies for mining augurs well for the future of this coast.

The local money market continues to work easy with considerable more disposition shown to put out funds. There is more cal for crop moving purposes, particularly for wheat going into warehouse. The high and, so far, advancing markets for grain cause growers to sell slow and unless they get their figure they store and get advances. Collections are improving although more or less friction is reported from some sections. Since the mint started up over $4,000,000 have been added to the gold coin supply. The bulk of this has gone into circulation. The exports of California products to foreign countries are large, (last week they aggregated in value over $1,-200,000), which add still more money to the general supply. Our New York advices state that the money markets are generally easy with the rate of exchange falling owing to heavy exporting and freer buying abroad on American securities. It is thought that gold importing from Europe will set in soon and that from $20,000,000 to $40,000,000 will be received this year. While this may be true yet if the money markets in this country do not go up it is not at all likely, for the rates of interest abroad are steadily appreciating.

New York Silver Prices.

NEW YORK, August 19.—Following are the c osing prices for the week:

	—Silver in— London.	N. Y.
Friday	25¾	55¾
Saturday	25½	55
Monday	25¼	54⅜
Tuesday	25 1-16	54
Wednesday	24¼	52¼
Thursday	24 1-16	52

	Copper.	Lead.	Iron.	Tin.
Fri.	11 00 @11 25	3 75	9 50@12 25	13 90
Sat.	11 00 @11 25	3 80	9 50@12 25	14 00
Mon.	11 10 @11 25	3 82½	9 50@12 25	14 05
Tue.	11 10 @11 25	3 82½	9 50@12 25	14 05
Wed.	11 10 @11 25	3 82½	9 50@12 25	14 05
Thur.	11 10 @11 25	3 85	9 50@12 25	14 10

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	7½c Prem
New York Telegraphic Transfer	10c Prem
London Bankers' 60 days	$4.87
London Merchants	$4.85
London Sight Bankers	$4.88
Refined Silver, per oz., 1000 fine	.52
Mexican Dollars	Nominal

SILVER.—The markets at home and abroad have receded still further. The decline the past week is nearly 4 cents per ounce firm, with seemingly the bottom not touched yet. European advices state that the lower prices have been brought on by selling offers from America; and in the absence of a European and China demand and a light call from Europe, dealers bid lower each day. The low prices are causing a general shutting down of extensive silver mines, and may also cause the closing of many that can be worked at profit even with silver around 40 cents an ounce fine. The decline is also demoralizing the export trade in this country and Europe with silver using countries, and it is also weakening securities of this country, which will make itself severely felt abroad.

MEXICAN DOLLARS.—The decline in silver has completely unsettled the market value of Mexicans, making it impossible to quote correctly. Brokers will not buy much except they have an order, and then only at about the bullion value; but they sell in small quantities at 43¼@44 cents.

QUICKSILVER. — The market is weak. The demand is slow for the season. Silver mines continuing to shut down is lessening the consumptive demand. Exports by sea the past week aggregated 100 flasks, to Central America.

Our market is quoted at $38 for domestic consumption.

COPPER.—The market has strengthened the past week, both at the East and abroad. Although the output is in excess of last year, yet it is cared for by increase in the consumption abroad and also at the East. With trade improving at home and abroad, it ought not to cause surprise if still better figures obtain.

Our market is quoted as follows:

Ingot casting, jobbing	13@—
Ingot " wholesale	12½@—
Sheet copper	—@16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½

TIN.—The market has made another advance at the East and abroad, the market closing strong. Ours is firmer. The upmove is said to have been brought about by speculative buying in Europe.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " light, "	4 00@—

LEAD.—The market has held firm, with a stronger tone at the close. The East reports a fairly active business passing at full figures.

Our market is quoted in jobbing lots as follows per pound:

Pig	—	@	4 80
Bar	5 00	@	5 25
Sheet		@	6 25
Pipe	5 25	@	5 50

SHOT.—The market is firm.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs			$1 35
Drop, B and larger sizes,	"	"	1 60
Buck, Balls and Chilled, do,	"	"	1 60

POWDER.—The market is steady.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9c to 11c, according to strength and quantity.

IRON.—The market with us is practically unchanged. At the East slightly better prices rule under an improved demand for both home and export.

AMERICAN.

	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

COAL.—Our marke does not show any material change in prices for spot, but distant cargoes at prompt shipment seem to be firming up for Australian.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$8 00@— —
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Cuman	5 50@ 6 00
Seattle	5 50@ 6 00
Coos Bay	—@ 4 75
Cannel	8 00@— —
Egg, hard	12 00@13 00
Wallsend	6 50@— —

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —		
English, to load	9 50	@	— —
" spot, in bulk	10 00	@	— —
" in sacks	11 00	@	12 00
Cumberland	— —	@	— —

ANTIMONY.—The market is steady.

Our market is quoted at 8¾c in a jobbing way. New York mail advices quote 7¾c for Cookson's, 7¼c for Hallett's and 7c for Japanese.

NAILS.—The market is steady with an active demand reported.

Wire, carloads, basis per keg			
" jobbing, " "			$2 10
Cut, carloads, " "			
" jobbing, " "			2 00

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4½

PLATINUM.—The market is quiet.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is steady.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

Chemicals.

While importers are disposed to firm up in their views to meet the higher duties, the liberal stocks carried by the trade is against it at present. So far as we are able to learn the latter have not advanced prices and probably will not so long as competition is active and goods bought at old prices are in hand. The same condition obtains at New York, with the exception that there importers are very heavily stocked, and as the demand from jobbers is quite slow, almost nothing, they are not disposed to firm up.

SULPHURIC ACID.—The demand is fair We quote in a jobbing way at 1½c per lb for 66%.

ACETIC ACID.—The market is firm at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported steady from store at 6⅞@7c per pound in carboys.

BLUE VITRIOL.—Our market is firm.

We quote in a jobbing way at 4½c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is firm.

Our market is quoted in a jobbing way at $1.50 a pound.

BONEASH.—The demand is good.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3⅞c; No. 2, 2½c.

PHOSPHORUS.—The market is firm.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firm at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is firm at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—There is a fair demand at 2½c a pound from stores.

NITRATE OF SODA.—Market is stronger. Our market is quoted from store at 4c for 95%.

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Alpha Con M & M Co, Nev.	19	10c	July 8.	Aug 12..Sept 2	C E Elliott, 309 Montgomery
Altoona Q M Co, Cal.	1	75c	Aug 3.	Sept 6 Oct 11	C Allenberg, 206 Sansome
Belcher S M Co, Nev.	55	10c	July 19.	Aug 23..Sept 13	C L Perkins, Mills Bldg
Best & Belcher M Co, Nev.	62	25c	July 1.	Aug 5..Aug 26	M Jaffe, 309 Montgomery
Bullion Con G M Co, Cal.	11	22c	June 22.	Aug 2..Aug 23	C A Grow, Mills Bldg
Con Cal & Va M Co, Nev.	9	25c	Aug 3.	Sept 8..Sept 29	A W Havens, 309 Montgomery
Crown Point G & S Co, Nev.	71	10c	July 27.	Aug 31..Sept 21	Jas Newlands, Mills Building
Eureka Con D M Co, Cal.	9	2c	June 30.	Aug 7..Aug 28	D M Keat, 330 Pine
Gold Ridge Con M & M Co, Cal.	5	4c	Aug 3.	Sept 18..Oct 9	H Sylvester, 43 Sixth
Horseshoe M Co, Cal.	3	40c	July 12	Aug 23..Sept 20	C E Green, 532 Market
Inyo Marble Co, Cal.	30	10c	July 27.	Aug 28..Sept 20	M A Cahn, 323 Phelan Bldg, S F
Marguerite G M & M Co, Cal.	7	10c	July 28.	Sept 10..Oct 11	F Mettman, 237 Twelfth
Mexican G & S M Co, Nev.	57	20c	July 28.	Sept 1..Sept 23	C E Elliot, 309 Montgomery
North San Juan G M Co, Cal.	3	7c	July 16.	Sept 8..Oct 4	H W Morris, 141 First St
Occidental Con M Co, Nev.	28	10c	Aug 3.	Sept 7..Sept 30	A K Durbrow, 309 Montgomery
Osborn Hill G M & M Co, Cal.	6	35c	Aug 4.	Sept 6..Sept 27	R R Grayson, 331 Pine
Osceola Con M Co, Cal.	6	1c	June 30.	Aug 2..Aug 21	Holland Smith, 307 Montgomery
Rose Creek M Co, Cal.	1	15c	June 28.	July 28..Aug 30	J M Wilmans, Crocker Bldg
Sierra Nevada S M Co, Nev.	113	20c	Aug 18.	Sept 22..Oct 12	E L Parker, 309 Montgomery
Thorpe M Co, Cal.	7	2½c	June 9	Aug 14..Sept 4	A F Frey, Phelan Building
Utah Con M Co, Nev.	25	5c	July 6.	Aug 9..Aug 30	A W Havens, 309 Montgomery

Mining Share Market.

SAN FRANCISCO, August 19, 1897.

The market has been flat, stale and unprofitable the past week to chippers, both bulls and bears. There have been some fluctuations, but of such small proportions as not to admit of enough profit to risk the venture. The lively moves in wheat are drawing dealers to futures in that cereal, and so long as it continues active, with lively fluctuations, just so long will it continue the gamble, unless the moneyed inside mining share pool should come into the share market to make a deal. That this can be done, and on merit, does not admit of questioning, for it has been done before on just such an unpromising outlook, and it is safe to say that what has been will be again, although it must be admitted that the low price ruling for silver is against it unless the gold-bearing ore is extracted. The news from the mines continues to be largely a repetition of what has been reported for some time past. A saving in the official letters could be made by having the superintendent of every mine in which work is being done furnished with printed letters in which they can fill in the level, number of feet run and the direction. This would save considerable time and probable expense. Gen. Bob Morrow's "little cats" to the public, but, if reports are correct, big-paying mines to him and associates strengthened the past week—Caledonia selling up to 25 cents and Overman to 20 cents. It may be that he is getting ready to have the public know about more ore being found, so as to report, in official letters to be filed, an increase in the output of the latter. Standard showed further firming up—selling up to $2 a share. There is a very strong probability that one or more dividends will be disbursed this year. The surplus fund in the treasury, with July expenses paid, is over $27,000, and it is stated that the net profits for the current month will increase this to fully $40,000. The new electric plant is said to give the best of satisfaction and makes quite a saving to the company. Tests of low-grade ore in Con. Virginia are said to run an assay value of about $14.

From the Comstock mines private news is not dished out lavishly, or if it is, the dull and heavy market causes people to pay little attention to it. This is to be regretted, so far as concerns the business calling of those whose stock in trade seems to be the getting up of reports from the mines suitable for the occasion. The official letters are skeletoned, affording very little, if any, information of a satisfactory character to the public, if the letters from Con. Virginia, Chollar and Potosi be excepted. These appear to be fuller and more complete. From the Utah mine no change in the character of the work and material encountered is reported. Shareholders of Sierra Nevada can console themselves with the knowledge that the company has found a 20-cent assessment down here, even if not able to show up much ore on the Comstock. Since its incorporation the total amount of assessment collected is $6,666,910, and dividends disbursed $102,500. The work in the mine is confined to the Layton tunnel and 900 foot levels and in the same directions as reported last week. In Union they are still pushing slowly forward to the south on the 900-foot level. In Ophir the west crossdrift on the 1000-foot level is in 304 feet; it is getting suspiciously close to the west lode, and, therefore, it is liable to be stopped at any time. Work is still south from the old Comstock tunnel level.

In Andes a north drift has been started from the east crossdrift on the 175-foot level. In Mexican they are still running an east crossdrift on the 1000-foot level. The official letter from Con. Virginia reports continued work to the west on the 1000-foot level. On the 1550-foot level they are running a south drift and also an east crossdrift, and on the 1650-foot level they are working at several points, with no particular change to note. No ore was extracted. Work is still continued by Best & Belcher and Gould & Curry in the joint east crossdrift 800-foot Bonner shaft level. Nothing comes to hand from Bullion or Exchequer. They are stoping ore in Alpha on the 500-foot level. The quantity is small to what can be taken out if desired; but then it may be for the best, for it is said that if more were taken out a larger assessment would have to be levied to pay milling or other charges. In Savage the work is on the same level heretofore reported. Work in Potosi is largely confined to the 100-foot level. A small streak of $20 to $30 ore has been struck. No material change comes to hand from the work done jointly to the west by Con. Imperial, Challenge and Confidence, neither is there anything new to report from Confidence or Yellow Jacket. The joint work to the west in Kentuck by Yellow Jacket, Crown Point and Kentuck is being pushed slowly ahead. From Crown Point, Belcher and Seg. Belcher nothing new is reported in this week's letter. In Overman, it is said, better work is being done.

There are dealers who still cling to the Brunswick lode proposition as the coming "sesame" to a share market. The joint work of Con. Virginia, Best & Belcher and Gould & Curry is confined to the 400-foot level. On this level they are running a south drift, a north drift and an east crossdrift. On the 600-foot level they are running a south drift. In Occidental they are at work on the 550-foot and 650-foot levels; on the former they are running east and on the latter they are running south. The official letter from Cholar reports they are still sinking incline shaft No. 1. They are still stoping on the 300-foot and 400-foot levels. The ore is lessening in quantity. On the 500-foot level they are running south and also upraising to connect with the 400-foot level, and sinking to connect with the 600-foot level. On the latter level they

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$33,189,500

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Weekly Market Letter on Application.

Quotations by Wire or Mail.

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WE are exclusive handlers of Automatic Acetylene Gas Generators for Northern and Central California. We are desirous of establishing responsible agencies for our territory. Correspondence solicited. WESTERN ACETYLENE GAS CO., Room 75, 916 Market Street, San Francisco.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from E. H. Adams, in the King Bird Mine, in Yuba Co., near Clipper Mills, to deposit tailings in Grizzly Creek; from J. T. Coffman and George T. Miller, in the Lost Camp Mine, near Blue Canyon, Placer Co., to deposit tailings in Blue Canyon, and from Mrs. E. A. Cox, in the Washington Mine, in Whisky Diggings, Sierra Co., to deposit tailings in Slate Creek, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on September 7, 1897, at 1:30 P. M.

"It is character, not circulation, that some advertisers want." Very well. The MINING AND SCIENTIFIC PRESS has both.

are running southwesterly. Only 82 tons of ore were extracted the past week; it averaged about $24 gold and 26 ounces silver.

The following illustrates the changes of the week:

MINES.	Aug. 12.	Aug. 19
Alpha	$ 16	$ 14
Alta Consolidated	06	
Andes		
Belcher		31
Best & Belcher	69	69
Bodie		
Bullion		
Challenge		32
Chollar	72	71
Confidence		87
Consolidated California and Virginia		
Consolidated New York		
Crown Point		18
Exchequer		
Gould & Curry	41	
Hale & Norcross	1 00	95
Justice		
Mexican	26	22
Ophir	64	60
Overman	06	08
Potosi	35	33
Savage	25	28
Sierra Nevada	72	65
Union	39	43
Utah	09	19
Yellow Jacket	31	32

San Francisco Stock Board Sales.

SAN FRANCISCO, August 19, 1897.

9:30 A. M. SESSION.

300 Alpha	14	2100 Occidental	23
300 Belcher	30	100 Overman	08
200 Best & Belcher	69	300 Potosi	33
200 Challenge	31	200 Savage	28
300 Chollar	71	600 Sierra Nevada	65
100 Confidence	87	200 Union	43
200 Crown Point	18	600 Utah	19
200 Gould & Curry	41	100 Yellow Jacket	32
200 H. & N	95		

SECOND SESSION—2:30 P. M.

100 Ophir	80	400 Utah	13
100 Best & Belcher	87	700 Seg Belcher	05
400 Savage	26	300 Union	39
400 Chollar	69	200 Challenge	32
200 Yellow Jacket	32	1300 Occidental	24
100 Belcher	31	100 Mexican	22
600 Sierra Nevada	60		

Rainfall and Temperature.

The following data for the week ending 5 A. M., Aug. 18, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

CALIFORNIA STATIONS.	Total Rainfall for the Week.	Total Seasonal Rainfall to Date.	Total Seasonal Rainfall Last Year to Same Date.	Average Seasonal Rainfall to Date.	Minimum Temperature for the Week.	Maximum Temperature for the Week.
Eureka	.02	.05	.04	.26	50	64
Red Bluff	.00	.00	T	.06	66	104
Sacramento	.00	.00	.00	T	53	95
San Francisco	T	T	.05	.02	50	64
Fresno	.00	.00	.00	.02	62	102
San Luis Obispo	.00	.00	.00	.....	52	84
Los Angeles	.00	.00	.03	.03	58	86
San Diego	T	.01	.04	.05	64	76
Yuma	T	.08	.56	.36	80	112

HO! FOR ALASKA'S GOLD FIELDS!

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Address, stating particulars, price, etc., A. B. this office.

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"YUKON," this Office.

ANNUAL MEETING.—The Regular Annual Meeting of the stockholders of the Marguerite Gold Mining and Milling Company will be held at the office of the company, No. 237 Twelfth Street, San Francisco, California, on MONDAY, the 23rd day of August, 1897, at the hour of 8 o'clock P. M., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Saturday, August 21st, at 2 P. M. F. METTMANN, Secretary.

Notice for Bids.

Sealed proposals will be received by the TUOLUMNE WATER COMPANY, at Columbia, Cal., for building a cob-work timber dam on the South Fork of Stanislaus river, according to the plans and specifications on file in the company's office. Bids should be marked on the outside of the envelope, and will be opened on Saturday, September 4, 1897. The privilege of rejecting any and all bids is reserved. By order of Board of Directors.

J. B. POWNALL, Secretary.

Assessment Notices.

ROSE CREEK MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Star, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of June, 1897, an assessment (No. 1) of 15 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 163, Crocker building, junction Post, Montgomery and Market streets, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 21st day of August, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 14th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. M. WILMANS, Secretary.

Office—Room 163, Crocker building, San Francisco, California.

MARGUERITE GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of July, 1897, an assessment (No. 7) of 10 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, 235 12th street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of September, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 11th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

F. METTMANN, Secretary.

Office—287 12th street, San Francisco, California. The Secretary will also receive payments from 12 to 5 P. M. at his business office, 225 Sansome street.

INYO MARBLE COMPANY.—Location of principal place of business, San Francisco, California; location of works, Inyo, Inyo County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of July, 1897, an assessment (No. 30) of 16 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 323 Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 28th day of August, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 20th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

M. A. CAHN, Secretary.

Office—Room 323 Phelan building, San Francisco, California.

OSBORN HILL GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Grass Valley, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 4th day of August, 1897, an assessment (No. 6) of 35 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, room 11, No. 331 Pine street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of September, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 27th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

R. R. GRAYSON, Secretary.

Office—Room 11, No. 331 Pine street, San Francisco, California.

CONSOLIDATED CALIFORNIA AND VIRGINIA Mining Company.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 3d day of August, 1897, an assessment (No. 9) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to to Secretary, at the office of the company, room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of September, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 29th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office—Room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 3d day of August, 1897, an assessment (No. 28) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of September, 1897, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 30th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 3rd day of August, 1897, an assessment (No. 5) of 4 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of September, 1897, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 9th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

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Machine for Making Slat Fence.

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23,000 Feet 10 5-8 Inch Steel Pipe,

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Several Pumps and Heaters,

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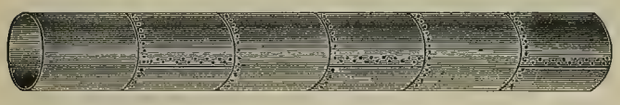
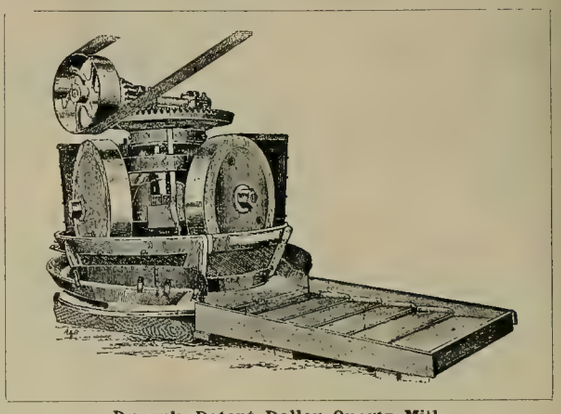


Sheet Iron & Steel WATER PIPES.



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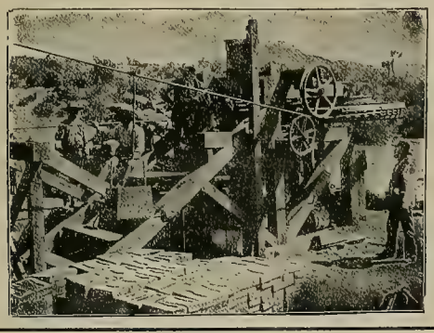
WESTINGHOUSE ELECTRIC CO., Ltd. :: 32 Victoria Street, London, S. W., England.
For CANADA: Address Ahern and Soper, OTTAWA, CANADA.



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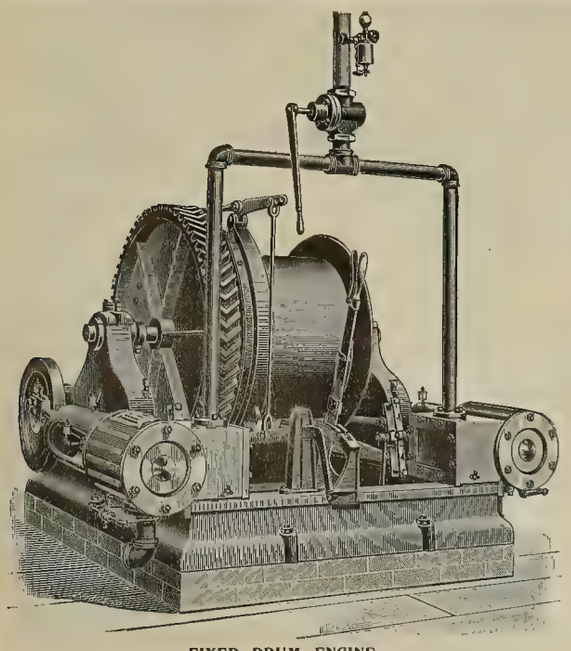

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AND PACIFIC ELECTRICAL REVIEW.

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Southern Oregon Mines.

In April, 1851, California gold miners along the streams of Siskiyou and Shasta counties heard of newly discovered diggings farther north, and heading for Rogue river in southern Oregon found hydraulic mining ground that through the years has furnished considerable gold. The fluctuating nature of the industry in Oregon is illustrated by the fact that while in 1884 that State produced $552,472 in gold, the output for '96 is estimated at $1,950,000, showing that there as elsewhere the depression in other lines of industry caused renewed attention to be given to mining—the original source of all human wealth. Of the amount stated southern Oregon produced about 40%: of this percentage by far the largest part was from the hydraulic mines. There is a little surface quartz mining going on in that section of the State, but no depth has in any instance been attained.

JOSEPHINE MINE, ROGUE RIVER, OREGON.

The conditions and climatic surroundings make hydraulic mining in southern Oregon a most congenial employment. The gold is fairly plenty; transportation is easy; no legal restrictions exist; wood and water abound; the climate is fine, and labor is easily procured. There are several operated mines that return good dividends, and a large number of paying claims. The pipe and giant so far constitute the main form of hydraulic mining, though wing-damming and dredging are receiving some recent attention.

On this page and on page 192 are given some typical views of mines in Josephine Co. The Josephine mine on Rogue river, Grant's Pass district, has long been worked and has always paid well; the Merrill mine, Galice Creek district, shows, incidentally, a device for removing stumps, etc.; the Junction mine, close to the Merrill, and where the three forks of the creek unite, is particularly well supplied with water, the lack of dumping facilities being partly compensated for by the recent construction of 1200 feet of flume. At the adjacent Forest Queen mine, on Louise creek, are four ditches, 1500 ft. hydraulic pipe, 1400 ft. flume and two giants.

Since the first piping at Scott's gulch, near Waldo, in 1854, the harnessed streams of southern Oregon have washed out many millions in gold, and, as in other sections of the coast, the amount mined is but a fractional index of the golden store still to be produced. Of late years mining has become "fashionable" again in Oregon, the hard times causing many to take up the more profitable industry. One of Oregon's most urgent needs is some mining legislation. At present it is considerably behind its sister States in this regard.

MERRILL HYDRAULIC MINE, GALICE CREEK, OREGON.

Useless to Hoard Silver.

A Denver, Colo., report that there was a general movement among the smelters of Colorado and elsewhere to hold silver produced until a shortage of the supply occurs, for the purpose of creating a demand and a consequent better price, occasioned inquiry by the *Republican*, which developed the fact that such a movement was not only extremely unlikely, but almost impossible under present conditions. In 1893, when the Indian mints closed, an attempt of this kind was made by some of the smelters in the hope that an advance in the price would result; but it failed, and the conditions were much more favorable at that time than they are now. Smelters and ore and bullion buyers all agree that nothing could be accomplished by such a movement at this time, as the call for silver in China, Japan and India, on account of existing conditions, is constantly growing less, and there is no probability that there will be any increased market for some time. It is conceded on all sides that the only thing to do is to sell the silver for the market price. It can always be sold, even though the demand is decreasing; and while there is comparatively little silver mining—that is, for silver alone—the accumulation as a by-product of gold, copper and lead mining is sufficiently large to make the matter of holding the product for better prices a very serious drain upon the resources of the strongest reduction companies, especially as there is no immediate prospect of any relief from any source.

As one ore-buyer said: "There would be no use in trying to hold it on a falling market. If there was anything in sight we might hold it for a short time, but I don't think there is a smelter in the world that could afford to hold silver three months, and the stock now on hand is enough to keep the price where it is for that time."

From the best obtainable sources of information it would seem that the bottom price of silver had not yet been reached.

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TO THE PUBLIC.

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San Francisco, August 28, 1897.

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Land Office Business.

For the second time within a year the Commissioner of the General Land Office has visited California and San Francisco. When Mr. Lamoreaux was here he was met at the northern gateway of the State by corporation attorneys in a private car and sedulously guarded while here. His lax nature, his questionable compliance with all corporate suggestions and his nimble haste to grant all corporate wishes in the mineral land business is a matter of history to all who have noted the progress of this famous and infamous absorption of the public domain with official consent and connivance.

This week Lamoreaux's successor was here—a different type of man—"unawed by influence and unbribed by gain"—accessible to the people, coldly avoidant of questionable corporate favors. Had he been in his present position three years or two years ago, the mineral lands of California would not be in their present plight. Just now he is powerless to do anything in the matter.

Commissioner Hermann's present visit to California is to make the best settlement possible in the matter of the Benson claims. A brief history of this business, as outlined in a Washington dispatch is of present interest:

The Interior Department, under the direction of the new Administration, has undertaken to dispose of these frauds, which had their beginning in the years from 1878 to 1885 in this State. They consisted in false surveys, which cost the United States more than $1,000,000. The last of the Benson contracts, as they are known, remain unsettled, although the recent Commissioner of the Land Office, Silas W. Lamoreaux, did his best to give Benson and his associates all that they asked for. He might have succeeded had not Secretary Francis in one instance, and Commissioner Hermann in another blocked him.

Commissioner Lamoreaux first prepared an estimate to go into one of the appropriation bills for $50,000, to satisfy all of the remaining claims in these fraudulent surveys, but Secretary Francis would not approve the estimate, and it was not submitted to Congress. Lamoreaux can never offer ignorance as an excuse for his action, because he prepared the estimate under protest of H. L. Collier, one of Secretary Hoke Smith's appointees and an expert, who had made careful examination of these surveys and was well satisfied that they were fraudulent. Collier, for his pains, was dismissed by Lamoreaux's orders.

When Hermann succeeded Lamoreaux as Commissioner of the Land Office he soon discovered that his predecessor had approved the accounts for the five remaining "Benson surveys," and had sent them, in all amounting to $50,000, of which $35,000 was for surveys and $15,000 for other claims, to the Treasury Department for payment as soon as an appropriation might be available. This also was done against the protest of Inspector Collier. Commissioner Hermann caused the agents of the Interior Department to conduct an investigation which satisfied him that Lamoreaux should never have approved the accounts. He immediately sent an order to the Treasury Department and had the papers returned to the Division of Accounts of the Interior Department. He also issued notice to Benson and his associates to show cause why the payment of their remaining claims should not be suspended. Benson, with his attorneys, hastened to Washington and spent some days arguing and pleading with Commissioner Hermann to let Lamoreaux's approval of the accounts stand. But when Commissioner Hermann produced the reports of the agents of the Land Office showing conclusively that the surveys were not valid and had not been made honestly, Benson weakened and proposed a compromise. This compromise Commissioner Hermann entered into and by its terms the surveys will be made over again honestly; and, when approved by the agents of the Land Office, will be paid for. The United States, for the time being, agrees not to prosecute civil suits to recover money which was paid out of the Treasury on fraudulent claims.

The evidence best shows the character of the business. Benson soon after his arrival in this State entered the Government service as deputy surveyor. He held this office until May, 1879, when he tendered his resignation to Surveyor-General Wagner of the State of California on account of his "wish to engage in business which in some respects might be incompatible with his duties as deputy surveyor." Prior to his resignation he and his associates had secured surveying contracts to the amount of $77,000 from the Surveyor-General, but after his resignation Benson's name disappeared from the rolls of the Surveyor-General's office as a contracting deputy, and thereafter he employed men to make surveys in California and in other States. These men were appointed deputy surveyors upon the request of Benson, and without their knowledge he took contracts in their names. He had them sign blank bonds, contracts, oaths, powers of attorney, etc., of which they knew neither the import nor the use.

Benson paid some of his men monthly wages of $50 to $60, and with others he divided the profits of contracts taken in their names. He nominated such men as he wanted for deputy surveyors, and Surveyors-General appointed them. He arranged with different persons in San Francisco to act as sureties for the deputies, such bonds being signed in blank. Oaths were seldom administered.

Evidence filed away in the Interior Department shows that Benson had co-operation and assistance in concealing from the ring's dummy surveyors the fact that contracts had been put in their names without their request, consent or knowledge. Contracts amounting to $200,000 were taken out in the names of five persons who did not discover that there were contracts in their names until two years after they had been entered in the records, and in some cases not until the thing had been exposed. The proceeds of these contracts were collected and turned over to Benson by the use of powers of attorney, signed in blank and filled up as required, which were accepted by the Surveyor-General and were forwarded to the General Land Office. Part of such powers of attorney, signed in blank, purport to have been duly executed before the chief clerk of the Surveyor General's office, acting as United States Commissioner. One of the five persons referred to was never appointed a deputy surveyor, never took an oath of office, never issued a power of attorney, and never collected a dollar, though the Treasury Department paid in his name to the Benson ring $45,000.

In 1885 Special Agent Conrad was sent out here to make an investigation, and he succeeded in obtaining evidence that caused the Grand Jury to return twenty-four indictments against Benson alone and seventy-six against "the ring."

During the seven years of his operations Benson secured contracts amounting to $989,000. But a single contract, and that for less than $3000, was taken out in Benson's name. Deducting the cost of surveys, the profits of the Benson ring were nearly 70 per cent. A paper purporting to be a settlement between Benson and one of his partners for surveys amounting to $350,000 shows a net profit of 51 per cent, and the following items of expense:

Expenses of surveys	$106,000
Paid for lobbying in Congress	25,000
Paid for blackmailers	5,000
Paid officials	17,500
Paid to attorneys before General Land Office	17,500
Total	$171,000

It was the practice of the ring to make some honest surveys under each contract, but most of the work was performed in the office and not in the field. When the Interior Department made its investigation "the ring" became alarmed and burned its records and papers. Benson went to Europe. He was arrested in Denmark and extradited. Special Agent J. A. Sibbald was sent to California in 1889 to bring the cases to trial, but, as he said in his letter to the Land Office charging collusion between the members of the ring and officers of the Government, the weakest instead of the strongest cases were tried, and the result was as he had predicted—the Government lost. Sibbald reported to the Land Office that the District Attorney at the beginning of the trial had said: "We don't want to try these cases very sharp; we do not want to convict anybody," and tendered his resignation, which was not accepted at that time.

Subsequently, in a report to the Land Office, Special Agent Sibbald said: "Of the proceeds of the contracts, amounting to $986,000, controlled by the Benson ring, I am satisfied that a proper investigation will show that not less than $750,000 was paid out of the Treasury to its agents and representatives on false and fraudulent powers of attorney. The statute of limitations now protects the forgers from criminal prosecution, but I believe the Government has its remedy by civil suits to recover the money from the men who used the bogus power of attorney, at least in the cases referred to in this report."

As the Interior Department did not act upon Special Agent's Sibbald's recommendations, he resigned. Benson's attorneys, hoping to prevent further warfare against the ring, made overtures to Mr. Sibbald, and finally engaged him to act as attorney in getting the Land Office to approve the accounts for two or three legitimate surveys. Mr. Sibbald was successful, but as his contract with Benson's representative was not in writing, it was repudiated and the fees were not paid.

After the Interior Department unearthed these things Benson and his confederates not only asked immunity from punishment, but requested payment for the fraudulent surveys rejected by the General Land Office upon proof that they were fictitious and fraudulent, which surveys amounted to from $250,000 to $400,000, according to different estimates. It is learned at the Washington Land Office that some of these suspicious claims, though it is difficult to determine how many were clearly Benson's, were settled by the last Administration upon the approval of accounts by Commissioner Lamoreaux.

To save himself from further prosecution, civil and criminal, while the suits against him were still pending Benson appeared before the Land Office in a previous Administration and suggested a compromise. He promised to have the lands surveyed again honestly and at his own expense. The Land Office agreed to this, but from new evidence in possession of Commissioner Hermann, it seems Benson did not keep his promise. However, Commissioner Hermann has entered into another such compromise, for he says: "The Government would rather have its lands surveyed than prosecute surveyors, and if they will survey them for nothing, hadn't we better let them do it?"

Nevertheless, the General Land Office is still conducting an investigation in the field. H. L. Collier, the special agent who protested when Commissioner Lamoreaux approved certain contracts, and who was dismissed for his trouble, has been reinstated by Commissioner Hermann and has been instructed to resume his old work and bring together all the evidence obtainable in relation to these fraudulent surveys. He is now supervising the surveys which Benson has been making under his compromise, and if any more crookedness is unearthed the matter will be called to the attention of the Department of Justice for action.

Commissioner Hermann believes that the Government has a chance of having its lands surveyed properly without any more expense; or, in other words, that it may get honest surveys for the money that it paid out upon false representations, but, if it has not that chance, he will bring the Benson ring to account for the past.

Benson is now with a surveying party on the Sonora road, surveying lands, and appears desirous of settling the matter with the Government by doing what it requires.

Concentrates.

THE fire in the Utica mine at Angels, Cal., is under control.

IDAHO'S State Mining Inspector has resigned to go to the Klondike.

THE Colorado Mining Stock Exchange is expected to organize under another name.

THE Calaveras *Chronicle* is publishing an application for a patent for the Gwin mine.

IT is thought that via the Stickeen will be the favorite Klondike route next year.

THE earnings of the Bolero Company, Sonora, Mexico, for the year '96 were $4,564,439.73.

THE capacity of the Treadwell mill, Douglas island, Alaska, is to be increased to 300 stamps.

THE use of a hot solution and mercury in the cyanide process is claimed by several mining men.

LEADVILLE'S "down town" mines are to be pumped out, unless silver goes considerably lower.

THE Bunker Hill & Sullivan, Cœur d'Alene, Idaho, now employs 350 men and turns out 500 tons ore daily.

A CARLOAD of miners' candles has 500 boxes, 240 candles each, and 160 boxes, 120 each—a total of 139,200 candles.

A. E. SMITH of Castledale, Utah, claims to have discovered an immense deposit of stone suitable for lithographing.

THE steamer Mariposa from Sydney and Auckland last Thursday brought English sovereigns of value $2,250,000.

IT is thought that the net cost of production of copper at the Calumet & Hecla mine last year was 5.45 cents per pound.

THE Hall Mines, B. C., smelter is now making daily shipments of copper matte to the Kansas City reduction works.

THE biggest year's yield of the Comstock was in 1876, the coin value of that year's production there being $38,572,984.

AT Grand Forks, B. C., affidavits of assessments on mining properties are being recorded at the rate of twenty to thirty per day.

THE Crocker estate, this city, are locally credited with the purchase of the Alice property, Yankee Hill, Colorado, for $250,000.

VIVIAN & SONS of Swansea are making an effort to compete with American ore buyers for the purchase of British Columbia ores.

THE Gwin Mine Development Co. are locally reported to have bought the Good Hope mine, Middle Bar, Calaveras Co., Cal., for $12,500.

AT the Gwin mine, Calaveras county, Cal., the 40-stamp mill crushes daily 130 tons $6 rock. The cost of mining and milling is about $2 per ton.

THE creation of a new Cabinet officer, the Secretary of Mines and Mining, is still a manifest necessity, and the project should receive active support.

A SCHOONER from St. Michaels, Alaska, arrived at Port Townsend last Thursday with $50,000 Klondike gold, and reports about 3500 people in that district.

THE Horn Silver at Frisco, Utah, is to be shut down. The property has paid $1,500,000 in dividends, but at present rates there is a loss on every ton of ore taken out.

THE Canadian customs department allows each miner bound for the Klondike to take in free of duty 100 pounds of provisions, miners' blankets, the clothing in use, and cooking utensils.

THE Mohave Desert Smelting Works has incorporated; H. Lang, G. W. Beck, H. T. Norcross, W. A. Off, L. Helm; capital stock, $500,000. Phœnix, Arizona, is the principal place of business.

THE Jefferson mine near Bowman's dam, Nevada Co., Cal., has been sold to New York men, who will put up a 20-stamp mill. It has been thirty years since any particular work has been done on the property.

TWENTY years ago who would have supposed that in the United States would come the time when the percentage of lead in silver-lead ore would determine whether the property could be worked at a profit?

ON the 25th inst. the ticket agent at Omaha, Nebraska, wired the operator at Trinity Center, Cal., to know what the excitement was, saying that he had sold during the past few days several hundred tickets for Redding.

THE Bonanza is the first deep level mine on the Rand, South Africa, to declare a dividend. During the year each stamp averaged 5.43 tons ore per day; 37,316 tons yielded £309,597 at a cost of £80,136; net profit, £129,461.

AT the Union Con. G. M. Co., Willand, twelve miles from Jackson, Cal., on the 25th, Mrs. Craighead, wife of the boarding house keeper, and two children were burned to death. Manager Craighead was driven insane by the loss.

THESE are great days for the dailies. It's a dull day now when a steamer from Dawson City is not sighted with three or four millions in gold aboard, or a million-dollar strike is not made in Trinity county. As a sensation it is almost as good as the Durrant case or the Fair trial.

THE Russian gold industry affords employment to 85,000 men, of which 89 per cent are engaged in hydraulic mining and 11 per cent in quartz. Of the total production less than 6.75 per cent is attributable to the latter. The yield for '96 is officially stated to be 40,991 kilogrammes.

LOS ANGELES, CAL., men are about to buy 300,000 tons Comstock tailings in Six Mile canyon, which went through the Gould & Curry mill in the '60s. Including quicksilver, it is figured that the deposit is worth $2,000,000. The buyers propose building a plant that will treat 400 tons daily.

R. A. VANCE contributes the interesting statement that "electricity in a dormant state is intense cold, and in motion intense heat." He likewise volunteers the information that "the Arctic zone is made up of solid gold." Mr. Vance seems almost crazy enough to start for the Klondike this season, but not quite.

THE nugget found Aug. 18, 1869, in the Monumental quartz mine, twelve miles north of Downieville, Sierra county, Cal., was the largest piece of gold ever found in California up to that date. It weighed 1142.25 ounces, or 95¼ pounds, cleaned, and was worth $21,156.52. It was found in decomposed quartz 25 feet from the surface.

THE annual report of the State mining engineer on the Rand, South Africa, returns shows that the industry, as a whole, is being worked at a loss. The expenditure on the mines for the last year amounts to £10,681,000, approximately, the gold produced figures at £8,603,821, the loss being practically £2,000,000. Of the moneys spent, £7,134,000 is put down to the seventy-nine producing mines and £3,547,000 to the one hundred and six non-producing mines.

RETURNS from the mill at the Horsefly mine, Cariboo, British Columbia, state that after a run of 426 hours 1192 tons of low-grade cemented gravel, which was got out in the course of development work, had been crushed. The result of the cleanup was 64½ ounces from the mill and 30 from the sluices; total, 94½ ounces gold, valued at $1602.

THE Alaska *Mining Record* closes a long relative discussion of the Skagway and Chilcoot passes by asserting that "the consensus of opinion is now that the difficulties of Skagway are less than those of Chilcoot, and they are both about as bad as they can be," being the same as saying that, whichever road the Klondiker takes, he'll wish he'd taken the other one.

AT the Golden Cross M. & M. Co., Hedges, San Diego county, Cal., the temperature is now 116° in the day and 114° at night. Seventy of the 140 stamps are crushing 240 tons of $8 rock daily. One hundred and fifty Americans and Mexicans are employed. The Americans do the mining, the Mexicans shovel, cut wood, etc. The wood is brought twelve miles and is sold by the ton—$4 per ton.

THE State Supreme Court this week reversed the Superior Court in its decision awarding John Haynes a judgment of $525.50 against Richard Chute. Haynes was employed by Chute to erect a building at a mine in Tuolumne county. Before completing the work he abandoned the job, and sued for what he had already done on the contract. He received a judgment for $525.50, which is now reversed.

A GOOD deal was said two years ago of Edison's process for the electrical separation of ores. The plan is to be given a practical test at West Portal, N. J., where "a stone building 100x500 feet and five stories high" has been built, "in which iron ore will be separated from dirt and rock by a secret process." If successful, the matter is important to Fresno county, Cal., where are large iron deposits in the Minarets.

PAPERS published on the "mother lode" indignantly deny recent published statements in the daily press that the hegira of miners thence to the Klondike occasioned a fear that mining properties in that section would be obliged to shut down. Such denials, though natural, are unnecessary; no one believed the assertions. The idea was to be sensational. In that regard the truth is the last thing considered.

THE opinion is now expressed in some quarters that the present depression in silver's price is the result of a concerted and systematic plan to buy up all the valuable silver mines, when the price will advance. Such a theory is extremely improbable; it is entitled to no serious consideration. The present deplorably low price of silver is in accordance with the law of demand, just as wheat goes up because India is not in the market as a seller, silver goes down partly because India is not in the market as a buyer.

"CONCENTRATES" is in receipt of a long private letter from Cuzco, Peru, wherein the writer, after saying he proposes to bring back the seed of the india rubber tree to sow in California, tells of some of the miners who were lured to Bolivia several years ago by tales of golden wealth. Several died between Guayaquil and Callao; some of yellow fever on the return trip; others started toward the Amazon and were lost. "Don't believe the big stories; disappointment awaits nearly all who come here," is the burden of the letter.

AFTER considerable discussion, it was tacitly settled some years ago that E. E. Matteson of Nevada City, Cal., was the father of hydraulic mining. The claim is now set up that Anthony Chabot of Oakland, Cal., was the real discoverer; that he used the first stream and built the first ditch. It does not make any great difference, but it is believed that Matteson was the first to put into practical use what is universally known as the California system of hydraulic mining, the chief distinction of which is the giant monitor.

THE usual number of inquiries regarding assessment work is received. Several seem to think because silver is down that they should not be obliged to work their claims. The equity of the thing is not under consideration. The law says that $100 in work or improvements must be annually put on each unpatented claim. On a claim located since Jan. 1st, '97, the locator has till Dec. 31st, '98, to do the $100 of necessary work. But it should be remembered that in California $50 must be so expended within sixty days after location.

COUNTY RECORDER MURPHEY of Mono county, Cal., recently asked for an order from the Superior Court to have District Recorder Lazard of the Bodie mining district deposit the records of that district in his office, in accordance with the provisions of the new mining law of California passed at the last session of the Legislature, which requires all such records to be made in the county recorder's office. The matter coming up before Judge Virden, he has rendered his decision, to the effect that the law is in conflict with the United States mining law, and is unconstitutional, null and void.

THE twenty-second annual report of the Ohio State Inspector of Mines shows that the year's coal production equaled 12,912,608 tons, a loss, as compared with 1895, of 771,271 tons; of the 12,912,008 tons of coal dug in 1896, 3,368,349 tons were dug by machinery—more than one-fourth of the total production. Five hundred and seventy-nine hands were employed to operate the machines, as compared with 447 during 1895, and 4346 hands were engaged in chuting down and loading the coal after the machines, as compared with 3374 during the year preceding.

TEN THOUSAND a year is not bad to take as a salary, added to which is another interest, locally, that will make it a round twenty thousand. That, says the Jerome correspondent of the Phœnix, Arizona, *Republican*, is the lot of the superintendent of the United Verde Copper Company, who, not many years ago, drew his $4.50 per day from the same paymaster. Others in the camp holding positions of trust are the recipients of checks, monthly, bearing figures that will aggregate from $2000 to $10,000 per annum—the latter sum to the company physician. Men get from $1.75 upwards per day, according to occupation.

THE fact that over $3,000,000 in gold was brought into the U. S. mint in this city on the first working day at that institution this month is given world-wide proclamation, with the inference that it was from the Klondike. The rest of the fact should also be stated: The mint had been closed for some weeks, counting the bullion and the transfer from old to new superintendent was going on, and meanwhile California's gold yield was accumulating; of the amount stated, about $800,000 came from the Klondike—the accumulation of a year; the remainder was the usual offerings delayed by the closing for the annual cleanup.

A LOCAL PAPER at Kaslo, B. C., says: "The Payne ore chute is believed to be the longest continuous chute of ore in the world. One tunnel is now 756 feet in ore the entire distance, and the end not yet reached. In places the ore body is 4 feet in width." In the vein of the Smuggler-Union mine, San Miguel Co., Colorado, a length of one mile has been worked along on various levels. There is one stope in that mine 800 feet in length where, in raising it, not a single point was found where the ore narrowed or grew so poor that it was left standing, while the limits of the ore chute were not yet reached. There are others.

NEXT spring a party of three will be sent from Washington, D. C., by the Geological Survey to make another investigation of the gold resources in Alaska. An appropriation of $25,000 was asked from Congress last year, but the amount was cut down to $5000. This was not available in time to send a party last season, but it will be used in dispatching three experts, one of whom will be Prof. Shurr. An effort will be made to have Congress raise the appropriation to about the same asked for last year. If this should be granted, more than one party will go. The mission is to compile authentic data on which a more complete report will be based and to make an accurate survey and geological map of the country.

THE Russian Government has issued a report on the production of platinum in Russia, according to which that country stands first in the world for that production, forty times the quantity produced by all other countries together being obtained there. In the year 1880 the quantity produced amounted to 2946 kilos; in 1895 it reached 4413 k. The production had gone on increasing up to the last year, when it diminished on account of the wet weather in summer. This metal is found in the southern Ural. The manner of its being worked up is unknown in Russia; this is done in Germany, to which country the platinum is exported in a crude state. Whatever Russia requires of worked-up platinum it has to buy back from Germany. Of late years the price of this article has run high; at present it is 900 marks (about $225) for 1 kilo of crude platinum in Russia. On mining for the platinum the still rarer metal iridium is also found, but only in very small quantities. Last year the total quantity of iridium obtained did not amount to more than 4.1 kilos.

AT Smartsville, Yuba Co., Cal., is being completed a dredger by R. H. Postlethwaite, a description of which, together with some remarks on river dredging, will appear next Saturday. Last Sunday the Allender & Co.'s hydraulic elevator at that place began work. Mr. Rother, the manager in charge, states: "When things are in proper shape about 400 miners' inches of water will be utilized and gold extracted from at least 1000 tons of deposit per day." The river bed will be explored to a depth of from 50 to 60 feet. The Postlethwaite dredger engine was steamed up for the first time last Saturday. Mr. Postlethwaite says: "Should the gravel only yield three cents per square yard the enterprise will rest on a paying basis." The machinery with a 50 H. P. engine gives a scooping capacity of 120 tons per hour and penetrates to a depth of 45 feet. Each five seconds a bucket containing 300 or 400 pounds will be dumped into a revolving screen cylinder. The fine or pay dust will fall into a receptacle, thence uniformly distributed over a set of patent rifles, while the coarser material will pass through to the dumping ground at the boat's stern.

THE Journal of the Society of German Engineers has a memoir on mining in the Upper Harz by Herr von Groddeck. The veins, which have been worked since the earliest times, yield argentiferous galena, zinc blende and copper pyrites. Water power is available. Ditches seventy-five miles in length bring the water into seventy reservoirs with a capacity of 13,000,000 cubic yards. Secondary conduits of fifty miles in length convey the water to motors aggregating 3500 H. P. The water is economized in such a way that it is led from the higher motors to lower ones, and finally to others deep down in the shafts. The various mechanical appliances used in the mines are passed in review by the author, special refereece being made to the man engines and the hydraulic engines. The new Kaiser Wilhelm shaft has been sunk vertically to a depth of 2840 feet. It has an internal diameter of 16 feet and is the first and so far the only winding shaft in the Harz with circular section and with iron tubing. The sinking was begun in 1880 and finished in 1892, the cost being £90,000. The remarkable feature is the absence of machinery from the surface, all the motors being hydraulic engines placed at a depth of 1180 feet in the shaft at the level of the Ernst-August adit. The water required is brought down in pipes from the surface and escapes through the tunnel.

ONE who locates and prospects by a tunnel under the Colorado act has a right to 1500 feet along an undiscovered "blind" vein or lode discovered in the tunnel for a distance of 3000 feet from the face of the tunnel. His right dates from the location of or the commencement of work upon his tunnel, and is contingent upon his prosecuting his work with reasonable diligence If a claim is located along the line of the tunnel the surface locator has the right to all veins, lodes and ledges within the lines of his location as against the tunnel owner to the same extent as he has against a subsequent surface locator; that is, a surface locator by virtue of his discovery of mineral in place in a vein, has thereby the right to locate so much of the surface ground and to obtain a patent thereto; by this right he also becomes possessed of all veins, lodes and ledges whose apexes are within the side lines of his claim extended downward vertically, and this whether these veins are what are called "blind" lodes or whether they appear at the surface. If his discoveries are prior in point of time to the location of the tunnel or the commencement of work thereon, he has this right although these veins or lodes may be within the line of the tunnel and be subsequently found therein. This point was not raised in the case of the Enterprise Mining Co. vs. the Rico-Aspen Co. recently decided in the Supreme Court of the United States. The point there decided was as to the title or right of possession to a blind vein discovered within the side lines of a surface location made subsequent in point of time to the location of the tunnel, the vein being a "blind" one or one not appearing at the surface, and being subsequently found in the tunnel. The court under that state of facts decided that the tunnel owner was entitled to the vein, and that he did not need to adverse the surface man when the latter applied for a patent, if at the time he had not discovered the vein in his tunnel.

Eastern Oregon Gold Fields.

Written for the MINING AND SCIENTIEIC PRESS by E. G. BAILEY.

Alaska ice is not the only cure for Klondicitis. With brows cooled by mountain breezes, and the brain fogs cleared away by the refreshing air of the coast, scores of travelers are stopping at the mining centers of Oregon and Washington surprised to know and realize that mining is not only going on, but that it is in a state of greater activity on the coast than ever before.

The following statement of the condition of mining in the portions of eastern Oregon recently visited by the writer, may serve as a guide to those desiring to see the producing mines for themselves. The mining region of eastern Oregon comprises the counties lying along the Snake river, from the north boundary of the State to about seventy miles south of Huntington. The three cities on the Oregon Railway & Navigation Railroad from which the mines are most accessible are Union, Baker and Huntington, thence by short buggy or stage rides. All of the mines mentioned are gold mines, the free gold being saved in the battery and on the plates, and the rest being caught in the sulphurets on concentrators. The concentrates are shipped in sacks to the smelters at Tacoma.

The Union-Companion mine at Cornucopia has twenty stamps in operation and a number of Frue concentrators. They are working several veins from 2 to 6 feet wide, the ore being said to run about $12 per ton. The mines are well developed and have several years of ore in sight. At the Baisley-Elkhorn mine there are two Bryan mills, having a capacity of about forty tons per day, steadily at work. Work was renewed on this mine a year ago and it is evident that there is ore enough in sight to insure steady production for at least two years to come. The Virtue mine has twenty stamps, ten being 850 pounds each and the rest 1000 pounds. The concentrator floor has about a dozen Frue vanners. In this mine they are now crosscutting at the 800-foot level to the vein, and sending ore to the mill from the stopes between the 600 and 400 levels. The vein runs from 4 to 16 feet in width and there are four good ore chutes in the claim. The product of this old reliable is from $20,000 to $25,000 per month. The ore runs in the mill from $12 to $14 per ton. The Flagstaff has an incline shaft down over 750 feet with levels and stopes started every 100 feet. The mill is an up-to-date steel mill with 1000-pound stamps, and Johnson concentrators. Owing to the fact that the shaft is sunk from the apex of a lone peak, and that the shaft is not yet to the valley level, they are not able to run the mill full time on account of scarcity of water. A little more development and this difficulty will be overcome. The vein is from 2½ to over 3 feet wide and runs about $15 per ton. Between the Virtue and Flagstaff are the Rachael down 450 feet, the Perry down 370 feet, and the Columbian and Friday near the 500-foot mark. None of these four have a mill as they propose to wait until development has secured an abundance of water for working the ore. In each of these mines the vein is from 2½ to 4 feet, and similar in character and quality to the Virtue. There are about twenty other claims developed to a depth of over 100 feet and showing good ore. Thirty-five miles west of Baker is the Cracker district, with a number of producing mines. The main lode shows ore from 6 to 30 feet in width, and has three producing companies at work upon it, the E. & E., North Pole, and Columbia. The E. & E. has a 20-stamp mill and sixteen Frue vanners. No attempt is made to save any of the gold by amalgamation, everything being allowed to go to the concentrators. The output is unknown as the Longmaids do all of their banking out of the State. It is known, however, that the carloads of concentrates are being shipped as regular as clockwork, and that the interior of the mine is in excellent condition. It is probably safe to put the product of the mill as between $25,000 and $30,000 per month. The North Pole mine is owned by the Baring-Goulds of London, who take no one into their confidence. They work about forty tons per day by the MacArthur-Forrest cyanide process, making regular cleanups and shipments. Their output is near that of the E. & E., the ore being the same, but the percentage extracted being larger. The Columbia mine has ten steel stamps of 1000 pounds each, and four Johnson concentrators. They add from $12,000 to $15,000 per month to Uncle Sam's coin. The Ohio is a parallel vein near to the big lode. This company have a 10-stamp mill, but have not run steadily owing to defects in their long water-power ditch. The mine is, however, being steadily developed. Geo. Grayson, owner of the Virtue, has purchased the Climax, near the Ohio and will put up a mill this fall. Eastern parties have just purchased the Kelly mine, discovered a year ago, and have purchased a Hammond 10-stamp mill.

The Bonanza mine, which sold recently for $500,000, is located about twelve miles east of those just described and is equipped with thirty stamps and a dozen Johnson concentrators. The mine is developed to the 450-foot level and has a lode consisting of parallel veins of quartz separated by thin layers of slate, the entire width of the ore-bearing belt or lode being nearly 300 feet. The product has been from $25,000 a month and upward for the last two years. Three miles from this mine is the Don Juan, which has been paying about $100 a day since the discovery a year and a half ago, with a small 3-stamp mill. Eastern parties purchased this two months ago for $30,000, and are putting up a 10-stamp concentrating mill. Seven miles from the Don Juan is the Red Boy with a ten ton Crawford mill, which has paid during the last two years for the property and enabled the owners to lay aside a fund which they are now using to build a 20-stamp steel mill with 1000-pound stamps and Johnson concentrators. The mine is developed to the 400-foot level and in three months more the new tunnel will reach the vein at a depth of 800 feet. The vein is from 4 to 12 feet in width and gives in the mill from $12 to $16 per ton.

Outside of the mills already mentioned there are a number of five and ten stamps scattered through the mountain regions outside of the well-known districts, among which may be mentioned the Gold Ridge mill, located near the Burnt River canyon, which has twenty stamps and four Triumph concentrators. The milling plant, however, is an old plant; and it is the intention of company this fall to replace it with an entirely new plant having 1000-pound steel stamps. The property consists of four parallel veins from 2 to 4 feet in width, developed to a depth of 500 feet.

On the opposite side of the river is the Gold Hill plant with building and power for ten stamps; but only five 1000-pound steel stamps and two concentrators are in operation. At Pleasant Valley, Sparta, Sanger, Conner Creek, Rye Valley and Mormon Basin there are small mills of from three to five stamps, which are being used to prospect and develop properties.

The geology of the mining districts of eastern Oregon is simple, as the mountain ranges have a granite core flanked on either side by several miles of highly metamorphic slates, in which are found the principal veins. In the region of the best veins the slate formation is cut by dikes of porphyry and diorite, many of the veins being contact veins between the dikes and the slates. All of the veins are well defined, cutting the formation at an acute angle and have a clear selvage or gangue. It is worthy of note that nearly all of the producing mines of eastern Oregon have passed, within the last three years, into the hands of experienced superintendents and operators. In fact, many of them are but the revival of old mines that were abandoned fifteen or twenty years ago.

Eastern Oregon was settled by placer miners in '62 and '63, and from that time up to the present date these placers have yielded a good annual revenue, and will continue to do so for a decade or more to come. But few of these miners have ever had any knowledge of quartz, the result being that the quartz lodes were only developed superficially; and it was not until three years ago that deep mining proper was started. Now the Virtue, Flag Staff, Cornucopia, E. & E., North Pole, Columbia, Gold Ridge and others have reached a depth of 700 feet, while two score or more are down 500. In every instance the mines show a good quality of ore at the lower levels, and all those who visit the region will be convinced that the mines are permanent and may be expected to continue to the limits of mining economy.

FOREST QUEEN MINE, LOUISE CREEK, OREGON.—(See page 189.)

JUNCTION MINE, LOUISE CREEK, OREGON.—(See page 189.)

Rice Growing in Japan.

Herewith is the latest of the series of views showing the handling of the plow primeval from Egypt eastward through Arabia and India to the very sunrise of Asia on the islands of Japan. In all these lands of the yesterday are found picturesque but ineffective implements and practice, and it is only a matter of time when improved American implements will supplant the rude appliances which have ruled in Asia since the birthday of the race. Of course there are local conditions and needs which require inventions of special character and local fitness must be the final test of every tool. Improved tools may not suit all purposes, but the elevation of labor all over the world depends upon the employment of the same progressive spirit, the same understanding of materials and high inventive skill which rule in the most enlightened nations.

Herein is seen the Japanese black water ox and the bare-legged plowman. English-speaking people do not grow rice in the Asiatic fashion, nor is it at all necessary to paddle around in a mud-hole as this

PREPARING LAND FOR RICE WITH WATER OXEN, IN JAPAN.

man is doing. Possibly it is necessary there where the population is so dense that the river beds must be made to yield produce; possibly it is not practicable to regulate the spread of the water to the times when the plant actually needs it, but there is certainly a more rational way to grow the crop; and where human time and comfort are worth anything, other methods are employed.

And yet Japan has a wonderful record in rice growing. About 6,500,000 acres of land and water has been used for the rice crop, of which a valuation of $202,521,750 is computed on a basis of a total product of 180,000,000 bushels—the average product being about 30 bushels to the acre. Four or five acres of lowland rice fields form quite a respectable holding for one person. This with another acre or so of upland, where vegetables are raised, and a little bluff land for timber, fuel, and grass to feed the pack horse, supports his family, pays for hired help and gives a little surplus at the annual settling day.

The homes of the rice, silk and tea farmers are the best of all the agricultural laborers of Japan. The houses are often as large as 30x40 feet, universally one story, thatched roof, strongly built, with veranda in front, and five or six rooms.

How is the Japanese able to maintain such an establishment on such a small piece of land and water? It is by "keeping everlastingly at it." He pays the Government $5 per acre taxes and 50 cents per acre besides for local taxes, or about 3 per cent on the value of his land. He practices the most intensive culture; grows his rice seedlings and transplants them by hand; he makes the utmost use of every particle of fertilizing material and every inch of land, and he lives within his income. There are certain most excellent economic principles involved in his operations, and yet his life is hardly human. He is ground down into the mud in which much of his daylight hours are passed. Contemplation of the industry of barbaric nations is depressing. It is well, however, that one-half of the world should know how the other half lives. It may make people more contented to mark the superiority of their own environment, and it may also reconcile them the more to the self-denial and plodding from which even the highest civilization gives no emancipation.

Around Leadville, Colorado.

Written for the MINING AND SCIENTIFIC PRESS by W. A. SCOTT.

The recent slump in the silver market has intensified the depression so long felt in Leadville, especially among the operators of mines in which silver largely preponderates. What are known as the down-town mines, such as the Penrose, Bonair, Coronado and Welden, which are in the main silver producers, have been closed down and filled with water since the time of inauguration of the labor troubles a year ago. The unwatering of these mines will similarly benefit many other adjacent properties. As has been stated before, an arrangement was effected some months ago whereby all the down-town mines were to contribute their respective portions to a fund to put in new pumping plants and empty the mines of water. In consummation of this plan the new pumps were purchased and, I believe, are on the ground, but as yet no move has been made to place them in position for work. The re-equipment of the down-town properties would not only result in adding heavily to the output of the camp and to the employment of labor, but would have a stimulating effect on the camp generally, because these mines are owned by some of the most thorough-going and responsible operators of the State. It is suggested by some that the hesitancy of the combination about setting the great pumps to work is due to the discouraging outlook for the silver market.

Some distance above the down-town group are such mines as the Wolftone, Mahala, R. A. M., Emmett and Mikado, which in earlier years produced carbonate ores, but are now worked through that formation into an iron sulphide, carrying silver, gold and some lead. It may be observed that the carbonate ores, so far as the developed mines are concerned, are pretty well worked out. The smelters here do not get from the home camp the supply of lead ores that they would like to obtain. This is not saying that the lead ores of the district are exhausted, for the district encompasses a large area, much of which has not been thoroughly prospected.

The ores rich in iron manganese now constitute an important factor in the shipments from the camp, and are produced from such mines as the Catalpa, Crescent, Yankee Doodle, Morning Star and Bison, on Carbonate hill.

On Breece hill, still farther up toward the crest of the Mosquito range, are the mines of the gold belt and include such as the Little Johnny, Ibex, Resurrection and Sedalia. These produce siliceous ores, whose values are about one-half in gold and the other half in silver and lead. The Johnny and Ibex group is the scene of very active operations, about 400 men being employed there at present. The work goes on from six different shafts, ranging from 500 to 700 feet deep. The newer of these is rapidly sinking and is to be sunk to a depth of 1400 feet. Much of the ore from this property is oxidized, but at greater depth it becomes more of a sulphide, with proportionately more silver.

The Resurrection shaft is down 900 feet, from which there is an output of about sixty tons per day. The Sedalia, adjoining it, is running with a small force of men.

In California gulch, where the original discoveries were made, are the Yak mine and tunnel, the A. Y. and Minnie, the Col. Sellers and others. The first-named is operating with a considerable force. The Col. Sellers and A. Y. and Minnie were enormous producers in the earlier and palmier days of the camp, and all along this historic gulch are plant after plant of machinery, whose wheels for years turned out riches, but which gradually became silent as the depression in the silver market came on.

The recent starting up of the Elgin smelter has attracted considerable attention in the camp. It is under the superintendence of Marcus Ruthenburg, who is employing there a process which, it is claimed, is successfully treating the zinciferous ores, of which there are thousands of tons on the dumps at various mines. By this process the zinc is eliminated and the silver, lead and iron saved. Mr. Ruthenburg's treatment of zinc ores recently resulted as follows: Zinc, 25 per cent; iron, 20 per cent; lead, 3 per cent; sulphur, 35 per cent, and 10 ounces silver. He asserts that this is a fair sample of thousands of tons

to be had in the camp. The Elgin is treating about fifty tons per day with one furnace, and two more furnaces are to be put in.

The Bimetallic smelter, after having been closed down several months, started up last June under the management of Franklin Ballou, and is treating about 200 tons per day of siliceous sulphide ores, the product being a copper matte, containing principal values in gold and silver. A feature of the Bimetallic plant is an arrangement for condensing the volatilized material carried over the draft. By this method all the lead and other material of value are saved.

The Arkansas Valley smelter is operating with full force and doing a large business as usual.

It is estimated the camp is producing about 1400 tons per day, which does not vary greatly from the output as it has ranged for the past year.

Even should the down-town mines be slow about resuming, and even if the camp has seen its best day as a producer of carbonate lead ores, there is every evidence that the district is widening out, and as the sulphide strata of Breese and adjoining hills continue to be delved into, it will be seen that the greatness of the district will in no wise decline.

Leadville, Colo., Aug. 14, '97.

THE South African *Mining Journal* is informed that Messrs. J. S. MacArthur and Alfred James have entered into partnership as mining and metallurgical engineers in Glasgow and London. Mr. MacArthur has retired from the managership of the Cassel Gold Extracting Company, which reminds that journal that lately the correct history of the cyanide process on the Rand has been incorrectly stated in several places. In the middle of 1890 an experimental plant was erected at the old Salisbury battery to test the general efficacy of the process. This plant was under the direction of Alfred James. The patents were taken out by the African Gold Recovery Syndicate, who made a contract with the Robinson Gold Mining Company to treat 10,000 tons of tailings. Invitations were sent out to gold mining companies to treat amounts varying from one to ten tons, and between twenty and thirty companies accepted the invitation. The experiments were finished in November, 1890. Then Mr. Darling took over the works from Mr. James with the object of testing the commercial value of the process; and when the Robinson directors failed to come to terms with Mr. James, Mr. Darling took charge of their plant, which was started on December 23, 1890, and was the first to treat tailings on a commercial basis.

Mines of the Gold Belt.

NUMBER II.

Written for the MINING AND SCIENTIFIC PRESS by W. H. STORMS, M. E.

Having in the first paper of this series given a general sketch of the geology and mines of the southern end of the gold belt, we will now turn to the section immediately adjoining it on the north.

Mariposa County.—It is here that that particular portion of the gold belt known as the mother lode has its southern termination, by which I mean that south from the southern part of Mariposa county the mines are entirely different from those found northwestward along the lode. The inclosing rocks are for most part different; the quartz is dissimilar, and every feature changes, but just what mines to include within that comprehensive term, "mother lode," and which ones to relegate to some other lode or to isolate from all others, it would be difficult to determine.

There is a great lode or vein in this county which extends northward through Tuolumne county and into Calaveras, having its northern terminus at Carson Hill, five miles southeast of Angels. Of all the numerous veins, this particular one is most prominent and has such peculiarly distinguishing characteristics as to entitle it to some distinctive name which will serve to identify it and set it apart from all others, and yet this great vein is only the main fissure of a greater fissure system. Some of the branching veins and accompanying parallel mineralized zones are far richer than the main lode. I shall call this great fissure or vein the dolomite vein.

The Dolomite Vein.—The distinguishing features of the dolomite vein are its enormous width in places; its remarkable and almost unbroken continuity from Bridgeport, Mariposa county, to Carson Hill; its very frequent association with serpentine and the unusual mineralogical composition of the vein.

This latter feature is the most pronounced and is really the principal feature by which it may be distinguished from other great veins. I consider this great vein as of eruptive origin—that it is, in fact, a dike of unusual length and width, the minerals of which have been altered. As we find it to-day, it consists of a great mass of carbonate of lime and carbonate of magnesia—dolomite, in fact. In some portions carbonate of iron also occurs, the combination then forming the mineral ankerite. Those portions containing carbonate, when unaltered, cannot be distinguished from the more abundant dolomite. Where not oxidized or affected by dynamic agencies, the dolomitic mass is pure, glistening white. It is comparatively soft and can readily be distinguished from quartz. Usually throughout the mass, whether it be 3 feet wide or 100 yards across, is scattered in greater or less profusion a beautiful grass-green micaceous mineral called mariposite. It is also often found disseminated in the massive quartz of the lode. Though so abundantly distributed in the great vein, it always occurs as disseminated scales, and never, as far as I have observed or heard, in massive form, not even as an aggregate of scales.

Quartz occurs in the dolomitic vein in great vein-like masses, and not infrequently it is gold-bearing, and a few instances are reported where the dolomite-mariposite mass is also auriferous. In the Rawhide mine, Tuolumne county, a small strip was found extremely rich in gold.

In many places the great croppings of the lode have become oxidized, the decomposing iron carbonate and more or less abundant pyrite forming great quantities of iron oxides (principally limonite, though hematite is also abundant), which stain the vein material and adjacent rocks deep red or brown. In some parts of the lode this oxidation extends to considerable depth, while in others it is merely superficial.

The Formations of the Vein.—The dolomitic vein is found in contact with a variety of rocks, the most common and important being the black clay slates slates of the mariposa beds. Basic rocks of various kinds are abundant, particularly diabase and diorite and amphibole schist, the latter being either altered

THE WHITLOCK MINE AND MILL, MARIPOSA COUNTY.

THE OLD MARIPOSA MILL.

CROPPINGS OF MARIPOSA VEIN.

THE MAY ROCK, MARIPOSA COUNTY.

diabase or diorite. Gabbro and serpentine also occur abundantly. That the character of the wall rocks has any influence on the value of the vein I am not prepared to say, though inclined to believe that it does not.

The comprehensive idea of the character of the dolomite vein and of other mines of the gold belt may be obtained, perhaps, from a description of the larger veins which seem to present typical features.

The Mariposa Vein.—In the southern outskirts of the village of Mariposa is this once famous mine. It is said to be a pocket mine, though I am credibly informed that a large amount of quartz was crushed in the mill, now fallen into decay, which stands on the banks of Mariposa creek near the mine. The vein crops along the surface for a long distance and is from 2 to 10 feet wide. The quartz is white and brilliant and frequently beautifully crystallized. Crystallized quartz is usually considered a sign of a pocket mine in this portion of the gold belt. Following the Mariposa vein southward, it crosses Stockton creek and strikes in the direction of Big Spring, near which a strip of slates and schists extends southward in the grano-diorite toward Grub Gulch. From the main shaft northward the vein is found to split into several branches; to become smaller, and finally it is impossible to positively identify it longer.

This vein occurs in a typical diorite-porphyrite, a dark greenstone of fine grain, with numerous well-formed white crystals of feldspar scattered through it. As far as observed by me, this rock formed both walls, but in depth I believe slates occur on the east wall.

The Mariposa mine is nearly two miles east of the dolomite vein, and has no apparent connection with it.

The dolomite vein might be considered as having its southern terminal near Bridgeport, on the west side of Buckeye creek, where a large mass of quartz crowns a hilltop. It is not gold-bearing, or at least only slightly so.

The first mine of any importance found on the dolomite vein northward from its southern end is the Mount Ophir mine.

Mount Ophir Mine.—In the early days of the Mariposa grant this was one of the most promising mines in this section. It has been idle many years, as have all the mines on this vast estate. The wall rocks of the Mount Ophir vein are not the same throughout. The upper part of the vein is found in walls of talcose slate (altered from diabase). In the lower tunnel serpentine is found on the foot wall. The dolomite vein here is small and much decomposed or altered to a talcose rock. The quartz lies on the west or foot wall side of it. A short distance east of the Mount Ophir, in the bed of the creek, may be seen a stratum of clay conglomerate, the pebbles of which are much flattened by the shearing of the rock.

From this locality northward to Merced river, a distance of ten miles, the ankerite vein and its branches follow the black clay slates of the Mariposa beds, being sometimes associated with them, but as frequently with the amphibolite schists and serpentine. These formations for most part constitute the floor of Bear valley, a depression having an average width of about two miles, and lying between two mountains of hard, granular diabase—Mount Bullion on the east and Bear mountain on the west. These rise from 1500 to 2000 feet above the valley, the diabase being much harder than the slates, schists and serpentine, and consequently resisting the erosive agencies which have carved out the valley. The great vein courses along the central part of the valley, though near the village of Bear Valley approaching more closely to Mount Bullion. On both sides of the valley several pocket mines were opened and worked many years since. These occur mostly at or near the contact of the black slate with the diabase. Some of these are reported to have yielded large amounts of gold.

The Princeton Mine.—This once famous property is situated a short distance southwest of the Mount Ophir mine, and, though quite different from the latter, seems to belong to an extensive system of fissures which are doubtless connected directly with the dolomite vein. The Princeton mine has been idle many years, but is reported to have produced more than $4,000,000 in gold. The deepest workings are only about 600 feet from the surface. It is nearly parallel with the dolomite vein, dips like it to the eastward, the angle varying from 45° to 75°. The inclosing rock is black clay slate on both walls. The vein is accompanied by a light-gray dike rock of fine texture. Near the surface this dike is in the hanging wall slates, but I have been told that in depth it came in contact with the vein and crossed to the foot wall side. The vein has a curving strike, which conforms, as far as may be seen, with the slates. The slates, however, stand nearly vertical. The percentage of sulphurets in the quartz was small, and the rock, generally speaking, free milling, a fact attested by the low grade of the large tailings dump. West of the Princeton is an intricate fissure system of gold-bearing quartz veins, both large and small. Some development work of superficial character has been done on some of them within the past year or two, but too little to make it possible to determine their relations to each other. The entire region of the immediate vicinity is so thickly strewn with quartz float as to make it difficult to tell from which vein any particular piece may have been derived.

The dolomite vein is not continuously prominent throughout Bear valley, but here and there comes to the surface, usually showing the dolomite with its accompaniment of mariposite and vein quartz. Some of these quartz croppings are often of great size and form objects of more than passing interest in the landscape. Among these the most prominent is known as the May Rock.

The May Rock.—It is a huge mass of quartz about 150 feet in length, over 80 feet in height and about 20 feet wide at the base, and it stands like a portion of a massive wall now falling into decay, towering silent and gloomy over the pine trees which grow about it. The quartz is auriferous, but so slightly that it is not at all probable that it will ever be broken down and crushed in a mill. This interesting rock is about two miles south of the village of Bear Valley, and on the west side of the road to Mariposa.

The Whitlock Mine.—This mine, owned and operated by the Sierra Buttes Company, is located five miles north of Mariposa, on the east side of Mount Bullion. The hanging wall is chloritic schist, the foot wall diabase. The vein has a somewhat sheeted structure. It has been opened quite extensively by the present owners. There are a number of prospects in this vicinity, large and small, the walls being greenstone and its altered products (talcose and chloritic schist). This district is about four miles east of the dolomite lode, and has no characteristic in common with it.

East of the dolomite lode a distance of eighteen to twenty miles is the east lode. The most important mine thus far developed on this lode in this county is the Hite mine, which will be described in the next article.

Soulsbyville, August 24, '97.

Mercur District, Utah.

Written for the MINING AND SCIENTIFIC PRESS by a Staff Correspondent.

Prevailing conditions at Mercur are brighter than they have ever been in the history of the camp. There is very little speculation and not much excitement, but the business of actual mining and development is progressing with a degree of confidence not heretofore exhibited. During the past thirty months the Mercur, Marion-Geyser, Sacramento and others have produced snug fortunes, and recently such as the Northern Light, Chloride Point and La Cigale have developed into good properties; but during all this time some degree of uncertainty prevailed in the camp, not as to the continuity or richness of the ore bodies but as to the methods required for treating any and all classes of ore found at various depths and under various conditions.

The Mercur mine, whose workings started pretty well up toward the apex of the ledge, and which are following the dip to the northeast, contains a class of ore which thus far has yielded readily to the least expensive form of cyanide treatment—in fact, it has proved to be an ideal ore for this method. The ores of the Marion-Geyser, on the opposite side of the gulch from the Mercur, seem very similar to those of the latter, being porous and soft in texture and free from substances which interfere with the cyanide work.

But the very extensive developments on the Golden Gate, on which the ledge was tapped by shafts at about 1500 feet greater dep h than the workings in the Mercur, revealed in places a class of ore which was not strictly "free-milling," as applied to the Mercur cyanide method, containing as it did a small percentage of arsenical and sulphurous material which made it non-susceptible to cyanide treatment. While the work of development and blocking out ore has gone on in the Golden Gate for the past two years to the extent of making it the most thoroughly developed mine in the district, a thorough system of experiments and tests have been carried on to determine precisely the processes to be employed in the mill in the meantime being planned. The management unquestionably has been fully satisfied for many months as to the methods to be adopted, but the uncertainty was felt by the people of the district, who construed the delay of the Golden Gate people as implying a doubt as to their ability to handle the low-grade, refractory ores. But now that the work of constructing one of the largest reduction works in America on the Golden Gate grounds has actually commenced, the effect in the camp is very favorable because it is considered that the most difficult problem of the camp has been solved and that should other property owners encounter ores similar to those on the Golden Gate they will no longer hesitate in developing their mines or building mills. It is possible that the mines adjacent to the Golden Gate may strike strata of the same arsenical ore when they reach the same depth as that now reached by the Golden Gate.

The new Golden Gate mill, being constructed under the superintendency of Mr. Daniel C. Jackling, will be a modification of the cyanide process, which will include some original features. For the purpose of handling the arsenical ores a roasting apparatus will be put in, which will be a type of the straight-line mechanical furnace. Mr. Jackling explains that by far the larger proportion of Golden Gate ores are oxidized and can be cyanided without roasting.

The new mill will be steel in structure and will start with a capacity of 500 tons per day, with provisions for 800 tons, and will have a roasting capacity of 400 tons per day. Contracts are let for much of the work and it is understood that the plant will be finished before the end of the year.

In the Mercur mine the work of development and blocking out ore goes continually on, the work being carried on through two inclines 700 feet apart. From the inclines there is a drift every 100 feet, with a crosscut from drift to drift in such a way as to leave the ore in blocks 100 feet square. In all, the mine contains about eight miles of drifting. In many places the ledge is 35 to 39 feet thick, and developments extend along the strike at least 1000 feet. The timbering, which is very extensive, is put up in square sets. A force of about 100 men is employed in the mine and about thirty at the mill. Last February, prior to the expiration of Capt. DeLamar's option on the Mercur, his expert estimated there was ore blocked out of the value of $1,008,000, and as much additional ground has been blocked out since, it is claimed there are the same values in sight to-day.

The Sacramento, which joins the Mercur on the west, is mining and milling about 100 tons of ore per day, which runs in value from $8 to $10 per ton.

That portion of the district known as the west dip is making very substantial progress. It is that region facing Rush valley in which the formation dips from 32 to 50 degrees and toward the west, the veins on the Mercur and Golden Gate side of the range dipping in the opposite direction. On the west dip are the La Cigale, Omaha, Daisy, Gray Rooster and others.

In the La Cigale the underground development is mainly through an incline which is sinking on the vein and which is now at a depth of 350 feet. From the incline two 500-foot drifts have been driven, one to the discovery shaft 500 feet to the south. Other drifts are in progress, making approximately 1500 feet of work outside of the main incline. In this property the ledge, which stands at about 45 degrees, dips into the valley and averages 10 feet wide. The ledge is traceable along the foothills for a distance of fourteen miles, of which the La Cigale has 3000 feet along the outcrop and 4800 feet with the strike of the vein. At the hanging wall there is considerable talc, but the bulk of the vein matter is oxidized and well suited to cyanide milling, and lies between strata of dolomite lime. The values will average about $6.50 per ton.

The La Cigale mill is nearing completion and will doubtless be in operation in September this year. It will have a crushing capacity of 500 tons per day and a leaching capacity of 200 tons. There are two sets of crushing rolls and it is the intention to crush the ore to a one-half mesh. The material will be handled automatically throughout. After crushing, the ore is carried by scraper conveyors to V-shaped bins, from which it is drawn into steel leaching tanks of 6x16x4 feet dimensions. These tanks are hung on trunnions and after the leaching they are inverted, by which the tailings are dumped into V-shaped bins beneath and carried thence by another set of conveyors to the dump. The entire arrangement is such as to dispense with handling the ore by hand and to run with the utmost economy. The management estimate that they will be able to mine and mill the ore at a cost of $1.50 per ton. A water supply is being piped in from Ophir creek, five miles to the north. The La Cigale is largely owned by Robert B. Blodgett, John Murray Marshall, Henry S. MacKay and George Dickson of Boston, Mass., and C. H. Scheu, C. H. Shaw, T. Ellis Brown and Mr. Cheeseman of Salt Lake, Utah. Geo. A. Packard, formerly of Montana, will be mill superintendent.

The Daisy, a short distance south of the La Cigale, has some good developments and its management has decided to erect a cyanide mill this fall.

The Northern Light mine and mill are at an altitude of 8600 feet and lie midway between the La Cigale and the Marion. The mine is really on the west dip zone. The vein is tapped by means of tunnels which cut it at 1400 feet depth. This property produces high values in silver, the ore carrying which is shipped direct to the smelters. The cyanide mill, by which the lower grade gold and silver ores are extracted, will soon be provided with twenty-four leaching tanks, making a capacity of 200 tons per day. These tanks are 20x12x5 feet, constructed of steel.

The Chloride Point, situate on the opposite side of the mountain from the Northern Light, produces practically the same grade and character of ore as is found in the latter.

Mercur, Utah, Aug. 10, '97.

Mechanical Progress.

The Suction Pipe and Its Correct Size.

No other piece of machinery in a mill or factory is subject to so much abuse and charged with so much unnecessary expense for maintenance and repairs as the steam pump, owing in a great measure to the fact that the average engineer does not thoroughly understand its construction and functions. When he knows that a steam pump has nothing whatever to do with forcing water through the suction pipe into the water cylinder, he will be in a better position to properly care for and run a steam pump.

Take from any manufacturer's catalogue a single direct-acting steam pump, with a water cylinder 6 inches in diameter and 12-inch stroke, and located at the mouth of a cistern open to the atmosphere: assuming that the vertical distance from the surface of the water in the cistern to the top of the water cylinder is nearly 34 feet, that the pump and its appendages and connections are air-tight, and that there is a gate valve attached to the lower end of the suction pipe—say, 1 foot below the surface of the water—and which can be thrown wide open in an instant, then the water cylinder and suction pipe both full of air and the gate valve closed tightly, start the pump, and after two or three strokes, or a sufficient number of strokes to exhaust all the air in the pump itself and in the suction pipe, stop it. So far the pump has not handled a single drop of water, having acted only as an air pump; there is a perfect vacuum both in the water cylinder and the suction pipe; now throwing open the gate valve instantaneously, the water in the cistern 34 feet below the pump barrel rushes through the suction pipe and into the pump barrel, filling the same and the suction pipe clear down to the gate valve, a column of water nearly 34 feet high supported by the atmosphere, whose pressure is 14.7 pounds upon every square inch of water in the suction pipe, whether the pipe contains the fraction of a square inch in its diameter or a hundred square inches. A column of water 1 square inch in area and nearly 2.3 feet high weighs one pound, and $14.7 \times 2.3 = 33.81$ feet, or 34 feet nearly.

This is taking for illustration an ideal pump, a perfect vacuum pump; such pump is never met with in practice, because air is an insidious element, ever on the alert to destroy a vacuum, and because it is impracticable to make the water end of a steam pump tight; and if it were made so, air would find its way into the water cylinder through the suction pipe, since the water itself contains air.

One can regulate the steam pressure to force the water out of the pump barrel at any velocity within the bounds of reason, but have only the pressure of the atmosphere to force it into the water cylinder; consequently one must regulate the velocity to suit the pressure. The theoretical velocity of water rushing upward through the suction pipe is found by taking the square root of the acceleration due to gravity multiplied into the head in feet. The head due to a pressure of 14.7 pounds per square inch is 6.4 feet, nearly; thus $14.7 \times 0.433 = 6{,}365$, $\sqrt{2 \times 32.2 \times 6.4} = 20.3$ feet per second, or 1,218 feet per minute. But this velocity is reduced by the effect of entrance head, by the weight of the water in the suction pipe, and by the resistance of friction in the suction pipe. To illustrate, take the catalogue pump, 6 inches in diameter water cylinder, and 12-inch stroke. The area of the water piston is 28.27 square inches, and $28.27 \times 12 = 339.29 \div 231 = 1.4688$ gallons of water per stroke of piston. Again, $339.29 \div 12 = 28.27$ feet per stroke, or a column of water 1 inch square and 28+ feet long. If the pump is run at a 100-foot piston speed per minute and the suction pipe is 1 square foot in area and 25 feet long, the pump will not work, because the velocity of the water flowing through the suction pipe is 2827.44 feet per minute, equivalent to 146.88 gallons of water per minute, and the friction loss in pounds of pressure per square inch will more than equal the pressure of the atmosphere, admitting that a perfect vacuum obtained in both water cylinder and suction pipe. It is not necessary to go into figures to show that a suction pipe of 1 square inch area is too small for a 6-inch x 12-inch water cylinder; merely making use of a few figures to show why it is so.

Authorities say that the velocity of the water in the suction pipe should not exceed 250 feet per minute. Looking again in the pump catalogue, it is found that the manufacturer has given this pump a suction pipe 4 inches in diameter. Figuring again, there is $4 \times 4 \times 0.7854 = 12.5664$ square inches area of suction pipe and $2827.44 \div 12.5664 = 225$ feet per minute velocity of water flowing through the suction pipe. The friction loss consequent upon 146.88 gallons of water flowing through 100 feet of 4-inch pipe, according to Ellis' tables, is about 0.69 pounds per square inch; but this suction pipe is but 25 feet long, consequently take one-fourth of this, or 0.1725 pounds per square inch as friction loss. One may lower the pump and shorten the suction pipe or increase the diameter of the suction pipe and reduce the friction loss to practically nothing.

It is plain that there is no such thing as suction, and that vacuum does not draw the water into the water cylinder. Suppose that the vacuum in the pump is impaired to the extent of 4.7 pounds per square inch; there should then be but 10 pounds of atmospheric pressure per square inch to force the water up through the suction pipe; thus $14.7 - 4.7 = 10$. By proportion, $14.7 : 10 :: 34 : 23.13$. Consequently it is necessary to lower the pump nearly 2 feet in order that the atmosphere could force water into the water cylinder.

Take a pump running at a piston speed of 150 feet per minute, with a suction pipe 20 feet long vertically, and if the net atmospheric pressure is just sufficient to keep the water cylinder amply supplied, the steam pressure may run the pump up to 175 feet per minute, and thereby increase the quantity of water delivered per minute, providing the supply does not break. But the supply would in all probability break, because of the increased resistance of friction in the suction pipe consequent upon the increased velocity of the water, without any increase of the pressure of the atmosphere.

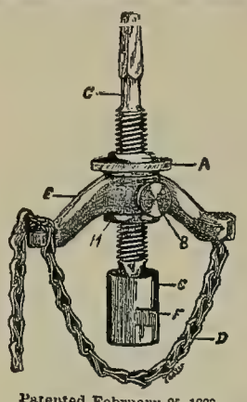
Of course, if one could increase the pressure of the atmosphere at the same time that he increased the speed of the pump, all would be well; but this cannot be, since the pressure of the atmosphere is a constant and unchanging quantity at the level of the sea.

It is believed by many that a steam pump such as is being considered will not handle hot water unless the water flows to the pump by gravity. There are steam pumps on the market that handle hot water having a temperature of 200° Fahr. successfully, with suction pipes as much as 18 feet long vertically. This can be done with a piston pump and very little piston clearance. Suppose a hot well open to the atmosphere and holding water at 153°. The total pressure per square inch due to this temperature and measured from a vacuum is 4 pounds. The weight of water per cubic foot at 153° is about 61 pounds. Then $14.7 - 4 = 10.7$, and $61 \div 144 = .4236$. Then $10.7 \div .4236 = 25.2 \times .8 = 20.16$, or say 20 feet for the vertical lift of water.

It is well to always place a vacuum chamber on the suction chamber close to the pump, and when the suction pipe is very long or has numerous fittings and valves in it, a vacuum chamber becomes indispensable. When the suction pipe is very long a foot valve is also necessary. The vacuum chamber being constantly filled with water, when by reason of speeding up the pump the water piston runs away from the inflowing water through the suction pipe, causing a break, a portion of the water in the vacuum chamber at once falls down into the suction pipe, filling the gap and restoring the continuity of the body of water flowing to the pump. In time air will collect in the vacuum chamber to such an extent as to resist the entrance of any considerable quantity of water, and it must be expelled either by drawing it off through the pump or by a small air pump attached to the top of the vacuum chamber.

Automatic Drilling Attachment.

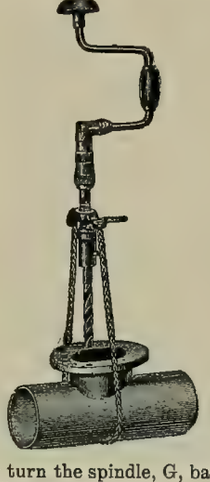
This tool will do a great many jobs that would require much time and expense in taking down and putting back if done on a drill press. It requires no



Patented February 25, 1896.

pressure by the operator to make it cut. The chain does that part of the work. Holes up to three-quarter inch can be drilled with ease, and with no danger of springing the brace with heavy pressure. It will, in many cases, take the place of the ratchet drill, and can be quickly adjusted ready for use. It is useful in mine repair shops, millwrights, machinists, engineers, structural iron workers and general construction work.

The mode of operation is simple. In



starting turn the spindle, G, back close to nut, H; pass the chain around the piece to be drilled, and draw it tight. The screw, B, is to adjust the feed, and should be loose when starting. Holding the hand under and against the wheel, A, at the same time turning the brace, will cause the drill to come into cut, when adjusting screw, B, can be turned down until the required feed is obtained.

A DIVING BELL devised by W. G. Smith is of steel 8 feet high 18 and feet around; is fitted with a telephone and electric light; the light is upon the outside of the bell and illuminates the bottom of the sea for some distance, the diver looking through heavy windows in the sides of the bell. In a late experiment six men went down in the machine to a depth of 250 feet in Lake Michigan, off Milwaukee, and remained at the bottom of the lake six hours. This diving bell will be taken by its owners across the ocean, where an attempt will be made with it to reach the remains of the German Lloyd steamer Elbe, which sank off Lowestoft, Jan. 30, 1895, shortly after she had started on one of her regular trips to New York.

Scientific Progress.

Scientific Prospecting.

NUMBER II—CONCLUDED.

By THOS. SMITH.

As all igneous rocks carry a large percentage of silicon, or silicic acid, we find that the greater number of these fissures are filled with quartz deposited from these aqueous solutions, as the disintegration of the eruptive rock would free the mineral in it—we find that the minerals are embodied in the quartz. In this connection it should be stated that the last outflow of any eruption is the most valuable. This is caused by the fact that the molten bodies of highest specific gravity are nearest the vent when formed, and are naturally ejected first. Of course, this need not be the case with permanent craters, as between the times of their eruption time would be allowed for the different fluids to resume their normal relative positions. This last overflow is generally ejected from one side of the crater only, the wall being generally irregular in its outline, allowing the mass to pour from the lower portion of the rim, and frequently, its specific gravity being so much greater than the preceding flows, it displaces the semi-fluid cooling mass, and traveling in a trough of its own construction therein forms dikes of different eruptive rock.

The facts we want to observe most thoroughly are in which direction the last overflow traveled from the crater fracture, and whether the mineralized eruptive rock has since been covered with sedimentary rocks. If the overflow is the upper stratum of the earth's crust, we shall find the quartz deposits on the line of the dikes the richest ores, but still not nearly so rich as the quartz formed in the mass and on the contacts of the primary dike still remaining at the crater fracture.

If we find that the eruptive blanket overflows have since been covered with sedimentary rocks, we should determine as nearly as possible the direction of their flow, and can then predict with reasonable accuracy that paying ores can be reached in any one of the blanket deposits and on their lower contacts at a given depth. Where large quantities of limestone lie above ore deposits, we may expect the concentrates in the fissures to be the spar formation. Where limestone is absent, we may expect to find quartz, but, whether spar or quartz are found, the veins will be barren unless the eruptive rocks in the vicinity have borne the minerals from the interior of the earth.

A great amount has been written about the different eruptive rocks, which ores may be expected to carry mineral and which not, and they have also been classified as mineral and non-mineral bearing by their color. This is also a theory based on guess work, and will not prove correct in a great many cases. The ability of a melted rock to float, and retain gold in proximity to the earth's crust so that it can be ejected from a vent, depends not upon its color or the presence or absence of any particular characteristics, but upon its specific gravity alone, and one of the surest indications that we can have that gold can be found in an eruptive rock is the presence of crystals of magnetite in its mass.

California Asphalt.

At the Las Conchas asphalt mine and asphaltum works on the seashore at Carpinteria, the mine has a body of bituminized sand covering about seventy-five acres, and estimated to average more than 25 feet in thickness. This sand is soaked with maltha from the bituminous shale on which it rests. The process of mining is a simple one. The surface loam, from 6 to 8 feet thick, is washed away, and a thin bed of yellow clay is removed, exposing the sand. This is dug up with hot spades, and carried up an incline in cars to the refinery. There it is dumped into a mixer, or steam-jacketed cylinder, in which revolving arms break up the

lumps. From this mixer the mass falls into vats of boiling water, where the sand settles to the bottom and the maltha floats. The sand is removed by worms and a bucket conveyor, while the maltha, which is called crude flux in this condition, falls through a flume to a tank, and is finally pumped to an elevated storage tank. From this tank it runs by gravity into two refining kettles of fifteen tons capacity each, and is kept for twenty-four hours at temperatures rising gradually from 100 deg. to 240 deg. Fahr., to drive off the water and light oil. The maltha is now called refined flux, and is carried by steam-jacketed pipes to the mixing department, where it is used to treat asphaltum brought from La Patera mine. The refined flux and crude asphaltum are kept at a temperature of about 350 deg. in revolving drums of about five tons capacity each. The amount of flux added depends upon the degree of hardness required in the refined asphaltum. In about five hours the charge is run into a kettle, in which the impurities settle to the bottom and are drawn off by a worm for use as fuel. The refined asphaltum is taken through another steam-jacketed pipe to the barreling tank, from which it is drawn into a traveling kettle running on an overhead gear and discharging its contents into barrels.

Electrical Progress.

The Burning Out of Armature Coils.

Burned armature coils cause probably more delay in the operation of closed-coil arc dynamos than anything else. Wholesale burn-outs, such as are caused by lightning, are not referred to, but those where one or two coils go without any apparent reason. Usually the trouble starts in one coil, but if the machine is not stopped at the first sign of smoke, three or more coils must be rewound. Upon testing out for grounds, etc., everything shows up clear, and the attendant is sometimes at a loss to understand it.

Geo. F. Woolston Jr. was at one time in charge of a number of these dynamos, which were required to be run day and night for long periods, allowing very little time for repairs and adjustments. Every now and then an epidemic of burn-outs would occur. Coils would go so fast that it was hard to keep them repaired. The whole trouble was finally traced to bad lamps on the line. Some of these lamps, when the carbon was almost consumed, would allow the arc to change so rapidly that the regulators on the dynamos could not work fast enough to keep the machine from "slopping over," or, in other words, an arc would form clear around the commutator. This was disastrous. It burned little jagged points in the segments and caused some of them to short-circuit. If the short-circuit held (was not burned off) an armature coil gave out at once. It is needless to say that the lamps were at once overhauled and put in shape. When this was done, there were no more burn-outs.

It often happens that the dynamo regulator runs either too fast or too slow—regulators requiring motion from the dynamo being here referred to. In one case it shifts the brushes too far either way, and in the other it does not shift them quickly enough to compensate for changes in the line resistance. A little experimenting will correct either evil.

In the case cited, the bad performance of some of the lamps was largely due to worn rods. The length of rod worn in a lamp depends upon the average length of carbon consumed per trim; at such times as the lamp is required to burn longer than usual, a part of the unworn rod enters the clutch, and the weight of carbon being less, it does not feed properly.

Direct-current motors are subject to the same trouble of coils burning out. Short-circuited commutator bars or cross connections cause much of this. The cross connections are necessarily crowded into a small space, and the constant rubbing is very likely to cause a short-circuit. Unless pains are taken to examine and repair these strips the coil will burn out again. Another frequent cause of trouble is the breaking of these cross connecting strips. This is especially true with geared motors on account of the jar. The break will immediately show itself by a flashing at the commutator, the exact location being made known by a burnt spot between two segments, or pairs of segments. A break of this kind can be temporarily repaired in some motors without removing the armature. A piece of insulated wire soldered onto the flange of the commutator on the outside, in such a way as to bridge the break, will allow the motor to run until such a time as permanent repairs can be made.

There seems to be considerable difference of opinion as to the use of sand paper on commutators. In Mr. Woolston's opinion it is impossible to lay down any rule for the care of commutators, for the reason that there are so many different kinds. Some are hard, some are soft, and some are both hard and soft. The only way to keep one of the latter kind running at all is by the frequent use of sand paper.

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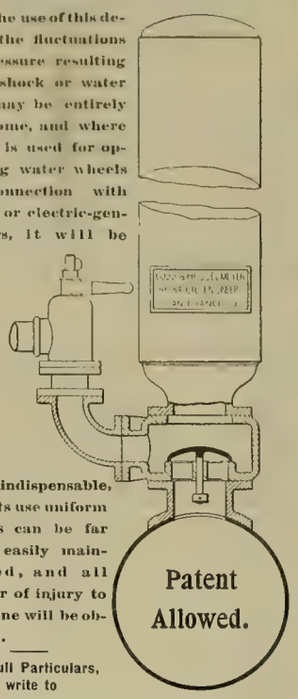

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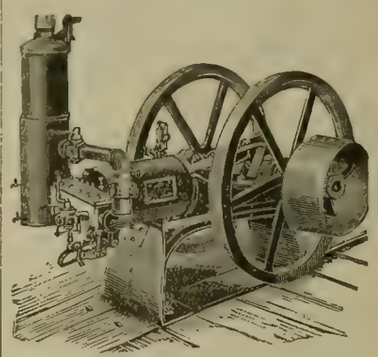

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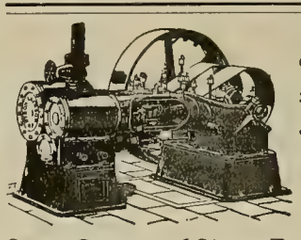

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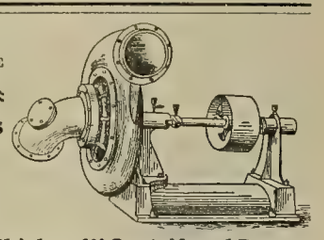

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Mining Summary.

CALIFORNIA.

Amador.

At the Amelia mine the shaft is down 80 feet in a slate formation. It is the intention to go down 1000 feet at least before prospecting for the ledge.

Work is expected to be resumed at the Bellwether mine next month.

A new hoist is to be put in at the Anita mine.

Butte.

A diamond drill for the Banner mine was recently freighted down from Greenville. It weighed 4020 pounds.

J. J. Daly bought from C. A. Braselton the quartz mine he was developing near Robinson mill for $10,000.

Calaveras.

Rich gravel is being taken from the Eclipse gravel mine, Tunnel ridge. Superintendent Hall is only doing necessary work preparatory to working the mine on a large scale. The average yield for the six hours' run for the past ten days has been fifteen ounces to each cleanup. The *Chronicle* says when the mine is thoroughly opened and gravel enough can be mined to run the pans their full capacity the yield per twenty-four hours will be about 100 ounces, or in the neighborhood of $1600, and the cost of mining and milling the same will not exceed $125 per day.

C. A. Lillie has bonded the Keystone mine, near Altaville, and will develop the property.

The Lightner Mining Co. have decided to build a 20-stamp mill. The Lightner adjoins the Utica mine on the northwest.

The McElhaney mine at Campo Nuevo, seven miles from San Andreas, owned by F. O. McElhaney, is bonded to the California Exploration Company for two years for $10,000. Development has begun.

The Curtis Consolidated Mining claim between Angels and San Andreas, two miles north of the Utica mine, embraces a tract 3300 feet in length to 900 feet in width and contains a 20-foot vein of quartz and prophyry. The ore in a shaft sunk 40 feet on the vein contains over 20 per cent of sulphurets composed of iron pyrites with strata of finer sulphurets coming in below water level, which the manager thinks will go very high. The main working shaft has reached a depth of 60 feet in quartz and prophyry.

El Dorado.

The Placerville *Nugget* says the Starlight mine is now paying $10,000 dividends per month.

On the Taylor mine lead a 1000-foot hoist is being put on the Esperanza. The Saucerman is putting in a single-reel hoist.

Nugget: There is not as much placer mining as usual at this time of year on the North Side, on account of an unusual scarcity of water.

The Plattsburg mine, near Georgia Slide, owned by the Wilton brothers, is being systematically worked, with good results.

Superintendent Tenbrook of the Gold Bug mine keeps a force of men at work, with promising results.

J. J. Grossman, Supt. Gold Development Co., is working a peculiar mining proposition in the western portion of the county. At present it is neither quartz, gravel or porphyry, but all in one, and a good prospect in each. They have gone down with their shaft 80 feet, at first through clear white quartz, but as depth was reached an old channel was encountered, and from then until now work has been exceedingly slow, not more than 5 or 6 feet per week being accomplished. At almost every step they encounter great basalt boulders which make much blasting necessary. Among the boulders are stringers of gold-bearing quartz, and the greater the depth the richer the quartz and the more sulphurets it contains, the latter being very rich. Mr. Grossman looks for his big pay in gravel when bedrock is reached.

The Two Channel gravel mine, ten miles from Georgetown, H. E. Picket superintendent, has 3000 acres of mining ground, and is operating a 10-stamp mill.

The Zentgraf or Chapman mine 20-stamp mill is in constant operation. The shaft is down 780 feet.

At the Flora mine, Volcanoville, is being operated a giant.

At Horseshoe Bar, a mile from the Two Channel mine, is the Horseshoe Bar mine, running a hydraulic elevator employing sixty men.

Fresno.

W. Wakefield from Pine Ridge reports rich strikes of gold-bearing quartz in that locality. He owns placer diggings on Laurel creek, in the vicinity of Bear creek. He has been compelled to stop work for want of water, but will resume in the fall. He is but a short distance from the strike made by L. Rebordore, on Bear creek, and says that this ledge is remarkably rich. Since the discovery of this ledge a number of extension locations have been filed. People have gone to prospect on Dinkey, Laurel and Bear creeks.

Humboldt.

The Red Cap Mining Company on Red Cap creek has built one and one-half miles of flume to the mine, 6 feet wide 2 feet deep. At the mine they have one No. 5 hydraulic and two No. 3. The gravel varies in depth from 10 to 30 feet. H. M. Binckley of Clear Lake is superintendent.

Kern.

Dean & Brand's cyanide plant at Kane Springs is ready for work.

Randsburg *Miner*: At a depth of 285 feet in shaft No. 1, Little Butte, the pay chute is from 14 to 24 inches in width. Assays show $471.69 per ton in gold, $5 in silver. E. L. Allen, general manager of the Little Butte mine, has bought the Little Butte extension.

Hafford and Bowman have sold to J. B. Black of Salt Lake one of their mines in the Slate range, fifty miles north of Randsburg. Capt. Black will build a mill.

Inyo.

Jas. A. Yerington, R. K. Colcord, J. F. Parr and George T. Mills have bought the Molus mine and its eastern and western extensions, in Piute canyon, eighteen miles northeast of Bishop. Active work to develop the property on an extensive scale will begin at once. The Molus shaft, now down nearly 100 feet, will be sunk as much deeper as the first move and a mill will be erected. Gov. Colcord will personally superintend operations.

Mono.

From the Eva mine, owned by W. A. R. Loose, have been got out 150 tons of ore, which is being packed to the Bodie tunnel mill. At the Dunderberg about forty men are employed.

This week in the action of Vermilyea & Doyle vs. Judd & Palmer, Judge Virden of the Superior Court appointed A. Farrington receiver of the Mammoth mine, Mammoth district. Vermilyea & Doyle are stockholders of the company, which is a Chicago incorporation. Judd is superintendent of the mine; Palmer is a director. The plaintiffs alleged mismanagement, etc., and asked for the appointment of a receiver.

Nevada.

Active operations will soon be under way at the Stanford mine, which was recently acquired by J. H. Neff, Edward Coleman and W. W. Montague. Joseph Thomas will be foreman.

The *Union* says the Sneath & Clay mine has been named the Phœnix. It is expected that operations will soon be commenced under the direction of Superintendent H. K. Shockley, who arrived recently from Cincinnati, O.

Ohmert & Hume, in the Gold Tunnel mine, near Nevada City, last week, struck a ledge of quartz filled with fine gold. The *Transcript* says the ledge matter will pay $600 per ton.

The new owners of the Texas mine intend putting up large machinery and will work the mine.

At Graniteville, the Netherlands Mining Company, operating on South Fork, represented by D. C. Mitchell, have men working the Birchville, Iowa and Commercial. The new 5-stamp mill will be running by Sept. 1st.

The *Herald* hears that the mill at the English Mountain mine, which was destroyed by fire a short time ago, will shortly be rebuilt.

The Live Yankee Mining Company have men at work in their tunnel at Bald mountain.

Placer.

The Pioneer quartz mine, near Iowa Hill, produced $13,241 last month at an expense of $6582.

Grass Valley *Telegraph*: The Omaha Cons. G. Mg. Co., which lately purchased the Homeward Bound property, has been driving their drifts southward to the ground. A new shaft was begun a few months ago and sunk to water level, when it was stopped to await hoisting and pumping machinery, now completed, and work resumed. The shaft will cut the No. 8 south Lone Jack drift, and from there until the 2000-foot level is reached, when it is the present intention to drift back north and work the Lone Jack and the Omaha No. 2 chutes on their trench in depth. Lateral drifts have been run from the Lone Jack beyond where the new shaft will course, thus greatly facilitating the handling of the ores in the large stopes in this vicinity. Upon the reaching of No. 8 level all work will be prosecuted through this shaft. Two ore bins, one at the new works and one at the Lone Jack, have been built, and a tramway 1200 feet long connect them, upon which the ore will be trammed in a ton car, and dropped in the bin at the Lone Jack, from where it will be again trammed 1000 feet to the Omaha mill. The Omaha Consolidated property gives employment to ninety men, besides about forty contributers in Omaha shaft. The 28-stamp mill is constantly running.

Sentinel: The new 10-stamp quartz mill at La Trinidad mine, in Sailor canyon, sixteen miles southeast of Cisco, is in operation.

The Tadpole placer mine, near Secret House, is working six men running a bedrock cut.

J. B. Knapp, secretary of the Blue Canyon Mining and Development Company, is putting in new machinery to run the power drills. The air compressor will have a 10½x14-inch cylinder.

G. T. Miller & Co., who recently bought the Lost Camp gravel mine, 1½ miles above Blue canyon, have eight men at work.

Republican: In Ophir district the Eclipse has eighteen men at work in the east and west drifts on the 300-foot level. The mill is running night and day on quartz going about $7 per ton.

The Boulder has been running on the co-operative plan. Last month the wages amounted to $3.23 per day for each man, the mill having crushed 73 tons of rock.

At the Hathaway are working sixteen miners, mostly in the 600-foot level.

At the Gold Blossom fifty-five men are working. The new shaft is down 100 feet. In the old shaft they are stoping in the 200 and 300-foot levels, and the mill is crushing thirty tons daily.

The Bella Union mine, situated two and one-half miles from New England mills, has begun ten men, H. M. Bayne superintendent. The 5-stamp mill, crusher and concentrator are run by water raised 10 feet by sipbon from the ditch, with 1120 feet of pipe.

E. W. Chapman is preparing to set men at work on the Three Stars mine near Ophir.

Plumas.

"Lucky Antone" a discharged employe of the Thistle Shaft mine, made a $9,000 strike last week. Charles Fish, who has a gravel claim at the junction of Nelson creek and Feather river, took $3,000 from his claim last week. Nelson creek is considered one of the richest streams in Plumas county.

Bulletin: G. Shideler, who has a mining claim at Light's canyon, Plumas county, last week shipped 4200 pounds of ore to Selby's, for which he received $313. Deducting costs the shipment netted him $130 per ton.

Riverside.

H. T. Duff, at the C. and C. group, Perris, has bought the 5-stamp mill and machinery of the Alice mine, which will be removed and set up on the Virginia mine.

The work on the foundations for the new 20-stamp mill has commenced on the property of the English company at the Gavilan, adjoining the Santa Rosa on the north. The ore runs about $300 per ton.

Work on the Cincinnati Belle is progressing. A 5-stamp mill is ordered to supersede the arrastra.

San Bernardino.

At Virginia Dale, Baird's new quartz mill and cyanide plant will soon be in operation. The Index people are working the Montrose. The F. C. B., on the same ledge, shows a 14-inch ledge at 35 feet, which assays $78.54. Sweesy & Arbios are down 100 feet on the Black Lead and are running a drift, getting out rock to mill. Moore & Sexton have a 50-foot shaft down on their property. Lee Bros. have the Desert King, a 2-foot ledge, which assays $35 a ton.

At Mojave two incorporations have recently been organized—the White Peak Mining and Milling Company and the Mojave Mining and Milling Company and also a cyanide works with capacity of fifty tons per day. The Gypsy mine assays well. Colorado men have bought the mine for $25,000 and will develop the property.

San Diego.

F. Holland will take charge of the Elvada mine, Julian, on which operations are to be resumed.

Shasta.

Iler brothers, on the Iron Mountain range, have their tunnel 800 feet in and have a ledge 7 feet wide.

A. F. Batten, three miles from Redding, has built a wing dam enclosing 120 feet square of gravel. He will pump out the water and clean the bedrock.

H. L. Shannon, superintendent of the Mammoth-Garfield mines at Old Diggings, reports to the *Free Press* that everything is now running smoothly at the mine. The new Hallidie wire ropeway which was recently put in is working very satisfactorily. Thirty men are employed and from forty to fifty tons of ore are moved and carried to the railroad by the ropeway each day. The ore is shipped to the smelters of the Mountain Copper Company at Keswick.

E. G. Martinez of French Gulch has a contract to run a tunnel on the old Connor mine and is in 250 feet and taking out free gold ore that will average $45 to the ton. The mine is owned by J. W. Hunt of Sebastopol, Sonoma county, who will shortly erect a mill.

At Harrison Gulch men are at work night and day in six of the tunnels, and a shaft will soon be sunk on one of the ledges. Hoisting works run by steam power will be used as soon as the shaft is well under way. It having finally been decided to use the cyanide process, three tanks and a gasoline engine have been put in. At present it is only by pumping the water back again after it has been used that they are able to keep ten stamps running.

Sierra.

At the Thistle Shaft mine work has been suspended, working the mine through the present shaft being impracticable. The company may have to tunnel. The suspension will be only temporary.

The owners of the Butcher Ranch quartz mine have a ledge assaying $18 a ton.

Recently a quartz ledge was discovered on the Gold Bluff ground 3 feet in width which prospects well in free gold. A tunnel is being run to tap the ledge.

The Willoughby mine, Gold Valley, has been started up. Some rich rock has been found at the upper tunnel.

Siskiyou.

F. Beaudrey has acquired possession of several hundred acres of mineral ground on Wild Cat and is making preparations to mine on an extensive scale. A ditch is being built from Jackson creek, several miles in length, and of capacity sufficient to carry on extensive hydraulic operations.

It is reported to the *Journal* that two prospectors took out $8000 worth of gold from a mine on Canyon creek, near Callahans, in half a day. There is a great deal of good mining ground in the vicinity of Callahans.

Parties returning to Montague from Coffee creek report at least 500 people at the diggings, with more constantly arriving. They also report rich strikes made at the head of the east fork of Salmon river, which heads near the source of Coffee creek, in Siskiyou county—a piece of gold, gravel and quartz combined, as large as a man's head, having been found.

The south fork and east fork of Salmon river, head in the Salmon range in this county, along the border of Trinity county, where Coffee creek and other streams running through Trinity to the Klamath river also head, all contain rich mines. Rich finds have been found at various times between Callahans and the head of the above-named streams, as well as at Jackson lake and the numerous gulches that extend down into Siskiyou and Trinity counties from the Salmon range. Over on Methodist creek, Know Nothing creek and other tributaries of the south and east forks of Salmon, many good paying mines are worked, both quartz and placer. On Know Nothing the Dannenbrink brothers have a fine quartz ledge, and Bennett, at Forks of Salmon, has some very rich mining properties. Over the mountains, from Salmon river, in Trinity county, are the noted New River quartz ledges that created so much excitement a number of years ago and which still yield large returns. The entire country at the headwaters of the Salmon and Trinity rivers in the Salmon, Trinity and Scott mountain ranges, contain rich gold fields, which extend down to and along the Klamath river. The same range of mountains connect with the Humbug range on the west side of Yreka and the mountain ridges of the Klamath, all the way to the Siskiyou mountains on the Oregon border.

Reports from the Happy Camp mining district state that excellent work has been accomplished in the placer mines in that section this season. Among the properties down there which have been paying handsomely is the Siskiyou mine, just opposite the Bunker Hill mine.

The Klamath Flume & Mining Company, in Happy Camp district, have a large tract; a large sum has already been expended in fitting the property up, and by the first of the year they will probably be ready for operation.

Mining on the head of Empire creek is in full blast at present, and all the miners seem to be doing well, making from $2.50 to half an ounce a day. Hungry creek, else in the same section of the Siskiyou foothills, near the Oregon line, is paying well this season.

Tehama.

Kestner & Thompson of Red Bluff have bonded their copper and gold property thirty miles west of Red Bluff, on Elder creek, to M. C. Conway of San Francirco for $75,000. Development to be commenced within thirty days; ore which is refractory shows $19.85 in gold and silver, and 220 pounds of copper to the ton.

Trinity.

Fourteen miles from Junction City, and from Weaverville about twenty-four miles, R. A. Skinner, on the Yellowstone mine, worked on a lease from the Niagara Company, with ten men and a 10-stamp mill, crushes $11 rock.

The Enterprise, one mile below the Yellowstone, operates five stamps. The ore mills from $15 to $20 to the ton from a depth of 400 feet.

Adjoining the Lone Jack, the North Star with ten stamps is at work part of the time.

Writing from Trinity Center a *Searchlight* correspondent says: The activity which naturally follows an important mining discovery is already assuming large proportions in this locality, and the steady stream of prospectors passing through here presents a lively reproduction of former mining days in California. Prospectors are lining the tributary gulches of Coffee creek, and although no strikes of great importance are reported from the immediate vicinity of the famous Graves mine at Morrison gulch, ten miles northwest of here, there have been some good discoveries made above that place. The prospectors are nearly all headed for Hickory gulch, about twenty miles northwest of here and directly beyond Morrison gulch. Trinity Center being the last point of securing supplies, the miners usually complete their equipments here. Last evening the last miner's pan in town was sold, and the dealers were compelled to telegraph for a new supply. The only means of getting freight or supplies to Hickory gulch is by way of pack trains over a narrow and difficult trail from Morrison gulch via the Nash mine.

The one strike which carries the most interest is that of Burgess & Murphey, who had been reported to have taken out $80,000. A prospector named John A. Lytle, who arrived here directly from there Saturday night, said that this report was a base fabrication. The fact is that on the 7th inst. Benjamin Burgess, formerly of Dunsmuir, having followed up a trace which he had last year found in a seam of clay, struck pay dirt in rich quantities, he with his partner, John Murphey, taking out $149 in the first twenty-two pans. They followed up the seam a distance of 400 feet, various tests yielding $5 to $20 per pan. Knowing that they had a good thing and fearing that they were losing considerable value, they decided to cease washing with a pan and construct a rocker. It is said that they are taking out about $200 a day and have already $800.

Large crowds of prospectors are reported in that locality, many coming from Dunsmuir and other points in Siskiyou county. Several small strikes, both placer and quartz, are reported.

In the '60s a man named Morrison took out $11,000 in one month from the bed of the gulch which bears his name. The pay channel was lost and a company organized for the purpose of recovering it removed great banks of gravel and was ruined financially in its vain effort to locate the treasure. The channel ceased to pay at the mouth of Graves gulch, and the present trio of lucky miners reasoned that the value must have issued from the smaller gulch. On this theory they worked the gravel of the creek and took out $4800 last April. Following a trace which led them out of the creek bed, they finally discovered the seam, on which they commenced opening a cut only two weeks ago to-day. They at once began finding small pockets containing pure gold and manganese, and found sixteen of these pockets, yielding in all some $4000 before striking the large deposit of gold—about $88,000, all in one cavity.

About $600 or $800 was taken from a seam near by, which bears toward the other at an angle that promises to converge them at a distance of thirty or forty yards from the surface and and a depth of 50 or 60 feet, where a large chimney of valuable formation will probably be found. It is the opinion of an experienced mineralogist who personally visited the mine that the property will yet yield many pockets of good value, but that it will be disclosed with little more development that the seams are not fissure veins, but gashes or surface checks. This is indicated by there being no sign of slipping or friction on the walls. There is no way of ascertaining the depth they penetrate, but that they will eventually pinch out and leave no seams is the history of all similar formations. The large deposit of gold is explained by the gash

forming a cavity which acted as a reservoir for the drain of all soluble minerals coming from a wide iron dike located some 400 feet up the mountain side, and to which the seam forms a right angle. This dike is traced for many rods and is believed to be impregnated with gold and other precious metals. The gold discovered was found in a formation of ochre, manganese and talc, and was enclosed in altered dioritic porphyry. It is located in a matrix of hydrated iron and clays, which came out of the big iron ledge and are simply the filtration of minerals in solution, forming slowly in the lapse of ages.

At the Oro Fino, seven miles north of Trinity Center, owned by Strode brothers, the lower or fifth level, running on the ledge, is now in over 600 feet and has a depth of 900 feet. Nine men are employed and a 5-stamp mill is operated. Mr. Strode expects to put in a larger mill next year.

A good strike is reported in the Carr mine, adjoining. Here the ledge pinched into a seam too narrow to render treatment profitable. Some $5000 or $6000 had been removed by an arrastra. A tunnel of 150 feet was run on the ledge, a winze of 50 feet sunk, and the ledge has slowly broadened out into substantial proportions, and can now be operated with profit.

Located four miles above the mouth of Morrison gulch, and on the opposite side of Coffee creek, are eight claims owned by P. A. Wagner of San Francisco. Five men are at work. A series of cuts into the lead indicate the course and size of the ledge 1700 feet up the mountain side. The ore contains about 6 per cent sulphurets. A 20-stamp mill will be put in as soon as a road to the mines can be built. Mr. Wagner says he will employ 100 men.

Tuolumne.

The Sonora *Democrat* reports that the ledge in the tunnel's face of the Woods Creek mine at Yankee Hill measures 4 feet. It was purchased some time ago by a French company from G. Mapes.

At the Confidence the 800-foot shaft, with its 6 feet of good vein in the bottom, will shortly again be driven down. The sweeping plant for collecting slimes is nearing completion.

The Golden Gate mine closed down Tuesday, the water supply being cut off. The reason was the breaking of the Tuolumne Co. Water Company's flume at Middle Camp, and, as a consequence, many other properties on the east belt and mother lode will be forced to temporarily hang up.

Last Saturday an $800 nugget was found in the Louis Dondero placer claim near Yankee Hill. This chispa, together with the $1930 piece of two weeks ago, makes one believe that there is plenty of coarse gold in the county yet. The claim is clearing, aside from exceptional nuggets, over $1000 per month.

Yuba.

The Good Title mine, at Indiana Ranch, is producing about $3000 per month with a 5-stamp mill.

NEVADA.

Ten carloads of silica from near Virginia City are being shipped to New York. It is sold there as electro silica in small packages and is said to be the best of polishing powder.

The Knickerbocker mill and mines at Ione have been sold to the Austin Mining Company for $23,000.

At Stateline the Ophir Company recently uncovered an 18-inch chute which sampled 1000 ounces in silver and $18 in gold.

The Creole Company is shipping ore thirty miles to Ploche to be milled in the Yuba mill by Anthony Godbe.

The sheriff of Humboldt county has sold the Hidden Treasure and Emma mines at Kennedy to the First National Bank of Winnemucca for $1709.

The Tuscarora *Times-Review* says: A lot of high-grade ore and concentrates from the Nevada Queen, in the neighborhood of $10,000, have been sent to the Selby smelting works. Six men are now at work taking out considerable high-grade ore in addition to that which goes to the mill for concentration.

J. E. Peck next month begins working the old Raymond & Ely tailings at Bullionville by his new process.

Enterprise: H. H. Blood, superintendent of the operations of the firm of Harris, Blood & Co., who are to reduce the Park tailings by the electro-peroxygen process, is commencing operations in Six-mile canyon.

OREGON.

Borden & Howell of Evans creek, Josephine Co., are building a twelve-mile ditch to cover their placer mines and expect to employ a large force of men shortly.

The 64¾ ounces of bullion from the Oregon Bonanza mine in Williams district, which was shipped to the Selby smelting works at San Francisco, yielded $1008, or a little over $100 to the ton of ore crushed.

The Eureka Mining Co., the new owners of the Denver City ledge, on Soldier creek, Josephine county, will employ thirty men soon.

The Jackson Mountain Mining Co. has incorporated to mine gold, silver and copper in Jackson county; capital, $750,000; office, Portland; D. M. Watson, C. L. Carr and A. J. Farmer. The company is developing a quartz mine near Jacksonville.

The Geiser brothers of Baker City, who recently sold the Bonanza, have bought the Diadem and Brindle Horse, six miles west of the Bonanza, for $15,000.

WASHINGTON.

Dennis Ryan, of St. Paul, has bought the Deer Creek mines near Silverton for $150,000. According to the estimate made by his mining engineer, Martin Currin, $200,000 must be expended in order to carry out the contract entered into with several of the larger holders. The first thing to be done will be to put in a 20-drill air compressor, on which work will begin early in September.

The French Creek Mining Company, operating in the Big Bend, is capitalized for $2,000,000. It is operating two and a half miles of gravel ground on French creek. The company have a complete plant, costing $80,000, in transit. They will be ready to wash next season. They have sixty men employed on flume work, of which they are putting in about 2000 feet, and they soon expect to have their pipe in place. The head of water will be 400 feet. G. J. Atkins is manager.

BRITISH COLUMBIA.

J. B. McArthur, being asked by the *Miner* what effect the decline in silver was having on Slocan ores, said: "If silver does not go below 50 cents silver mining in the Slocan will be as profitable as last year, and will be profitable in most of the mines at 40 cents. Lead is now $3.60, with a duty of $1.50, leaving the net price to the British Columbia mine owner $2.10 per 100 pounds. Lead last year was from $2.10 to $2.30, with a duty of 75 cents, leaving the net only $1.55. The mine owner thus nets 55 cents per 100 pounds more on his lead than last year. S. McDonald of the Payne mine states that they will ship until silver strikes 25 cents, and then make money."

At Pilot Bay twenty men are fixing up the smelter, to be running in October.

A Nelson report says: As a result of Prof. Carlyle's tramp around the different sections or West Kootenay, an amendment to the mineral act may be expected during the next session of the legislature. Throughout the entire district, but more especialy in outlying districts, he has observed a tendency on the part of claim owners to cheat the provisions of of the mineral act dealing with the performance of assessment work upon claims. Though the present act is most liberal, in that it admits of the recording of locations before performing any development work whatever, there is a disposition on the part of claim owners to shirk the annual assessment falling due within the year following the location of claims by a system of re-location. The effect of this is that large areas are staked off and no work is performed beyond the driving of the stakes. In one district—Trout Lake—Mr. Carlyle came across one individual who was holding sixty claims. These men are unable to do necessary development work themselves, and by evading the spirit of the act they stand in the way of those who are willing and able to do the necessary development. This system naturally tends to retard all new districts. To overcome the difficulty Prof. Carlyle is of the opinion that the mineral act should be amended so that before a location can be filed in the record office the locator of a claim should be required to perform $100 worth of work. As the opinion of Mr. Carlyle will no doubt have considerable weight with the minister of mines, some such amendment may be made to the mineral act next session, unless Prof. Carlyle can be induced to change his mind in this respect before the legislature meets again.

ALASKA.

A contract for the machinery and equipment of a 100-stamp mill has been awarded by the Alaska United Gold Mining Company for operations upon the site of the new bullion producer. The *Mining Record* learns that the Treadwell Company is about to add 300 stamps to its milling capacity. A new mill of that size is to be built upon the Treadwell property, near the site of the present 240-stamp mill, which, while entirely independent in its operations, will, before the close of 1898, steadily drop its stamps on Treadwell ore. The new five-compartment shaft, while far from the depth to which the intention is to sink, has uncovered new reserves of ore which make it positive that a doubling of the present plant is entirely warranted, and, as soon as the opening of spring will permit the beginning of building operations, the Treadwell Company will break ground for a stamp mill which will not find an equal on earth, not only as to size, but in every point of arrangement and equipment.

In a report made some time since Captain Mein said that, while the pay ore did not become richer in depth, the deposit is much larger than there was reason to believe from the developments made up to that time. In the east end there is a block of ground embracing two sections, which were considered waste, but which have been proved by new development on the 220-foot level to be the best ore in the mine, and there are 400,000 tons of good milling ore in the block. Supt. Duncan has estimated that there are 2,960,014 tons in sight, but he is said not to have allowed for the ore above the adit level and only for ore exposed to the end of the drifts being run. For these reasons Captain Mein says there are 5,000,000 tons above the 220-foot level, and it is safe to estimate it will last 100 feet below that level, which would make 7,000,000 tons. He recommended the erection of another 240-stamp mill and this was endorsed by the company. It appears, however, that a South African mill of 280 stamps is in course of construction, and that the famous Treadwell might not be deprived of the honor of being the largest stamp mill in full operation in the world the company decided that the new mill shall be one of 300 stamps. When these are in operation it is thought that the cost of mining and milling the Treadwell ores will not exceed $1 a ton.

A letter from James O'Brien from Klondike says "a new strike has been made on a creek sixty miles above Klondike, near Stewart river." Forty-seven pounds of gold had been taken out of the discovery hole. As is the case in a mining country, no matter how widely distributed, the news rapidly spreads, and those who had failed to strike it rich at Klondike were rushing for the new diggings. As the letter was being written 150 men were starting from Klondike for the Stewart river, just as hopeful as when they took part in the rush to Eldorado and Bonanza creeks. O'Brien says all the six tributaries of the Klondike river are proving rich beyond report. Adams creek is the only one condemned by the writer.

UTAH.

At Park City Supt. Chambers of the Ontario says all necessary work such as timbering work drifts, taking out some rail and cleaning up in general preparatory to the closing of the mine was being pushed rapidly, and as soon as the work is completed the mine will be closed indefinitely and would not be reopened with silver at 52 or even at 60 cents per ounce, as the mine could not be worked at a profit with their production at such a figure.

The mill on the Last Chance mine, recently destroyed by fire, is to be rebuilt and in operation in the next ninety days. M. R. Hunt is the manager.

The Yellow Jacket Copper M. Co. has incorporated at Salt Lake; capital stock, $50,000; W. C. Higgins secretary, A. L. Morris general manager; to work the Yellow Jacket lode in the San Francisco mining district, Beaver county.

Salt Lake *Tribune*, 24th: Unless the ills that are now sapping the life out of the diggings are quickly overcome it is not unlikely that a number of the most prominent mines that have been wasting away will close down early in the coming month. That the Bullion-Beck will resort to the step was admitted by one of the directors yesterday afternoon. The inconsistency of a struggle against present hardships, he said, had been laid before all, from the man who is advocating a single gold standard to the corporation which has advanced the cost of wheeling the ore out of the camps. Attention was called to the low price of silver, which ruled yesterday at 52 cents an ounce; to the cost of explosives; to the advance in the cost of transportation from points where silver is predominant; to the raise in the cost of treatment where the ore does not carry its own fluxes; to the advance in the price of provisions and to other damaging et ceteras, that have been heaped upon the producer. These ills have been laid before those who hold, it is contended, the remedy in their hands, but each has taken the matter under advisement and the average man has lost all confidence in the hope which has been held out to them that relief would come to all who waited.

Of the Bullion-Beck, it is said that it has large bodies of ore blocked out, and that the ore is of such grade as to render it impossible for it to face all these advances and yield a profit to the owners.

There are a score of properties experiencing the same ills, and it is believed unless a remedy is prescribed that there will be a wholesale letting out of men a week from to-day.

The situation is a serious one and the hope is expressed that some understanding may be arrived at by which all interests may be protected, while all the mines are permitted to run. It has been suggested that a conference take place between all those whose welfare is concerned the present week, and that efforts be made to prevent any such thing as a general closing down of those mines that have not lead with which to offset the depression in the silver market. It is said the railroads have the matter under consideration and promise an early reply.

IDAHO.

J. M. Howe of the American Placer Mining Company at Oro Fino reports that owing to the low stage of water the main flume has been abandoned for the time, and ten men are at work with the sluice boxes.

W. T. Andrews, manager Seven Devils Copper Co., Washington county, says the ore bodies show average value 20 per cent in copper, with silver and gold in sufficient quantity to pay expense smelting. A smelter of seventy-five tons per day will be blown September 1st, to be followed by another plant, capacity 350 tons per day. The economical and profitable operation of the property involves the construction of a line of railway, built from Huntington, sixty miles to the Snake river on the east. The new smelter, which is to be a pyritic plant, is to be in operation not later than February 1st, '98.

A. M. Butler has put in a dredge on Snake river, near Nyssa, for Baker & Scott of Tacoma. It is one of the largest ever put on Snake river and has two 14-inch centrifugal pumps; the barge is 50x110 feet; the plant will handle 250 yards of dirt an hour.

The Idaho Democrat group of mines is sold to Boston men for $20,000. It has a chute 130 feet long and 4 to 8 inches thick, of ore carrying an average of 110 ounces silver and 65 per cent lead per ton. This is on two tunnel levels 70 feet apart. It is five miles west of Hailey.

The Granite Mountain Gold & Copper M. Co., at New Denver, controls the claims on Granite mountain and the water right on Deep creek, with ditches, furnishing the water power for development work. The ore is called gold-copper, running, mill test, from 20 to 40 per cent copper and about $8 in gold to the ton, with traces of silver.

MONTANA.

The working of placer ground with dredging machines having proved a success in Madison county, Montana, arrangements are under way to operate with them at Montana City, in Jefferson county.

An Alaska mining company has been organized at Helena. It cost $1003 to file the articles. The capital is $25,000,000; incorporators are P. B. Weare, J. Cudahy, C. A. Weare, W. W. Weare, Chicago, and T. C. Power, Helena. It is proposed to engage in all sorts of mining enterprises in Alaska and Montana, do a trading business, build cities and towns, and put in telegraph and telephone service.

The drop in the market value of silver is a matter of consequence to the Anaconda mines, which produced 5,433,826 ounces of silver last year. As it depends on silver and gold to furnish the bulk of its profits the decline in in silver is a serious matter. With the decline in silver from 68½c., which it received last year, to the present price received, in order to pay 10% on $30,000,000 capital, it is figured that Anaconda will have to produce 1,250,000 more ounces of silver than it did last year. Every cent that silver declines in price per ounce means a loss of $54,338 on the basis of last year's output.

At Livingston Work, Larimer & Ewing will operate the McCauley mine and mill, Crevasse district. The mill now on the property will be improved by a concentrator.

WYOMING.

Salt Lake *Tribune*: At Basin City two prospectors are washing out gold from the sands of the Big Horn river by the carpet process. The sand is shoveled into a large box into which water is pumped with an old-fashioned hand pump. The dirt then runs over a set of riffles and goes into another box in which an old piece of carpet is stretched. The wash passes over this carpet, which arrests the particles of fine gold. The carpet is then shaken and washed, quicksilver added, and the resulting mass is washed. This takes out the quicksilver and leaves the gold dust. The dust is extremely fine and could not be saved with the ordinary apparatus.

COLORADO.

A. S. Dwight, general superintendent Consolidated Kansas City Smelting and Refining Company, says the smelting interests at Leadville are improving. The Arkansas Valley smelter is handling 900 tons of ore a day, which is more than any other smelters, with very few exceptions, are now doing.

The Pactolus Hydraulic Mining & Milling Company, near Central City, has works designed to work 2000 yards of gravel per day, and has built a ditch six miles long to deliver 5000 miners' inches 2¼ miles below. As the fall in the river is only about 50 feet to the mile, it has been necessary to employ gravel elevators to raise the gravel and water from the giants to the tail sluice. The works at present consist of the above-mentioned ditch, a storage reservoir of seventeen acres, two lines of 18-inch steel pipe, one of which supplies two giants with water, while the other connects with the gravel elevator, which raises the gravel 42 feet. The elevator and giants are worked under a head of 250 feet water pressure. From the elevator the gravel and water pass through a tail sluice or riffle box 700 feet in length, floored with angle-iron riffles. The advantages these riffles offer, as compared with the wooden blocks heretofore in use in that country, are, better saving of gold, greater facility for cleaning up and durability.

At Telluride the *Journal* reports the sale to the U. S. & B. C. M. Co. of Kansas City, Mo., of the Liberty Bell group of properties, in Cornet creek basin, for $50,000. Ten per cent of the amount was deposited in the Bank of Telluride. The company will work the mine on an extensive scale.

Says the Rico *News-Sun*: The Enterprise mine continues to employ nearly 100 men and is adding to the force; sixty men work on ore, the remainder development work. Five drifts are being driven under contract, by the month; the contractors average better than day's pay at the going wages of the camp. Ore enough is blocked out to keep 200 men busy for months. This ore carries about seventy ounces silver and nearly an ounce in gold per ton. Development work is now confined to those veins showing a predominance of gold values. Every ton of ore shipped from the mine runs from $20 to $200 per ton, showing why Rico's great property continues to work while others are closing down.

NEW MEXICO.

Next month it is expected that the new mill at Cerrillos, to reduce ore by the Stewart process, will be in operation. Estimated capacity fifty tons of ore per day. The process is to subject the ore to a combination of furnace heat under blast and suction draft and steam, which forms a superheated steam, which is drawn down through the ore and will take the zinc and lead out into a water tank, separating the gold and silver from the rock and depositing them upon the bottom of the tank, being thence gathered off by quicksilver.

The Challenge mine at Hematite is now being worked by the Challenge Mining & Milling Company. It has widened from a 14-inch pay streak to 2 feet. The company is pushing the construction of its fifty-ton chlorination mill being built one mile below Hematite.

ARIZONA.

At Pearce the Commonwealth Company propose to increase the capacity of their mill from 60 to 120 tons per day.

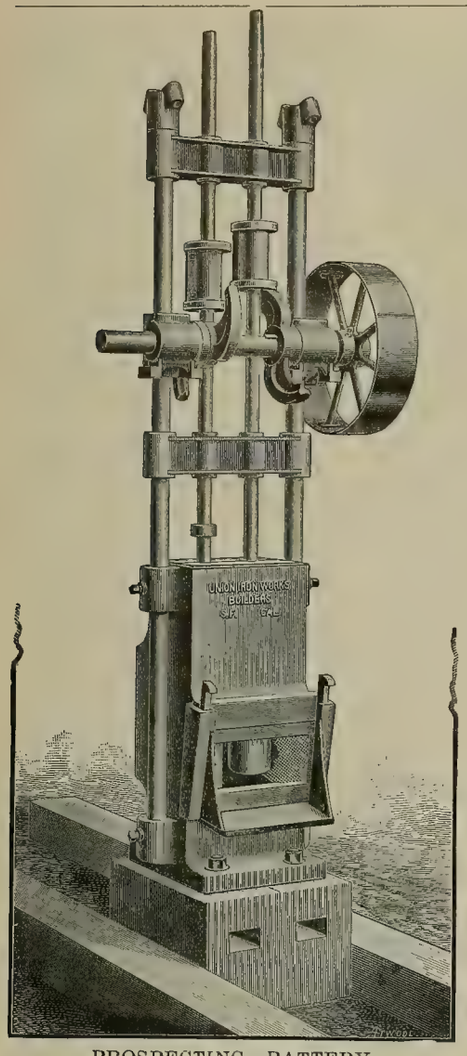
The 120-ton concentrator on the Elkhart mine, Chloride, made a satisfactory trial run last week. This plant is the largest of the kind in Arizona. The successful operation of these works means much for Mohave county. With the plant in full operation the output of concentrates should reach twenty-five tons per day.

A suit has been filed against the Detroit Copper Company of Morenci by the same parties who are sueing the Arizona Copper Company of Clifton. Both complaints are that these companies are using a process in converting copper matte into block copper, part of which is an infringement on a patent claimed by a Frenchman, who is represented by a Washington City attorney.

At Crittenden, the Columbia Smelting Company have erected a complete silver-lead reduction plant. The furnace is 100 tons capacity. The ore is from the Flux and Hardshell mines. The coke and iron ore come from New Mexico. The limestone is blasted a few miles north of the plant. The expenses of the company are estimated at $600 per day. About seventy-five or eighty men are employed, fifteen at the mines.

MEXICO.

D. B. Nichols wires from Guadalajara that he has just sold a mine there for $2,000,000 to an English syndicate. Nichols has been the superintendent for years; his share is stated to be 25% of the purchase price.



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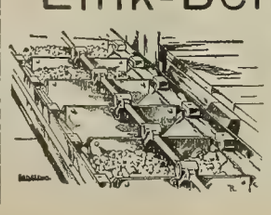

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Coast Industrial Notes.

—Dollar wheat at last.

—California's '97 wheat crop will be 30,000,000 bushels.

—Everything except wages is appreciating in value in Mexico.

—A railroad from Juneau, Alaska, to Dawson City is discussed.

—Jamestown, Cal., expects to be the terminus of the Sierra Pacific Railway.

—The Starr mills at Crockett, Contra Costa Co., Cal., are to be used as a beet sugar factory.

—The dredger has finished work on the Grand Island, Cal., levees after a run of three and a half years.

—At the 30th annual fair of the Mechanics' Institute in this city thousands of visitors are now daily delighted.

—Stockton, Cal., is shipping flour to Peru. It also sends a shipment of flour in barrels that is destined for Shanghai, China. It is unusual to ship flour from California in wood.

—The McCloud River railroad from Upton, near Sisson, Cal., for twenty miles around the base of Mt. Shasta to Squaw valley, is completed and in operation. The eastern terminus has been named McCloud instead of Vandale.

—The Mt. Diablo coal mines are attracting attention. The Pittsburg Mining Company, developing mines at Somersville, six miles north of Mt. Diablo, has bunkers at Los Medanos. The Black Diamond mines were at one time large producers of coal.

—The Los Angeles and Pasadena Railroad Company has incorporated: A. McNally, D. B. Dewey, Chicago; J. H. Hughes, Pasadena, Cal.; M. H. Sherman, Phœnix. It is proposed to build a road from Los Angeles to Pasadena, at an estimated cost of $1,000,000.

—The biggest raft of piles ever towed down the coast arrived at Oakland, Cal., harbor recently from the Columbia river. It contains 77,060 piles, each about 100 feet in length. It took twenty-four tons of chains to keep them in place. The raft arrived in good shape.

—The San Diego, Cal., Flume Company has 100 men on the Pine Valley reservoir site, eighty miles east of San Diego city, to add 2000 miners' inches to their water supply by a dam 80 feet high and a conduit sixteen miles long. It is expected that the diversion will be completed by February 1st, '98, at a cost of about $100,000.

—A permanent exposition of mining machinery, electrical appliances, agricultural implements, and all kinds of labor-saving apparatus, is to be established by the Peruvian Government at Lima, Peru. Exhibits will be exempt from Custom House duties, and the usual consular fees, and exhibitors will have the option of showing their wares for six months or longer.

—At Solomonville, Arizona, on the 24th, the Arizona Pacific Railroad Company incorporated; capital stock, $10,000,000; incorporators—E. J. Beard, I. E. Solomon, F. Dysart, W. H. Wood, J. Blake. The company proposes to construct a railroad from a point on the Santa Fe in New Mexico to Phœnix, Ariz., passing through the counties of Graham, Pinal and Maricopa, with branch lines to Clifton and Globe.

—An American now doing business in China writes the *Manufacturer* that the Chinese buyer has no idea of a prospective drawing, and illustrations are quite unintelligible even to many of the cultured c ass. He wants to "look see" everything he purchases. He must have actual samples before he can grasp the idea. Therefore it is suggested that there should be established in China a permanent exhibition of American manufactures, with engine power to keep all machinery in motion at all times.

—A proposed California exhibit at the Omaha exposition contemplates a miniature Niagara Falls with wine substituted for water. Over the cataract will continually flow 100,000 gallons of California claret. The rocks and the bed below are to consist of glass blocks, which by means of electric light devices will bring out the ruby color of the wine, and the banks on each side will be decorated with citrus trees bearing lemons, oranges, etc., in growth overhanging grottoes in which visitors may rest and sample the wines and the fruits of California.

Commercial Paragraphs.

"MINE DEVELOPMENT THE BASIS OF PROSPERITY," a pamphlet published by Almarin B. Paul, M. E., 49 Crocker Building, this city, will be sent by him, free, to any subscriber of the PRESS on receipt of address.

H. C. TABRETT, of the Risdon Iron Works, has invented a salt-water evaporator to supply marine boilers with distilled water. The invention has been embodied in a boiler recently placed in the Hawaiian steamer Upolu, which will have a trial trip to the Farallones to-morrow.

THE Central Light and Power Co., recently incorporated in this city, proposes to compete with other companies for the business of furnishing electric light and power. Their plant and business office are in the Parrott Building, San Francisco. A. Brooke-Ridley is consulting engineer, S. L. Naphtaly general manager.

THE Colorado Iron Works Co. of Denver, Colo., closed a contract on the 16th inst. for a 10-stamp mill, erected, to go in near Baker City, Oregon; carload mining machinery to Plomo M. Co., Fort Garland, Colo.; carload hoisting machinery to Ameca, Mexico; large steel caisson to Penn'a S. Co., Sandy, Utah; carload water jackets for El Paso S. Works, El Paso, Texas; carload stamp milling machinery to Oaxaca, Mexico.

Personal.

EMIL SULTZ, SR., is putting up a 20-stamp mill at Sierra City, Cal.

GEO. F. BECKER of the U. S. Geological Survey is at Sutter Creek, Cal.

JNO. DAGGETT is examining his mining property in Siskiyou Co., Cal.

H. F. FULLEN is at Robinson, Nevada, to take charge of the Chainman mill.

H. J. RODMAN is the Phœnix, Arizona, agent of the St. Louis Gold Mining Co.

SUPT. MCCALL succeeds T. B. Dillon at the Monte Cristo mine, Volcano, Amador Co., Cal.

LIEUT. HERBERT DEAKYNE of the U. S. Debris Commission has returned from Butte Co.

ROBT. HEDLEY succeeds Paul Johnson as superintendent Hall Mines smelter, Nelson, B. C.

JOHN MUIR has gone on a botanizing expedition to the mouth of the Stickeen river, Alaska.

SAMUEL NEWHOUSE, managing director of the United States Exploration Co., is visiting Bingham, Utah.

PICACHO, CAL., people are interested in the fact that Col. D. K. Allen is enjoying himself in New York City.

PERCY H. MCMAHON has been appointed superintendent of the Wedge mine, Randsburg, Kern Co., Cal.

GEO. R. TUTTLE of San Francisco has been appointed superintendent of the Rockland mine, Grass Valley, Cal.

L. R. THOMAS will be Register and G. B. Rogers, of Blackfoot, Receiver of the U. S. Land Office at Blackfoot, Idaho.

ON the 17th ult., Chas. Butters was inaugurated president of the Chemical and Metallurgical Society of South Africa.

COL. E. G. HEFFRON, late manager Niagara mine, Bingham, Utah, has come to California to develop a gold property in Shasta Co.

TAYLOR D. MACLEOD of Yuma, Arizona, has sold his group of gold mines to Colorado people and will superintend the development of the property.

C. L. BRANDT of Cripple Creek, Colo., will have charge of the cyanide operations at the North Mountain Company's works, Egan canyon, Nevada.

M. J. HELLER has returned from a trip through Shasta county and has gone to Mariposa county to examine property for an English syndicate.

EX-GOV. MARKHAM has returned from a mining trip to old Mexico, and says that he found a better disposition to sell at reasonable prices than usually exists in California.

JAMES WILSON, Secretary of Agriculture, and C. F. Saylor, the department's special agent on the investigation of the sugar-beet industry, are en route to San Francisco.

D. A. MACDONALD, a MINING AND SCIENTIFIC correspondent, goes to the Klondike today on an $8000 contract to exploit mining ground for a party who have "staked" him.

OSCAR JONES, Forest City, Cal., formerly superintendent Mayflower mine near Forest Hill, now has charge of the North Fork, Bald Mountain Consolidated and Lucky Dog gravel mines and the Minnesota Development Company quartz mine, Sierra Co.

A. O. NEWTON is the new manager for the Butte and Yellowstone Coal and Coke Company, capitalized for $50,000, H. L. Frank of Butte as president. The company will erect twenty-one ovens, and by December it is expected coke will be burning and shipments made to Butte, Montana.

W. M. BAINBRIDGE has resigned the position of superintendent of the Elkton mine, Cripple Creek district, Colo., and expects to locate in Salt Lake City, Utah, September 1st. He will be succeeded at the Elkton by W. B. Wilson, recently identified with mining in the San Juan country.

WM. WESTON, mining engineer of Cripple Creek, leaves next week with the Baron G. de Bellescize to make an examination of gold properties in Poughkeepsie gulch, in the San Juan region, Colorado. On his return he will proceed to Victoria, B. C., on mining business and will probably be in London by the 1st of November.

Recent California Mining Incorporations.

Rappahannock G. M. Co., Oakland, Cal.; R. V. Whiting, S. C. Williams, A. F. Merriman, A. M. Benham; capital stock, $150,000; $6000 subscribed.

Cal. and N. W. T. and M. Co., San Francisco, Cal.; E. F. Gutschow, G. Gross, J. Bergez, H. Lacy and C. H. Newhaus; capital stock, $100,000; $500 subscribed.

Alaska M. and T. Co., San Francisco, Cal.; A. C. Stowe, R. L. Bernair, R. B. Crickton; capital stock, $1,000,000; $50 subscribed.

Greenhorn M. Co., San Francisco, Cal.; M. F. Reilly, D. McNee, M. Goldberg, M. W. McIntosh; capital stock, $300,000; all subscribed.

Alaska M. and T. Co., Alameda, Cal.; A. J. Samuel, C. E. Severance, T. B. Hussey, W. H. Cameron, J. M. Bartlett; capital stock, $100,000; $15,000 subscribed.

Association for Alaskan Exploration and Mining, San Francisco, Cal.; C. M. Oakley, D. G. Dexter, J. H. Ginder, M. S. Woodhams; capital stock, $250,000; $175 subscribed.

The Chloride Point, Utah.

It is believed that there is at present no exclusively silver mine in operation in the United States. There are several in which silver is a by-product.—*Mining and Scientific Press.*

We can cite the PRESS to at least one exception—the Chloride Point, which carries no lead or copper. It is true that small gold values are obtained, but the mine would be operated as usual were there none, as the ores run very high in silver and the vein is large and uniform.—Mercur, Utah, *Miner*, Aug. 20th.

Recently Declared Mining Dividends.

Mercur, Utah, $25,000, Aug. 19; total to date, $775,000.

Geyser-Marion, Utah, $9000, Aug. 21.

Mercur, Utah, $25,000, Aug. 20.

New York, Honduras and Rosario M. Co., 10c per share, $150,000, Aug. 25.

Homestake mine, South Dakota, 25c per share, $31,250, Aug. 25.

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Notice for Bids.

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J. B. POWNALL, Secretary.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from E. H. Adams, in the King Bird Mine, in Yuba Co., near Clipper Mills, to deposit tailings in Grizzly Creek; from J. T. Coffman and George T. Miller, in the Lost Camp Mine, near Blue Canyon, Placer Co., to deposit tailings in Blue Canyon, and from Mrs. E. A. Cox, in the Washington Mine, in Whisky Diggings, Sierra Co., to deposit tailings in Slate Creek, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on September 7, 1897, at 1:30 P. M.

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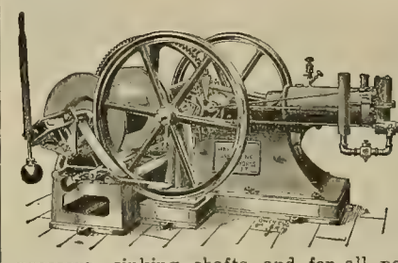

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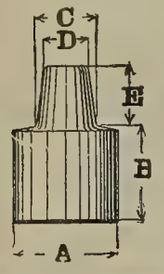

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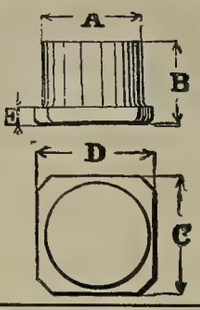

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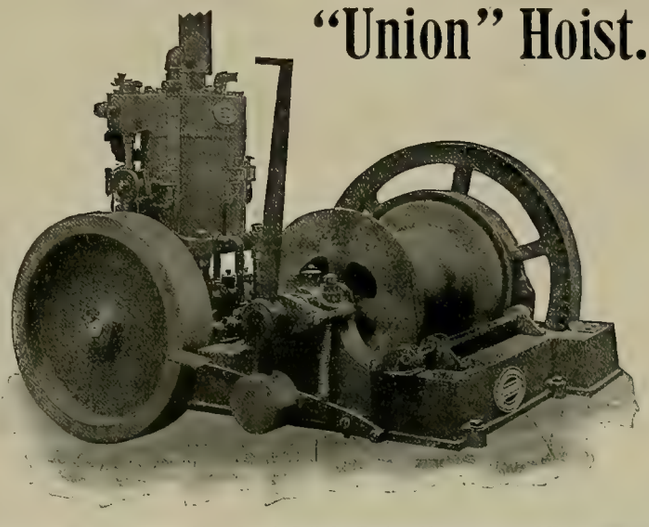

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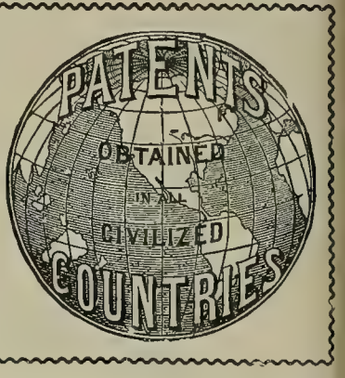

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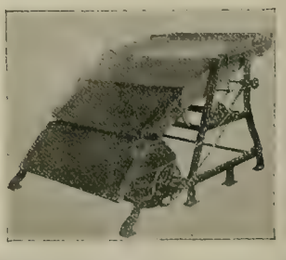

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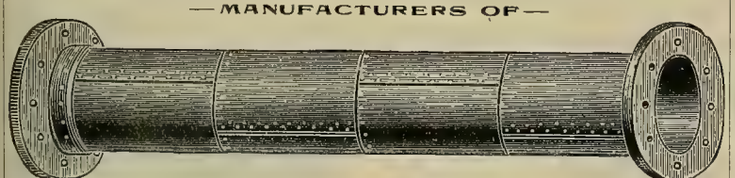

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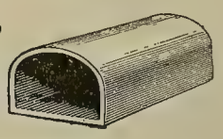

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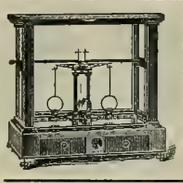
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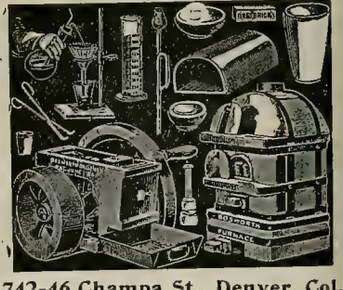
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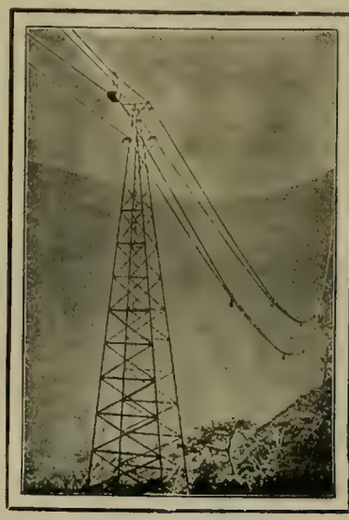

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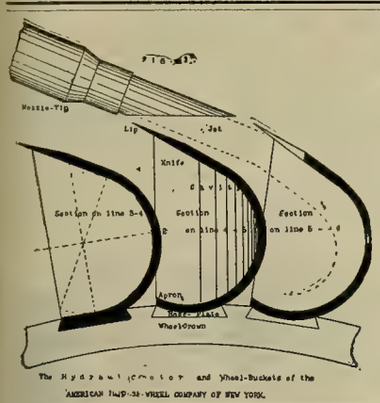

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING AUG. 17, '97.

588,381.—CARBURETER—Daniel Best, San Leandro, Cal.
588,261.—BRAKE WHEEL—G. S. Binckley, San Francisco.
588,215.—PULP HANDLING APPARATUS—L. J. Borie, San Francisco.
588,134.—CAR VENTILATOR—E. T. Earl, Oakland, Cal.
588,415.—GOVERNOR VALVE—G. E. Foster, Placerville, Cal.
588,231.—PRINTING PRESS—H. S. Merrill, Los Angeles, Cal.
588,171.—CATTLE GUARD—B. F. Parker, North Yakima, Wash.
588,540.—SHIP'S PORT VENTILATOR—D. R. Rose, San Francisco.
588,533.—REVERSING VALVE—D. W. Roy, Tucson, A. T.
588,300.—WATER HEATER—E. J. Verrue, San Francisco.
588,252.—CONCENTRATOR—L. M. Waer, Tucson, A. T.
27,549.—DESIGN, PRINTER'S JOB CASE—T. Nelson, Pendleton, Or.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong&Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

PULLEY LOCKING DEVICE.—Wm. H. Kirkman, Berkeley, Cal., assignor to H. E. Poehlman, same place. No. 587,976. Dated Aug. 10, 1897. This invention relates to a device whereby pulleys may be locked, so as to prevent the return of a cord or rope passing over the pulley, so that when the weight is being lifted, or in conjunction with curtains and other such attachments, a cord may be pulled up and immediately locked when released. The result is effected by the employment of a grooved pulley having spiral locking channels, a shaft slidable through the pulley and movable in bearings, a yoke connected with the shaft having an opening through which the cord or rope passes from the pulley, a spring whereby the yoke is normally moved to one side with the opening out of line with the pulley groove, said spring yielding to allow the rope to move, so that it is brought into line with the pulley groove whenever the power is applied. Whenever the cord is released the spring acts to throw the yoke to one side, bringing the cord into position to be locked against the enclosing frame.

SHIP'S PORT VENTILATOR.—D. R. Rose, San Francisco, Cal. No. 588,480. Dated Aug. 17, 1897. This invention relates to an attachment for vessels which is especially designed for ventilating purposes and to allow the ports to be opened for the admission of air while preventing the ingress of water during rainy or stormy weather. The ventilator consists of a tubular tortuous passage adapted to project upwardly within the apartment into which the port opens, having a tubular flange projecting therethrough and forming a tight joint with the port opening, and also having a supplemental removable tube with diagonally disposed diaphragms within it, the whole serving to admit air and to prevent the admission of water from the outside.

GOVERNOR VALVE.—George E. Foster, Placerville, Cal., assignor of one-half to Geo. W. Kimble of same place. No. 588,415. Dated Aug. 17, 1897. This invention relates to a balance valve which is especially designed as a hydraulic valve for governors and for use in pipes through which water is flowing. It consists of a cock or valve extending transversely across a water pipe or way and turnable in its chamber, this valve having a cut-away segment which, when standing in line with the water passage, allows the water to flow on the side, and, when standing transversely, substantially cuts it off. A retaining valve is formed within the valve chamber and stands parallel with the axis of the valve, and a casing having its inner wall separated from the outer wall provides a circumscribing space within which the valve is surrounded and partially balanced in both its open and closed positions.

CARBURETOR.—Daniel Best, San Leandro, Cal. No. 588,381. Dated Aug. 17, 1897. This invention relates to improvements in devices for producing an explosive gas or vapor from hydrocarbons. This invention consists of a series of superposed shallow pans, with pipes extending upwardly through openings in the pans and connecting with the engine cylinder to allow the hot products of combustion to pass up through them. The pans have upturned rims and flanges, and have the means for feeding the oil into the upper part of the apparatus so that it will gradually flow down from one pan to the other, the heat forming a vapor, and air is mixed with this vapor, being received into an annular exterior channel around the carburetor, carried up to the top where it is admitted into the interior and thence passes down and mingles with the oil vapor to produce the explosive gas. At the bottom of the apparatus is a fireplace by which independent heat may be applied to commence the vaporization and formation of gas until the engine is fairly started, after which the exhaust from the engine keeps up the operation.

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WILL BE HELD AT SACRAMENTO, . . .

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THE DAIRY DEPARTMENT will have a complete working exhibit showing the latest methods in dairying, and the working of improved appliances. Competent instructors from some of the leading creameries in the State will be in charge to give instructions to all in this growing industry.
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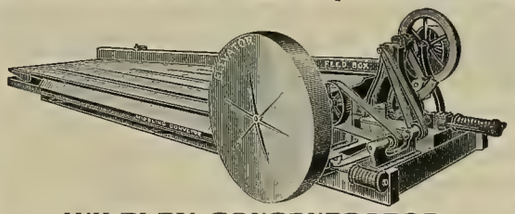

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Extract from letter of July 23d, 1897, from the Mine and Smelter Supply Co. of Denver, Colo., to Messrs. White, Rogers & Co., San Francisco, Cal.:

Mr. Reed, general manager Caroline Mining Co., Colorado, has 34 Woodburys. We have up to date sold him 8 Wilfleys, and we understand that he is to replace all of the Woodburys with Wilfleys.

We have just received a test run made between the Wilfleys and Woodburys at the Iowa Gold Mining and Milling Co., Silverton, Colorado, and give you the results:

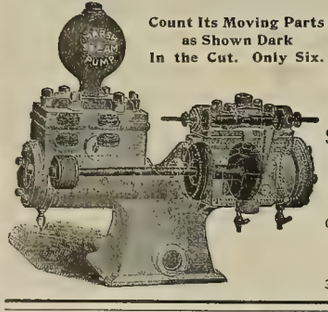
WOODBURYS—24 hours; 1 oz. gold; 8.5 ozs. silver; 6 per cent lead; 1½ per cent copper; 12 per cent zinc; 60 per cent silica.

WILFLEYS—24 hours; 3 ozs. gold; 25 ozs. silver; 19 per cent lead; 6½ per cent copper; 17 per cent zinc; 10 per cent silica.

The Wilfley Table made 750 pounds more of concentrates than machines handling same quantity of pulp on the other side of the mill.

They have just ordered three more of the Wilfleys, and expect to take out jigs and put in Wilfleys in place of fine jigs etc., etc., etc.

MARSH STEAM PUMP.



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It will do more and cleaner work than any rubber belt machine.
It weighs only one-half as much as some of the six-foot concentrators.
Is the most simple in its construction of any machine in the market, and only one-third as many pieces in it as in some of the others. Was invented by an old miner of forty years' experience handling every known concentrator on the market.
Should any piece need repairing, it can be removed without disturbing any other part of the machine.
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Its distributor is perfection itself, distributing the pulp evenly over the entire surface of the belt.
Grade of shaking frame can be changed while the machine is running at full speed.
It is the strongest, lightest running and most inexpensive to keep in repair of any
Will save more of the fine slimes than any other machine.
Is cheaper than any other six-foot machine, costing only $350.00 f. o. b. cars or boat, San Francisco.
Will handle the pulp from five stamps better than any other Concentrator.
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This machine requires so little attention that one man will easily attend to a dozen of them.
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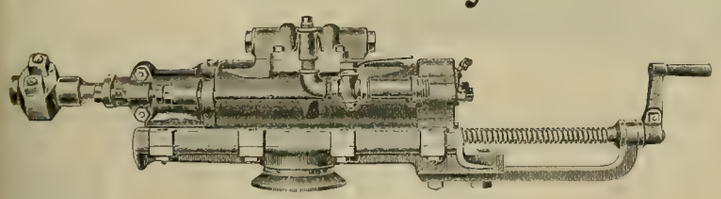

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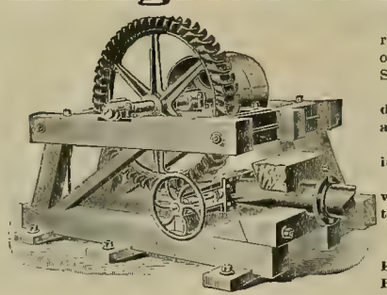

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Wheels inclosed in iron cases, from 6 to 24 inches.

Wheels for electrical power can be furnished **with or without Governors Highest regulation guaranteed.**

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Adapted to all Heads from

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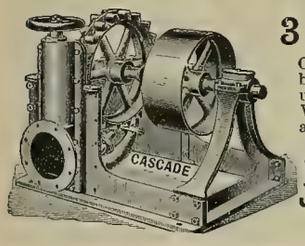

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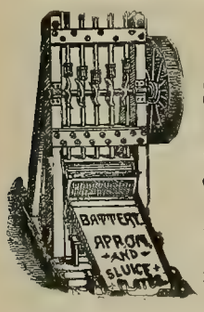

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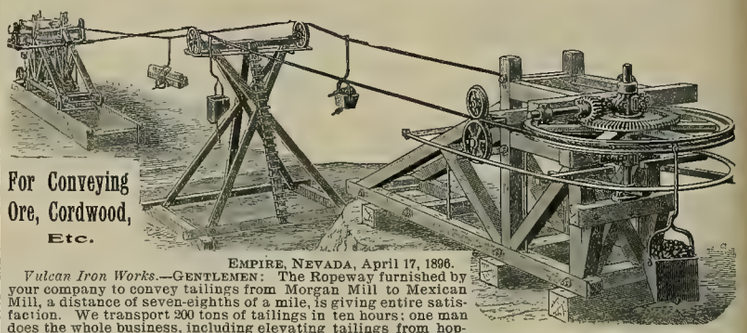
—WITH—

AUTOMATIC ORE LOADER AND AUTOMATIC DUMPING DEVICE.



For Conveying Ore, Cordwood, Etc.

EMPIRE, NEVADA, April 17, 1896.

Vulcan Iron Works.—GENTLEMEN: The Ropeway furnished by your company to convey tailings from Morgan Mill to Mexican Mill, a distance of seven-eighths of a mile, is giving entire satisfaction. We transport 200 tons of tailings in ten hours: one man does the whole business, including elevating tailings from hopper in the ground, operating Vulcan self-loader, and attending to the Ropeway generally. The self dumper requires no attention whatever. The Vulcan loader I consider the best feature in the whole Ropeway, making it possible for one man to load 200 tons in ten hours.

Yours very truly, J. P. WOODBURY, Supt.

VULCAN IRON WORKS,

MANUFACTURERS OF MINING MACHINERY,

Office, 505 Mission Street, San Francisco, Cal.

IF YOU HAVE A SMELTER--YOU WANT IT.
IF YOU HAVE A COPPER MINE--YOU NEED IT.
IF YOU HAVE A CYANIDE PLANT--YOU OUGHT TO HAVE IT.
IF YOU OWN CHLORINATION WORKS--YOU SHOULD BUY IT.
IF YOU ARE INTERESTED IN A MINE OR MILL--YOU CAN'T DO WITHOUT IT.

What? P. & B. Paint.

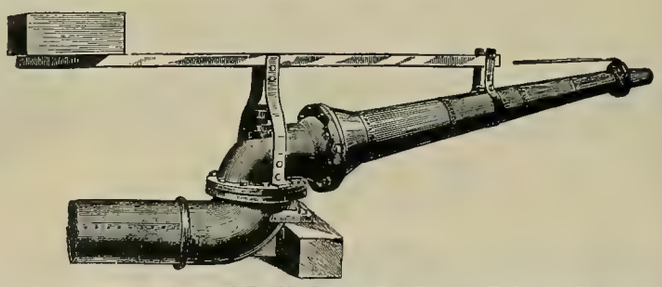
IT IS ABSOLUTELY ACID PROOF---TRIED AND PROVEN.

Manufactured by

PARAFFINE PAINT CO., San Francisco. Los Angeles.

You Can Order It From Your Dealer.

Double-Jointed Ball-Bearing Hydraulic Giants.



The above presents an improved **Double-Jointed Ball-Bearing Hydraulic Giant** which we build. The improvement consists of the introduction of a **Ball Bearing** by which the pressure of the water is reduced to a minimum and the direction of the nozzle changed at will with ease.

Catalogues and prices of our specialties of HYDRAULIC MINING MACHINERY furnished upon application. **JOSHUA HENDY MACHINE WORKS, 38 to 44 Fremont St., San Francisco, Cal.**

ADAMANTINE SHOES AND DIES

—AND—

CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for illustrated Circular.

Manufactured by CHROME STEEL WORKS, Brooklyn, N. Y.

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Stamp Cam.

H. D. MORRIS & CO., DEALERS IN MINING MACHINERY AND SUPPLIES.

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MANHATTAN RUBBER BELTING, PACKING AND HOSE,
SANDERSON DRILL STEEL,
MORRIS CENTRIFUGAL PUMPS,
LIGHT STEEL RAIL.

CONSOLIDATED

Kansas City Smelting and Refining Co.

Incorporated Under The Laws of New York.

Capital paid in..... $2,700,000.

Buyers of All Classes of

GOLD, SILVER, LEAD AND COPPER ORES,

Bullion, Mattes and Furnace Products,

GOLD BARS, SILVER BARS and MILL PRODUCTS.

SMELTING WORKS:
Argentine Kas.; El Paso, Tex.; Leadville, Colo.

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We use the following Cipher Codes at our Argentine Works: A. B. C. Code; Moreing & Neal's Code and Bedford McNeill's Code.

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Cripple Creek, Colo.
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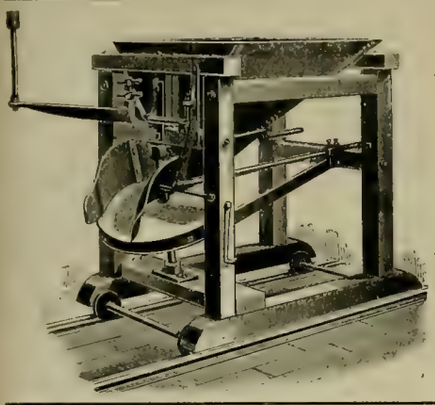
WORKS OF THE CON. KANSAS CITY SMELTING AND REFINING CO. AT LEADVILLE, COLO.



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POSITIVE FEED. MINIMUM POWER.

Bolthoff Improved Challenge Automatic Ore Feeder.

The only revolving disc feeder, made without gears or clutches. Feeds wet or dry ore; slow or fast. Is operated by a Friction Band. We have other valuable stamp mill improvements.

WHEN WRITING FOR CIRCULARS AND PRICES MENTION THIS PAPER.

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The COLORADO IRON WORKS CO., Denver, Colo.,

ENGINEERS AND MANUFACTURERS,

Beg to draw your attention to the introduction of the . . .

FINLAYSON PATENT WIRE ROPE TRAMWAY.

It is of the double rope pattern and the newest and best thing in its line ever placed on the market. The automatic features, simplicity of construction, ease of running and economy in operation places the

Finlayson Tramway

far ahead of all other systems of aerial ropeways. It is unsurpassed in tonnage capacity. It is on the principle of "You push the button and the machine does the rest." If interested send for special catalogue.

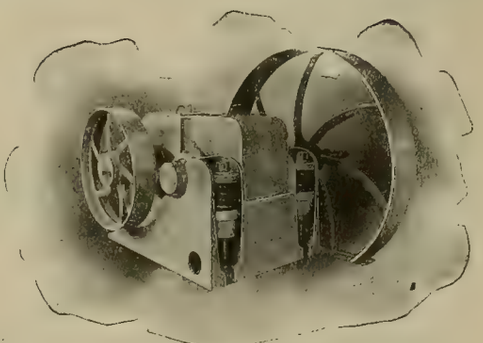
Our Line of Manufactures includes all kinds of Modern Equipments for the Successful Milling and Smelting of Metalliferous Ores. Special Catalogues on Application.

Denver Crushing Rolls!

Constructed Upon New Principle!

SIMPLE! COMPACT! STRONG!

Few Parts. Easily Accessible.
High Speed. Maximum Capacity.



SEND FOR SPECIAL CATALOGUE. ✦ Mention This Paper.

MODERN SMELTING, MINING AND MILLING MACHINERY.

Denver Engineering Works Co., Denver, Colorado, U. S. A.

Market Reports.

The Markets.

SAN FRANCISCO, Aug. 26, 1897.

General trade continues to steadily increase in volume, with about every line of goods appreciating in value. High prices ruling for all kinds of farm products, with wheat in control of a big bull clique at the East and abroad, are doing no little in promoting a strong, healthy feeling in trade circles, as is also continued activity in gold mining on this coast. We dare venture the assertion that not in the history of this country have farmers been placed in position to cancel mortgages on farms, or, where they do not exist, to put so much money in the bank as this season, all due to advancing prices coming on at the commencement of a new season and before producers had marketed their products. It is an axiom of trade that the prosperity of this country is gauged by the farmer's income, which, if correct, ought to insure us very prosperous times for fully one year to come. Manufacturers, particularly ironworkers, speak quite hopefully of the future and express confidence that their business will show a very large increase the coming year.

The local money market continues to work on easy lines notwithstanding there is quite demand for crop moving purposes. There has been heavy warehousing of grain, particularly wheat, by speculators, shippers and farmer, on which advances have been made. As this goes out on export and home demand more takes its place. The money so placed soon finds itself into general circulation which relieves any symptoms of friction. It is confidently expressed that between now and the close of the year there will go into circulation in this State alone for farm products and from manufacturing and mining industries over $40,000,000. This large sum added to that already in general circulation will cause a more congested money market. The East reports active money markets at all trade centers particularly where speculation centers. The rates of interest do not show much appreciation so large is supply, but with grain, cotton and tobacco crops moving freely to market the demand for fruits ought to be very heavy. A leading New York authority writes: "Developments in the London market have of course revolutionized the European exchanges in the last week, as far as countries on a gold basis are concerned. It is worth noting that for the first time probably on record the Bank of Russia itself holds more than enough cash to pay off all its outstanding notes. At Rome the tendency of exchange is upward, although it is naturally not much affected by the advance in London discount. The same is true of Lisbon and Paris. The Indian exchanges have been wonderfully firm, and arbitrage in silver has been difficult to work, owing to an absolute panic in the bazaars which are quite disorganized and unable to quote prices with any certainty. The same is largely true as regards Shanghai where exchange is quite demoralized but tends all the time to keep below the silver point. A movement of the old Japanese yens is to be noted from China's circulation to Japan. There is, of course, large profit in returning this coin."

New York Silver Prices.

NEW YORK, August 26.—Following are the closing prices for the week:

	Silver in— London.	N. Y.
Friday	24⅛	52¾
Saturday	24	51⅞
Monday	24⅛	52
Tuesday	23⅞	51¾
Wednesday	23¾	51¾
Thursday	23¾	51½

	Copper.	Lead.	Iron.	Tin.
Fri.	11 10 @11 25	3 90	9 50@12 25	13 90
Sat.	11 10 @11 25	3 95	9 50@12 25	13 80
Mon.	11 10 @11 25	3 95	9 50@12 25	13 80
Tue.	11 10 @11 25	4 00	9 50@12 25	13 75
Wed.	11 10 @11 25	4 00	9 50@12 25	13 70
Thur.	11 10 @11 25	4 00	9 50@12 25	13 65

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, glit edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	2½@5c Prem
New York Telegraphic Transfer	5@7½c Prem
London Bankers' 60 days	$4.84
London Merchants	$4.83
London Sight Bankers	$4.86
Refined Silver, per oz. 1000 fine	51½
Mexican Dollars, nominal at	42

SILVER.—The market has fluctuated to lower figures, with a steadier feeling at the close. The shipments from Atlantic seaports continue free considering how low the white metal is. There seems to be an entire absence of any special demand either speculative or legitimate. If present good crop prospects in Argentina or India are realized in a large wheat crop, there will be a better demand for silver, particularly from India. The world's production of silver will show quite a falling off this year in comparison with last year. The very low price of silver is making itself severely felt with the copper mines that have a considerable output of the white metal. The last steamer for China took out $124,788 in silver bullion for Bombay.

MEXICAN DOLLARS.—The market is demoralized. Dealers hardly know what to pay, owing to the rapid declines the past two months. We doubt if over 40 cents would be paid for a round lot of new. The steamer for China took out 741,102 dollars. This is the heaviest aggregate shipment by any former steamer this year.

QUICKSILVER.—The market is slow, but fairly steady.

Our market is quoted at $38 for domestic consumption.

COPPER.—The market has held strong throughout the week. Our New York advices indicate still firmer prices, if the European and American consumption continues to enlarge. The very low prices ruling for silver may curtail the production of copper by some of the mines where the latter is an important factor.

Our market is quoted as follows:

Ingot casting, jobbing	13@—
Ingot " wholesale	12½@—
Sheet copper	—@16½
Bolt	¾ and 5-16, 20c; ⅜ and larger, 16½

TIN.—The market is easy, but not quotably lower. The demand is slower for pig.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

LEAD.—The market holds strong at a slight advance. The consumption at the East is enlarging, while the new tariff affects imports.

Our market is quoted in jobbing lots as follows per pound:

Pig	—	@	4 80
Bar	5 00	@	5 25
Sheet	—	@	6 25
Pipe	5 25	@	5 50

SHOT.—The market is firm.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs			$1 35
Drop, B and larger sizes,	"	"	1 60
Buck, Balls and Chilled, do,	"	"	1 60

POWDER.—The market is steady.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¾c, according to strength and quantity; No. 2, from 9c to 11c, according to strength and quantity.

COAL.—The market is practically unchanged. The demand for both steam and household is improving. For Australian, higher prices are asked for shipment.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$8 00	@	—
Greta	6 00	@	6 50
Nanaimo	6 50	@	7 00
Cuman	5 50	@	6 00
Seattle	5 50	@	6 00
Coos Bay	—	@	4 75
Cannel	8 00	@	—
Egg, hard	12 00	@	13 00
Wallsend	6 50	@	—

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	—
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	—	—	—
English, to load	9 50	@	—
" spot, in bulk	10 00	@	—
" in sacks	11 00	@	12 00
Cumberland	—	@	—

IRON.—The market has a better tone in sympathy with the East, where the markets appear to be hardening under a very active demand.

	AMERICAN. To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50
	ENGLISH.	
Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

ANTIMONY.—The market is steady.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 7¾c for Cookson's, 7¼c for Hallett's and 7c for Japanese.

NAILS.—The market is steady with sales at quotations only made in small quantities.

Wire, carloads, basis per keg	
" jobbing, " "	$2 10
Cut, carloads, " "	
" jobbing, " "	2 00

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4½

PLATINUM.—The market is quiet.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is steady.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

Chemicals.

There is absolutely nothing new to report. The liberal stocks of all kinds in jobbers' hands are against any advance in prices to meet the increased duties. It is said that round parcels can be obtained abroad at a sufficient reduction to meet the higher duties. Our New York advices state that blue vitriol and copperas show an advancing tendency. Outside of these the market is easy, with second hands offering to sell below importers' or agents' figures.

SULPHURIC ACID.—The demand is fair We quote in a jobbing way at 1½c per lb for 66%.

ACETIC ACID.—The market is firm at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported steady from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is firm.

We quote in a jobbing way at 4½c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is firm.

Our market is quoted in a jobbing way at $1.50 a pound.

BONEASH.—The demand is good.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2¼c.

PHOSPHORUS.—The market is firm.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firm at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is firm at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—There is a fair demand at 2¼c a pound from stores.

NITRATE OF SODA.—Market is stronger.

Our market is quoted from store at 4c for 95%.

Mining Share Market.

SAN FRANCISCO, August 26, 1897.

The market ruled heavy, with the exception of Occidental, owing to light outside trading due to lively fluctuations in wheat causing more attention to be devoted to it. It is common report that many holders have sold so as to go into wheat. The strength in Occidental the past week is on reports of an improvement on the 550-foot level, with chances in favor of its resulting into something good. The chances, it is said, are also good on the 650-foot level. The impression prevails that shares of mines on the Brunswick lode will show more activity and probably be the next gamble. If reports are correct regarding the work, it looks as if such is in contemplation. It is stated that fewer men are at work in Con. Virginia on the Comstock and more men put to work on the Brunswick in the joint Gould & Curry, Best & Belcher and Con. Virginia workings. Exploiting work is being done on the upper levels of Chollar, particularly on the 200-foot level. This work ought to attract more attention to the Brunswick unless a good-sized body of ore should be uncovered on the Comstock lode. On this latter lode fairly active work is being done in several of the mines, while in the other either no work is being done or else it is prosecuted in a half-hearted way. What will follow John W. Mackay's return to the coast is conjecture, but his several visits the past ten years did not result in anything good to shareholders, who bank on his coming as the open sesame for a good-sized up-move. If nothing intervenes, Mr. Mackay is expected here the latter part of next week. As he has large business interests on this coast his presence ought not to count for anything in the share market unless it should be determined to show up a big body of ore and it is hardly likely this will be done with silver selling so low. The feature of trading the past two or three weeks has been the drawing up of the cats and after they have been advanced they do not go off to the low figures ruling before strengthening. From the Bodie district there is nothing to report regarding work, the mills or output of ore.

Our advices from the Comstock mines are practically unchanged. The work under way in several will result in ore strikes, mostly gold bearing, unless it is stopped, as it has been heretofore, just in time not to make a strike. They are still drifting north in Utah from the main west crossdrift. It has been extended over 200 feet. In Sierra Nevada they are still sinking below the Layton tunnel level. They are driving the north lateral drift slowly ahead. Nothing of interest is reported in the material passed through. Work is continued on the south drift from the upraise above the 900-foot level. In Mexican they are crossdrifting east on the 1000-foot level. As yet they have not found anything of value; but, as they did not expect to, they are not disappointed. In Ophir they are making slow progress in west crossdrift No. 3, 1000-foot level. They are in about 340 feet. They are still going south on the old Central tunnel level, started about 132 feet from the mouth of the west crossdrift ran from the sill floor. In Con. Virginia work is suspended on the 1000-foot level through the old Con. Virginia shaft. It is stated that the possibilities of this level were not exhausted, by any means. Active work is being done on the 1550-foot and 1650-foot levels in the same directions reported last week. Only low-grade ore has been found, or, at least, so far as made public. They are experimenting on low-grade ore; eighty-seven tons milled $13.11 per ton, but we are not advised what proportion, if any, was silver. Best & Belcher and Gould & Curry are still driving ahead to the east from the 800-foot Bonner shaft. There is no change in the Savage work. No work is being done in either Hale & Norcross or Chollar. They are still exploiting on the 100-foot level of Potosi. Only porphyry and low grade ore are reported officially. In Alpha they are taking out ore which goes largely silver, or, at least, the official letter says so. In an upraise from the 500-foot level it was found that the ore was less lower grade. When desired, it is stated, they can find high-grade, gold-bearing ore. From the joint west crossdrift of Con. Imperial, Confidence and Challenge no news of importance has come to hand, neither has there from the work in Confidence. In Crown Point, Belcher, Seg. Belcher and Overman nothing new has been received. The work is in the same directions reported last week.

From the Brunswick lode official advices report that the joint work by Con. Virginia, Best & Belcher and Gould & Curry is confined largely to exploiting work on the 300-foot and

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Alpha Con M & M Co, Nev.	..19	..10c	..July 8.	..Aug 12.	..Sept 2. ..C E Elliott, 309 Montgomery
Altoona Q M Co, Cal.	..1	..75c	..Aug 3.	..Sept 6	..Oct 11. ..C Allenberg, 206 Sansome
Bullion Con G M Co, Cal.	..11	..22c	..June 22.	..Aug 2.	..Aug 23. ..C A Grow, Mills Bldg
Con Cal & Va M Co, Nev.	..9	..25c	..Aug 3.	..Sept 8.	..Sept 29. ..A W Havens, 309 Montgomery
Crown Point G & S Co, Nev.	..71	..10c	..July 27.	..Aug 31.	..Sept 21. ..Jas Newlands, Mills Building
Eureka Con D M Co, Cal.	..9	..2c	..June 30.	..Aug 7.	..Aug 28. ..D M Keat, 330 Pine
Gold Ridge Con M & M Co, Cal.	..5	..4c	..Aug 3.	..Sept 18.	..Oct 9. ..H Sylvester, 43 Sixth
Hale & Norcross S M Co, Nev.	112.	..10c	..Aug 18.	..Sept 22.	..Oct 13. ..R U Collins, 331 Pine
Horseshoe M Co, Cal.	..3	..40c	..July 12	..Aug 23.	..Sept 20. ..C E Green, 532 Market
Inyo Marble Co, Cal.	..30	..10c	..July 27.	..Aug 28.	..Sept 20 ..M A Cahn, 323 Phelan Bldg, S F
Marguerite G M & M Co, Cal.	..7	..10c	..July 28.	..Sept 10.	..Oct 11. ..F Mettman, 237 Twelfth
Mexican G & S M Co, Nev.	..57	..20c	..July 28.	..Sept 1.	..Sept 23. ..C E Elliot, 309 Montgomery
North San Juan G M Co, Cal.	3.	..7c	..July 16.	..Sept 8.	..Oct 4. ..H W Morris, 141 First St
Occidental Con M Co, Nev.	..28.	..10c	..Aug 3.	..Sept 7.	..Sept 30. ..A K Durbrow, 309 Montgomery
Osborn Hill G M & M Co, Cal.	6.	..35c	..Aug 4.	..Sept 6.	..Sept 27. ..R R Grayson, 331 Pine
Red Cap M Co, Cal.	..1	..$9	..Aug 25	..Oct 1.	..Oct 23. ..E deK Townsend, 125 Beale
Rose Creek M Co, Cal.	..1	..15c	..June 28.	..July 28.	..Aug 30. ..J M Wilmans, Crocker Bldg
Sierra Nevada S M Co, Nev.	113.	..20c	..Aug 18.	..Sept 22	..Oct 12. ..E L Parker, 309 Montgomery
Thorpe M Co, Cal.	..7	..2½c.	..June 9	..Aug 14.	..Sept 4 ..A F Frey, Phelan Building
Utah Con M Co, Nev.	..25	..5c	..July 6.	..Aug 9.	..Aug 30. ..A W Havens, 309 Montgomery

WE are exclusive handlers of Automatic Acetylene Gas Generators for Northern and Central California. We are desirous of establishing responsible agencies for our territory. Correspondence solicited. WESTERN ACETYLENE GAS CO., Room 75, 916 Market Street, San Francisco.

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DO ALL OUR OWN EXPERT AND CHEMICAL WORK.

THOMAS J. FRY, President. JOHN SYLVANUS, Sec'y & Treas.
T. R. MILLER, Vice-Pres't. JOHN D. FLEMING, Counsel.

CAPITAL STOCK, $100,000.

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Mining Investment Company,
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DENVER, COLO.
Branch Office, - COLORADO SPRINGS.

Gold and Copper Properties Wanted. We have prospective purchasers for developed and producing mines and desire to correspond direct with owners of such properties. We handle properties on legitimate commission only and prefer to deal with owner or authorized representatives.

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Weekly Market Letter on Application.
Quotations by Wire or Mail.
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SALT LAKE CITY, UTAH.

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600-foot levels. In Chollar the shaft is down to the 700-foot level. This level will probably be opened up. Exploiting work is continued on the 400-foot, 500-foot and 600-foot levels without any material change reported on either of the levels. There is a falling off in the number of tons of ore raised—last week there were only sixty-four carloads. The grade is also lower, the assays were only $11.83 gold and 13.96 ounces silver to the ton. Active exploiting and developing work is being done in Occidental on the 550-foot and 650-foot levels, with an improvement reported on both.

The following illustrates the changes of the week:

MINES.	Aug. 19.	Aug. 26.
Alpha	$ 14	$ 15
Alta Consolidated	..	12
Andes	..	..
Belcher	31	35
Best & Belcher	69	69
Bodie	..	..
Bullion	..	06
Challenge	32	..
Chollar	71	72
Confidence	87	..
Consolidated California and Virginia	..	..
Consolidated New York	..	04
Crown Point	18	22
Exchequer	..	..
Gould & Curry	..	45
Hale & Norcross	95	..
Justice	..	..
Mexican	23	23
Ophir	60	..
Overman	08	..
Potosi	33	33
Savage	28	29
Sierra Nevada	65	64
Union	43	..
Utah	19	14
Yellow Jacket	32	36

San Francisco Stock Board Sales.

SAN FRANCISCO, August 26, 1897.

9:30 A. M. SESSION.

1200	Alta	07	150	Gould & Curry	45
100	Belcher	34	100	Mexican	21
500	Best & Belcher	69	1100	Occidental	65
500	Chollar	69	300	Potosi	33
450	Con New York	03	250	Sierra Nevada	61
350	Crown Point	20	500	Utah	14

SECOND SESSION—2:30 P. M.

100	Mexican	23	100	Utah	14
300	Savage	29	1500	Bullion	06
50	Chollar	72	100	Seg Belcher	08
250	Crown Point	22	600	Alta	12
200	Yellow Jacket	36	100	Julia	05
900	Con Imperial	02	1300	Occidental	63
1200	Kentuck	03	1000	Con New York	04
50	Belcher	35	100	Alpha	15
100	Sierra Nevada	64			

Rainfall and Temperature.

The following data for the week ending 5 A. M., Aug. 25, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

CALIFORNIA STATIONS.	Total Rainfall for the Week.	Total Seasonal Rainfall to Date.	Total Seasonal Rainfall Last Year to Same Date.	Average Seasonal Rainfall to Date.	Minimum Temperature for the Week.	Maximum Temperature for the Week.
Eureka	00	.05	.06	.27	62	48
Red Bluff	00	00	T	.07	108	70
Sacramento	.01	.01	T	T	103	60
San Francisco	00	T	.07	.03	70	52
Fresno	00	00	00	.02	108	72
San Luis Obispo	00	00	00	....	90	52
Los Angeles	00	00	.03	.04	96	64
San Diego	00	.01	.13	.07	90	66
Yuma	.04	.12	.59	.44	110	78

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Table of Contents—Perface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of cupellation; Weighing of Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests of Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

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Assessment Notices.

MARGUERITE GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of July, 1897, an assessment (No. 7), of 10 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, 257 12th street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of September, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 11th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

F. METTMANN, Secretary.

Office—257 12th street, San Francisco, California. The Secretary will also receive payments from 12 to 5 P. M. at his business office, 225 Sansome street.

INYO MARBLE COMPANY.—Location of principal place of business, San Francisco, California; location of works, Inyo, Inyo County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of July, 1897, an assessment (No. 30) of 16 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 323 Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 28th day of August, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 20th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

M. A. CAHN, Secretary.

Office—Room 323 Phelan building, San Francisco, California.

OSBORN HILL GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Grass Valley, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 4th day of August, 1897, an assessment (No. 6) of 35 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, room 11, No. 331 Pine street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of September, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 27th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

R. R. GRAYSON, Secretary.

Office—Room 11, No. 331 Pine street, San Francisco, California.

CONSOLIDATED CALIFORNIA AND VIRGINIA Mining Company.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 3d day of August, 1897, an assessment (No. 9) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to to Secretary, at the office of the company, room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of September, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 29th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office—Room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 3d day of August, 1897, an assessment (No. 28) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 68, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of September, 1897, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 30th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 68, Nevada block, No. 309 Montgomery street, San Francisco, California.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 3rd day of August, 1897, an assessment (No. 5) of 4 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of September, 1897, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 9th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 25th day of August, 1897, an assessment (No. 1) of Nine Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, No. 125 Beale street, City and County of San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of October, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 23d day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

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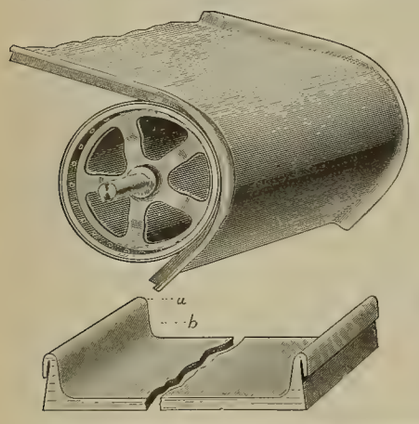

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GRASS VALLEY, NEVADA CO., CAL., Feb. 20, 1897.

JAS. S. BROWNELL, ESQ., San Francisco, Cal.—DEAR SIR: The Brownell Patent Lip flange belt for ore concentrators, which I bought of you nearly two years ago, has been in constant use and is in good order and gives us perfect satisfaction. We have several other kinds of belts in the mill, and your belt and flange I consider the best of all. Yours respectfully, ROBT. WALKER, Superintendent.

ROANOKE MINING COMPANY,
MOKELUMNE HILL, March 4, 1897.

MR. JAS. S. BROWNELL, 132 Market St., San Francisco, Cal.—DEAR SIR: We have in our 20-stamp mill at this place five Frue vanners; three of these are equipped with the Patent Lip flange belt and two with the plain flange belt. We certainly consider the former a great improvement on the latter. They will certainly wear much longer, as cracking now seems out of the question. Any one purchasing the Frue vanning machine should see that it is equipped with the Patent Lip flange belt. Very truly yours, ROANOKE MINING COMPANY.
Per G. M. WILDE, Acting Superintendent.

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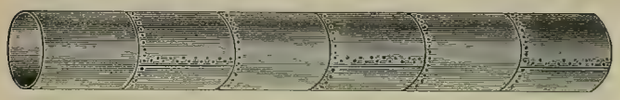

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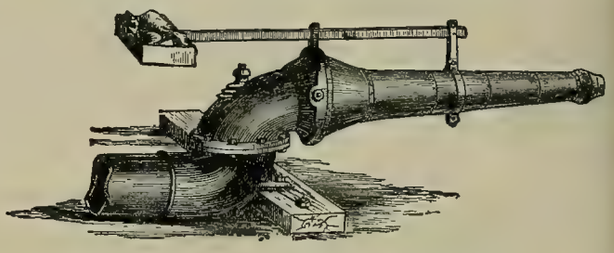

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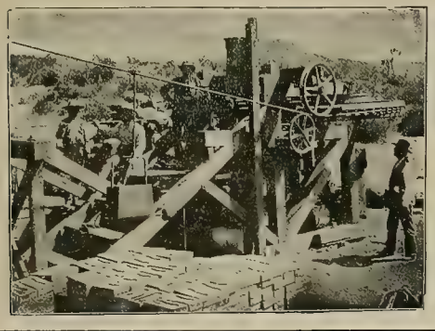

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Extracts from Letters Received from Mr. Philip Argall, Manager the Metallic Extraction Co., Cyanide, Colorado:

January 2, 1897.

"The roasting is inv... good. We can do 80 tons per day to 0.13% sulphur, when everything runs smooth. Our month re... which, of course, includes all delays, is 1700 tons, from 1.94% sulphur to 0.16%."

February 19, 1897.

"Our furnace is now running very nicely indeed, averaging 90 tons per day to 0.10% sulphur, and doing excellent work; in fact, it has improved right along and we are highly pleased with it.
"For 24 hours ending 7 A. M. to-day 102 tons were roasted."

The ROPP FURNACE is now in successful operation at the following reduction works: The Hanauer Smelting Works, Salt Lake City, Utah (one furnace); The Metallic Extraction Co., Cyanide, Colo. (one furnace); The Colorado-Philadelphia Reduction Co., Colorado City, Colo. (three furnaces); The Selby Smelting & Lead Co., Selby, Cal; (one furnace); The Mount Morgan Gold Mining Co., Rockhampton, Queensland (one furnace); and Broken Hill Proprietary Co., Broken Hill, New South Wales (two furnaces).

Catalogue on Application.

MINING AND SCIENTIFIC PRESS.
AND PACIFIC ELECTRICAL REVIEW.

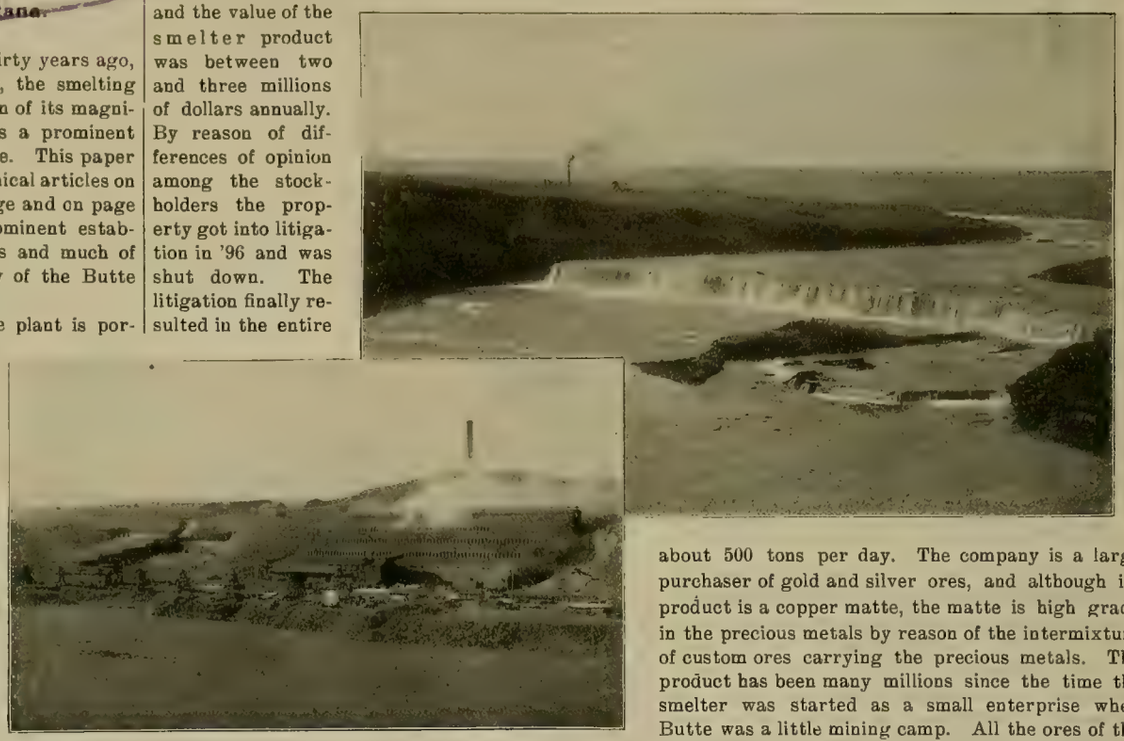
No. 1939.—VOLUME LXXV. Number 10. SAN FRANCISCO, SATURDAY, SEPTEMBER 4, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Smelters of Butte, Montana.

Beginning in a small, crude way thirty years ago, with a windmill fan for a blast-blower, the smelting industry of Butte, Montana, by reason of its magnitude and annual output, now occupies a prominent place, handling daily 7000 tons of ore. This paper has repeatedly published expert technical articles on the mode of operation and on this page and on page 216 gives some views of the more prominent establishments, being indebted for the cuts and much of the descriptive matter to the courtesy of the Butte *Bystander*.

The Boston and Montana Co., whose plant is portrayed on this page, is the second greatest concern of the kind in Montana. Its principal mine is the Mountain View. The concern has paid about $4,000,000 in dividends in the ten years of its operation; it annually produces about $5,000,000 in copper, carrying some silver, and owns the $2,000,000 smelting plant as shown at Great Falls. Capt. Thos. Couch, who projected the first operations of the Merced Mining Co., at Coulterville, Mariposa Co., this State, was the original factor in organizing this big Montana company.

The Butte and Boston smelter is also shown on this page. In 1888 the Butte and Boston Mining Company organized to work mining properties in Butte purchased from A. J. Davis. The number of claims bought was thirty-three and the price paid was about $1,250,000. In the purchase was included a fifty-stamp silver mill, some of the properties being silver mines, and to work the ore product of the copper mines a smelter was built having a daily capacity of 500 or 600 tons. C. H. Palmer became manager; for several years the mines were very productive and the value of the smelter product was between two and three millions of dollars annually. By reason of differences of opinion among the stockholders the property got into litigation in '96 and was shut down. The litigation finally resulted in the entire property being sold at receiver's sale, the price at which it was bid in being in the neighborhood of $3,000,000. The company's mines have an abundance of pay ore, among the richest in the Butte district.



THE BOSTON AND MONTANA CO.—WORKS AT GREAT FALLS.

On page 216 is shown the Colorado smelter and concentrator. The Colorado smelter was the first to treat Butte ores successfully by smelting, twenty years ago; the capacity of the works at that time was twenty-five tons daily. Now the capacity is about 500 tons per day. The company is a large purchaser of gold and silver ores, and although its product is a copper matte, the matte is high grade in the precious metals by reason of the intermixture of custom ores carrying the precious metals. The product has been many millions since the time the smelter was started as a small enterprise when Butte was a little mining camp. All the ores of the Gagnon were till recently transferred from mine to smelter on wagons. The Butte Street Railway Company laid a track from the mine to the smelter, equipping the new line with electric ore trains, and now the ore is transported by rail to its objective point. On the same page is a cut of the Montana Ore Purchasing Company's Works at Meaderville. F. A. Heinze is the originator, promoter and manager of this company. The first plant treated 100 tons of ore per day. That was in 1893. Since then the plant has been increased in size; its present capacity is 500 tons per day and its production between two and three million dollars annually.

THE BUTTE AND BOSTON SMELTER.

The Butte Reduction Works has been in operation for ten years. It was originally the property of a stock company, but in 1890 was bought by W. A. Clark for $300,000, who since then has owned and operated it. Until '96 its capacity was 150 tons per day; improvements now give it a daily capacity of 500 tons. Its chief ore supply comes from the Colusa Parrot and the Original mines.

The Parrot smelter, shown on page 216, has been in operation about fifteen years. It has a capacity of 500 tons per day and was the second smelter built in Butte (the Colorado being first) and was the pioneer in the resmelting of copper matte in converters, which reduces it to a practically pure copper. The company is building a new and larger smelter near Whitehall in Jefferson county, with a daily capacity of 1000 tons of ore, the second largest in the Northwest. The ore is carried from the Butte mines to the smelter by the Northern Pacific railroad.

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J. F. HALLORAN.....General Manager

TO THE PUBLIC.

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San Francisco, September 4, 1897.

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River Improvement, Etc.

It is a matter of ancient history that the California Legislature some years ago appropriated $250,000 contingent upon a like amount to be appropriated by the national Congress. It is fast becoming a matter of equally ancient chronology that such amount was so appropriated. A $300,000 appropriation for a dredger also graces the State statute books. It took about six years of steady effort on the part of this paper, assisted by other deserving journals, to get these appropriations. It also took a concert of effort on the part of mountain and valley residents, and a vast amount of mutual deliberation and concession. It was with no small degree of satisfaction that the successful result of all this work was announced; such satisfaction is regretfully absent from this present statement, because of the fact that, beyond the payment of sundry clerical salaries and the voluminous reports, there is so far no active movement.

Meanwhile the seasons come and go, another winter is at hand, and nobody is growing younger. It was believed at the time the securing of the money was the order of the day that the matter was not generally viewed as a heritage to posterity, nor is that view popularly held now.

We have a National River Board and a Board of Public Works, Commissioners, Auditing Boards, Engineers, Secretaries, Chairmen, etc., aggregating considerable combined talent. The office work is admirable, the reports are models of topographical skill, the correspondence and discussion afford interesting reading to those who like that sort of thing, but some objective evidence of progress is earnestly desired. The State has already spent a great deal of money in preliminary work, including surveys, and it was supposed that as soon as the appropriation was secured that the era of talk and getting ready was past, and that actual work could begin. In this regard it is understood that executive objection to rendering the money immediately available had been overcome.

Judging from recent reports published in the Sacramento papers it seems that the dredger idea is now considered secondary to a jetty scheme which becomes the main proposition. Judging from other published comment it seems to be the prevailing idea in some quarters that the State authorities have charge of the whole work of river improvement and dam construction.

The following is deemed worthy of recital:

In '91 a commission of Government engineers made report to Congress recommending an appropriation; in '93 Cols. Mendell, Heuer and Benyaurd, U. S. Government engineers, made similar recommendation; in '95 they renewed that recommendation. Thus we find that obstructions in the Sacramento, Feather and Yuba rivers in this State, occasioned three successive official reports to Congress by U. S. engineers instructed to examine and report. Each time the report by these U. S. engineers was accompanied by a recommendation that $300,000 be appropriated to begin a plan agreed upon and designed by these U. S. engineers. This State on March 24, '93, appropriated $250,000 contingent upon a like appropriation from Congress. That appropriation was made on June 2nd, '96. Another appropriation of $300,000 was made by the State Legislature April 3rd, '97, for a dredge.

The joint appropriation of $500,000 by the State and nation was for the construction of a debris restraining dam—not for the impounding of fresh debris or for miners to use as a tailings dump, but to stop the seaward movement of the detritus mined twenty-five years ago. Hydraulic miners, under the Caminetti act, must continue to build their own dams and take care of their own debris.

It is in order to observe that money can only be obtained from the national treasury for river improvement on a report and recommendation of Government engineers appointed for that purpose, and that money so appropriated can only be expended by Government engineers who direct the work, supervise it and audit the accounts—that is, every dollar must be spent under the exclusive supervision of U. S. engineers.

Following is the language of the national appropriation:

For the construction of restraining barriers for the protection of the Sacramento and Feather rivers in California, $250,000; such restraining barriers to be constructed under the direction of the Secretary of War, in accordance with the recommendation of the California Debris Commission, as contained in executive document No. 16 (H. R.), Fifty-third Congress, second session, pursuant to the provisions of and for the purpose set forth in section 25 of the Act of Congress of the United States, entitled "An Act to create the California Debris Commission and regulate hydraulic mining in the State of California," approved March 1, 1893: *Provided*, That the Treasurer of the United States be and he is hereby authorized to receive from the State of California, through the Debris Commissioners of that State, or other officer thereunto duly authorized, any and all sums that have been or may hereafter be appropriated by said State for the purpose set forth, and said sums, when so received, are hereby appropriated for the purpose above named, to be expended in the manner above provided.

It will be noted that the $250,000 appropriated by the State and the $250,000 appropriated by Congress is under the sole supervision of the U. S. engineers composing the California Debris Commission; and that the State has no control or say as to how a single dollar of the amount shall be expended. It is to be further noted that the appropriation was made under section 25 of the Caminetti act, which is as follows:

SECTION 25. That said Commission (the California Debris Commission), in order that such material as is now or may hereafter be lodged in the tributaries of the Sacramento and San Joaquin river systems resulting from mining operations, natural erosions or other causes, shall be prevented from injuring the said navigable rivers or such of the tributaries of either as may be navigable and the land adjacent thereto; is hereby directed and empowered, when appropriations are made therefor by law, or sufficient money is deposited for that purpose in said debris fund, to build at such points above the head of navigation in said rivers and on the main tributaries thereof, or branches of such tributaries, or at any place adjacent to the same, which in the judgment of said Commission will effect said object (the same to be of such materials as will insure safety and permanency), such restraining or impounding dams and settling reservoirs, with such canals, locks or other works adapted and required to complete same. The recommendations contained in executive document numbered two hundred and sixty-seven, Fifty-first Congress, second session, and executive document numbered ninety-eight, Forty-seventh Congress, first session, as far as they refer to impounding dams, or other restraining works, are hereby adopted, and the same are directed to be made the basis of operations.

Thus there is at present available $500,000 for the work to be done under federal governmental supervision. Recent changes in the personnel of the U. S. Commission and the press of other work cause a regrettable delay in the active prosecution of the plan from which so much was expected. It is some satisfaction to know that whenever the Commission get ready to move, they have half a million dollars at their disposal. It is to be said that there is a possibility that the State authorities are dilatory in hopes that their inaction may cause the federal authorities to take hold of the work involved in the $300,000 State appropriation. The unfortunate fact remains that, while State and nation have appropriated $800,000, nothing is being done. It is clear from the above that the Debris Commission has jurisdiction in the $500,000 appropriation, and the State authorities in the $300,000 appropriation. Those whose province and pleasure it was to secure such appropriations have certainly done their duty; it would be eminently satisfactory to be able to chronicle the fact that at least a beginning had been made in this most urgent work.

California Miners' Association.

The approaching annual session of the California Miners' Association bids fair to be, in many respects, the most important meeting ever held by that body. That we are on the eve of a great awakening in the mining industry of California no longer admits of a doubt. In fact, we are entering the first stages of it now. The eyes of the world are upon California, and mining investors who have been following the alluring but disappointing visions that have appeared from time to time in other lands are now turning toward our Golden State for safe investment and legitimate returns. This desirable result is in no small degree attributable to the earnest and extended efforts of the California Miners' Association. Organized in January, 1892, the association has steadily advanced the mining industry along safe and conservative lines until it has attracted the favorable attention of the better class of mining men throughout the world.

The work of the Association, however, is by no means complete. It has just reached that point where exceeding care must be exercised in order to preserve and extend the benefits already obtained. The gratifying results obtained from both our State and national legislatures in behalf of hydraulic mining need to be supplemented by further legislative aid before the final results so earnestly desired can be deemed assured. The needs of an executive Department of Mines and Mining are becoming more apparent as the mining industry advances. The necessity for a revision of our federal mining laws can no longer be overlooked; there should be no abatement in the efforts of the Association to preserve to the mining prospector the mineral lands within the railroad land grants. These are some of the matters that must at once engage the attention of the Association, and their importance can scarcely be overestimated.

It will thus be seen that the work of the Association increases, rather than diminishes, as the years go on. This leads to another matter that may not inappropriately be referred to at this time.

No work looking to the substantial upbuilding of any great industry can be carried forward successfully without the expenditure of more or less money. Although the California Miners' Association has been extremely fortunate in the assistance it has received in the way of gratuitous service, professional and otherwise, it has been compelled to incur a considerable expense in the large amount of work which it has carried forward. This expense has been borne quite largely, heretofore, by the merchants and manufacturers of San Francisco, while the miners and mine owners throughout the State have not, as a whole, contributed their proportionate share. A few mining counties, notably Placer and Nevada, have contributed substantially to the cause, but the great majority of the mining counties have but poorly responded to the cry for help.

On the other hand, the mining counties, through their respective delegations, have continuously had a majority of the delegates attending the annual meetings and have thus controlled the policy of the Association and the selection of its officers. It is, of course, right that the miners themselves should have the controlling voice in the affairs of the Association. At the same time they should not neglect to contribute their due proportion toward the expenses of the organization that has done, and is still doing, so much for them.

Concentrates.

MEXICO is about to impose an export duty on gold.

THE increased price of lead is the only present lining to the cloud over the silver camps of the coast.

THE gold dollar of 1792 had 24¼ grains of pure gold. In 1834 it was reduced to 23 1-5 grains of pure gold.

THE *Bedrock* (Or.) *Democrat* estimates the output of the Baker City district will exceed $2,000,000 this year.

AIR can be easily liquefied, but it must be stored and transmitted at a temperature of more than 200° below zero.

OWING to a shortage work on the Montana school of mines has ceased. Butte will probably contribute enough to finish it.

THE Florence, Colorado, cyanide works now have a daily capacity of 400 tons—the largest works of the kind in the country.

ENGLAND'S colonial plan has changed since the days when discoverers of gold in Australia were punished for their presumption.

COLORADO men now propose to erect electrical works in Clear Creek valley to generate power to be used in the Idaho Springs mines.

THE law allows eight men to hold 160 acres placer claims and considers $100 worth of annual work or improvement sufficient to hold the tract.

"CONCENTRATES" is unable to tell with exactness when and where the copper plate was first introduced in the California quartz stamp mill.

GOLD in barite has been found at Big Bend, Butte Co., Cal. It is frequently found associated with talc schists, notably in Sierra and Mariposa counties.

THE Los Angeles Mining and Stock Exchange is about to occupy larger quarters. It has 100 members, and over 500,000 shares of stock were sold in August.

SO LONG as present conditions prevail, the Horn Silver mine at Frisco, Utah, will continue to market its high-grade lead ores and maintain the present pay-roll.

AMONG the "rush" to Trinity Co., Cal., last month were several prospectors who will be heard from later on. The prospector can be usually depended on to find what is in a country.

ON May 29, '96, the President vetoed the $250,000 appropriation for restraining dams; on June 2, '96, the House passed the bill over his veto and the next day the Senate did likewise.

VISITORS to San Francisco will find it well worth while seeing the mining and milling machinery, etc., exhibit at the Mechanics' Institute Exposition at the 9th and Larkin Sts. Pavilion.

THE British Yukon Company of Montreal announce that they will start the building of a railway from Skagaway to the headwaters of the Yukon this fall and finish it by the fall of 1899.

OUR Alaska special correspondent who has reached St. Michaels has some items on page 219 of this issue. From Dawson City are received four photos, which will be engraved for next week's issue.

UTAH dealers in explosives have lowered prices one cent per pound in the general movement there to give the silver miners a chance to continue. Giant powder is now quoted in Salt Lake City at 15 cents.

MOSCOW, Idaho, papers make the unusual statement that the big wheat harvest there has made such high wages that the mining companies have had to stop on account of scarcity of labor, as "all classes are taking to the harvest fields."

THE West Colusa shaft of the Butte and Montana Co. is the largest in Montana—17½ feet in the clear. Double-deck cages large enough to admit two cars standing side by side are used. The company proposes sinking it to a depth of 2000 feet.

LARGE quantities of gold are coming to San Francisco from Australia. The Mariposa last week brought nearly $2,500,000. Last Sunday the steamship Moana sailed from Sydney, N. S. W., with 600,000 sovereigns for this city—nearly $3,000,000 more.

THE gold output at Witwatersrand, South Africa, according to a cable, in July was 242,479 ounces, a decrease of 9050 ounces as compared with the previous month's total, and an increase of 38,606 ounces as compared with the corresponding month of last year.

GEO. SIMMONS claims to have discovered a turquoise mine twenty miles from Vanderbilt, Cal. What were supposed to be the only turquoise mines in the United States—in New Mexico—were recently illustrated and described in a special article in this paper.

THE Broken Hill Proprietary Co. of N. S. W., the largest silver producing concern, in its half-yearly report at the meeting held in Melbourne on July 30th, show that during the six months there were treated 201,016 tons ore, yielding 13,438 tons lead, 3,826,873 ounces silver, 1825 ounces gold and 313 tons copper.

LAST week, in letters three inches long, the dailies announced that the steamer Portland was hourly expected from St. Michaels, Alaska, with several tons of Klondike gold—three million dollars at least. When the Portland did arrive 'twas with about $100,000—about the average monthly clean-up of one California mine.

KLONDIKE investment companies have organized in several large cities, and even in San Francisco those fake schemes are being advertised. It is hardly necessary to say that any well regulated faro game or lottery affords better inducements for investment than those games, wherein the gudgeon is expected to bite at a bare hook.

SOME of the letters received in town inquiring as to the overland route to the Yukon are unconsciously humorous and display a startling state of ignorance of our great north land, says the Edmonton *Bulletin*. One inquirer asks if he could get through on his bicycle and another inquires if there are good boarding houses on the way and if the Indians are troublesome.

TWO LOTS of gold from the Klondike, the first ever received there, were assayed at the New York Assay Office in Wall street last Wednesday. One lot, weighing 44.45 ounces, assayed .749 per cent fine gold and .246 per cent silver, which made the value $15.48 an ounce. The other lot, which weighed 10.6 ounces, assayed .830½ fine gold and .174 silver, making the value $16.95 an ounce.

THAT is an interesting suit begun by the Montana Ore Purchasing Co. against C. S. Batterman. He is now superintendent of the Boston and Montana M. Co., but was employed by the plaintiff two years, during which time he made underground surveys and superintended operations. Plaintiff alleges that he has given the B. and M. M. Co. information obtained while in plaintiff's employ and sues for damages.

WHEN one is in the employ of another in a certain line of work, and devises an improved method or instrument for doing that work, and uses the property of his employer and the services of other employees to develop and put into practical form his invention, and explicitly assents to the use by his employer of such invention, the court held that he had given to such employer an irrevocable license to use such invention.

NORTHERN CALIFORNIA papers are having a good deal of quiet fun over the "boom" articles in San Francisco dailies about Trinity county. The papers in that section have been truthfully chronicling strikes and discoveries there week by week and are not objecting to the interest manifested, though they naturally dislike to see so many well-meaning people fooled, as such reports tend to discredit the truth when soberly stated.

THE coinage of the San Francisco Mint during August was very large, 3,331,500 pieces, the largest number of pieces ever coined there during a single month, the value being $5,810,000. In amount of deposits, August, 1897, breaks all records. The value of the gold deposited that month was $8,030,746.70. The Klondike gold and Australian coin deposits have helped out in this, but the greater part of the gold was the product of California mines.

THE St. Louis *Globe-Democrat* devoted a page recently to the "Clean Shirt" mine, which the writer says contains millions of tons of gold ore going $1000 per ton. Nobody can work it on account of the spooks of prospectors killed there in '60 by Piutes. The "Clean Shirt" belongs to Jas. Barron, and is located in Eagleville, Nevada. The story was, as usual, a "fake," but caused seventeen Missourians to write to Wadsworth, Nevada, making inquiries about the property.

ON the second day of January this year the silver and lead quotations were as follows: Silver, 64⅞c; lead, $2.90. To-day's quotations are: Silver, 51½c; lead, $3.85; brokers' exchange $4.22½. In eight months the decline in silver has been about 21 per cent, the advance in lead 37 per cent. The low-grade ore mines of Bingham, Utah, for instance, with a by-product of silver, are to-day receiving more money for their product than at any time within a period of three years past.

ANY miner or prospector who has a blow pipe, alcohol lamp and a few drops of cold sulphuric acid can, in a few minutes, determine whether tellurium is present in ores. All that is necessary is to break off a small piece of the ore, place it in a small porcelain dish previously warmed so as to avoid breaking, apply the blow pipe until the ore is at an oxidizing heat, then one or two drops of sulphuric acid on porcelain dish; allow to mix with the ore. The reaction will immediately follow, if tellurium is present, by beautiful carmine and purple colors.

THE Boston News Bureau says: Parties in a position to know confirm the reports of heavy sales of copper for export to France. It appears that representatives of the French Government and other foreign consumers recently asked the Calumet & Hecla for a price on 40,000,000 pounds or 20,000 tons. The Calumet people named 11¾ cents as their lowest figure. Thereupon the Frenchmen bid 11¼ cents, which offer was promptly refused. After waiting a number of days, the Calumet's term was finally accepted. This sale is said to mean 11½ cents for ingot copper right away.

SUPERVISORS of California mining counties are passing the following powder ordinance: Section 1. No person shall keep, store or have in any building, structure or place, within one-fourth of a mile of any inhabited dwelling house or county road in the county of ——, State of California, more than ten pounds of gun powder, more than ten pounds of Hercules powder or more than ten pounds of blasting powder, or more than ten pounds of dynamite or more than ten pounds of giant powder. The recent fearful explosion at Georgetown impels such precautionary measure.

COAL is being mined under the sea on the north coast of the Spanish province of Asturias. A seam is opened there which extends an unknown distance, the workings now being in 660 feet. The mine is reached by a vertical shaft, whose surface is 65 feet above the sea, and the bottom 185 feet below it. With the necessary machinery room after room is opened in succession, slices 10 feet long are taken out, and when the full thickness of the seam has been removed the roof is made secure by building a dry stone wall from 3 to 5 feet thick against the pillar of coal left standing. The space behind is packed solid with stone, for timber is out of the question in such a thick seam. Each miner digs from two and one-half to three tons per day.

WHERE 750 feet of water is to be carried in a canal, a foot of water being the amount that will flow through an opening a foot square under four inches pressure, or one cubic foot per second flowing through an opening of fifty square inches, the water will move 12 feet per second, or 8 2-11 miles per hour. To prevent washing the channel, water next the bed must not move faster than the following table for the different materials: Soft clay, one-sixth mile per hour; fine sand, one-third mile per hour; sand as large as peas, one-half mile per hour; gravel as large as beans, two-thirds mile per hour; gravel one inch in diameter, one and one-half miles per hour; pebbles one-half inch in diameter, two and one-fourth miles per hour; heavy shingle, two and three-fourths miles per hour; soft rock, three and one-fifteenth miles per hour.

A WRITER in a Parisian journal points out that Russia occupies an interesting position as a gold producer. She is gradually feeling her way from a silver standard to a gold, and she is herself the fourth largest producer of the more precious metal. It is estimated that eastern Siberia, including the region of the Yenissei, will alone give an annual production of gold of the value of $15,000,000. With the completion of the Transsiberian line, there will be four great and steady producers of gold—the United States, South Africa, Australia, and Siberia, with her neighboring Chinese territories. Besides these, there must continue to exist a number of other producers, like Brazil, the Guianas, British Columbia, Mexico, Germany, Austria-Hungary and Bolivia. But these, he believes, can never seriously compete with the four producers just named.

THE recent decline in silver affects the treasury. The present available cash balance, as given in the official treasury statement, is in round numbers, $222,000,000. In estimating this balance on hand, the government stock of silver bullion is reckoned at its original cost, instead of its present market value. The amount of this silver bullion now on hand is $114,000,000, giving it the value of its original cost. But considering the present market value of silver, this bullion would not sell for more than $60,000,000. Aside from this a large part of the cash balance is made up from standard silver dollars now held in the treasury, each one of them being counted as a full dollar. The amount of this coin silver is $391,000,000. The government stamp upon these coins gives them their dollar value in current circulation, but, if they were measured at their actual bullion value of about 40 cents each, this asset of the cash balance would also suffer a shrinkage. The two items of coined and uncoined silver amount to $505,000,000, and it is at this amount that it goes onto the credit side of the cash balance. At its market value, however, it would be worth only $252,000,000.

AT the Argent mine, Tasmania, a Bartsch circular percussion table is in operation. The machine consists of a cast-iron table 13 feet in diameter, convex in form, and turned smooth on the surface. It is vibrated by cams worked by a shaft underneath. The separation of the minerals from the gangue is by water currents, supplied by a curved water pipe, revolved slowly over the surface of the table. Receptacles at the outer rim of the table receive the several grades of concentrates. The ore is fed on to the table with water, and runs in a curved direction toward the outer edge of the table. On its way the stream is reduced in velocity and depth to about one-third, owing to the greater surface covered, causing a separation of the lighter and heavier particles. The former leave the table at once, while the latter are further separated by passing under the stream of water from the rotating curved water pipe, which, assisted by the vibrations of the table, with gradually increasing energy and velocity, separates the various materials according to their specific gravity and washes them into the rotating delivery receptacles, and from thence into circular troughs, which collect the different grades of concentrates. The daily capacity of the machine is from 12 to 15 tons.

UNDER the head of "Vicarious Mining" the Chicago *News* sarcastically suggests that any one who may wish to participate in the vast new riches of the Klondike region need not by any means give up a comfortable home and the incidental advantages of having something to eat during the winter. All needed is to take a few shares in the Colossal Consolidated Klondike Company at anywhere from 10 cents to $1 a share, according to the nerve of the promoters and the financial capacity of purchaser. There need be no fear that this style of being engaged in the exciting pursuit of Alaskan wealth will not be put within the reach of all. It always is. Some kinds of financial venture are necessarily limited to the rich and favored, but not so the mining venture. A good many citizens have a taste for these engravings. In selecting a certificate two points should be borne in mind. First, the color. Experienced men who have made a large collection say that the light-brown engravings, while they take the eye at first, are apt to fade. Their advice is to insist upon a rather dark shade of green as being the most lasting. The next consideration is size. Always get as large a certificate as possible, and peremptorily reject those which are less than 30 inches in length. As to cost—one can get just as pretty and lasting a certificate for $1 as for $1000.

A PARAGRAPH in the London and China *Telegraph*, London, June 21, 1897, reads: Some details furnished to the Geographical Society of Paris confirm the statements made from time to time as to the value of the gold deposits in Siberia. The particulars were given by M. E. D. Levat, C. E., who went over the ground in the company of a Russian engineer, M. Th. Sabachnikoff. They state that an immense development of the gold placers has been carried on between the Ural and Vladivostock. Nowhere in the world, states M. Levat, are there such vast stores of gold and spread over so large a surface. Eastern Siberia at present produces between 135,000,000 and 150,000,000 francs of gold, without taking into account what is clandestinely exported. In the Amoor province at least a quarter of the production is so dealt with. The majority of the mines are situated far from the Amoor, from whence stores and provisions have to be drawn and considerable transport difficulties are experienced. Work can only be carried on for about 100 to 120 days in the year—say from May to September—for the indispensable water is frozen hard for the rest of the time. During the cold season, however, prospecting is carried on. No medal is without its reverse. The smuggling of gold is reduced to a fine art. Entire villages exist of gold stealers, who are practically free, as the result of the immense distance open to their enterprise. If caught, they affirm the gold comes from China. Even on the Russian gold fields, theft by the workmen can not be prevented, and their methods of disposing of it are elaborate.

RECENT PROGRESS in the chlorination process lies mainly in the direction of improvements in the mechanical appliances. Repeated efforts to prevent the oxidizing action of the chlorine upon the unroasted sulphide in ores, by adding nitre, have not been satisfactory. One of the improvements in chlorinating has been the increasing of the size of the lead-lined barrels which contain the charge of ore. Formerly five tons was the maximum quantity used in one barrel, now ten tons are placed in suitable sized barrels. Regarding the filter made of asbestos cloth which was previously used, this has given place to a substitute, in the shape of a deposit of cheap sand which does not require to be removed until about one hundred charges have been put through. The old asbestos cloth was expensive and was only available for a few charges. In Australia the barrel system has been almost entirely abandoned and in its place vats have been erected once more, the average containing twenty-five tons of ore per charge. Chlorine gas is not used in the chlorination works at the Mount Morgan mine, Australia; chlorine water being employed on account of a lesser consumption of chemicals, as well as a better control of the reagent. The use of bleaching powder combined with sulphuric acid for generating chlorine is superseded by the employment of manganese dioxide, salt and sulphuric acid and the installation of chlorine stills, towers and solution tanks. The success which has attained by these methods is shown by the statement that the percentage of extraction at the mines referred to are equal to 95% of the total ore value, and the cost is stated as being equal to $3.00 per ton, a figure which it is expected will be decreased with the use of the revolving roasting furnaces.

River Dredging for Gold.

Written for the MINING AND SCIENTIFIC PRESS by R. H. POSTLETHWAITE.

Regarding river dredging for gold, I find from my own observation, and also from the letter written by Mr. Richards in the issue of the MINING AND SCIENTIFIC PRESS of June 12th, that so far subaqueous mining has not been a success in this State. I have read Mr. Richards' letter with great interest and fully endorse his remark that successful dredging must be the result of mechanical skill and "evolution." This evolution is exactly what I claim for the class of dredges that I am now designing, and which are being built by the Risdon Iron Works.

A brief resume of dredging as carried out on the river Molyneux in New Zealand, where there are now working some sixty dredges, will show the evolution process. It is a very swift river, carries more water than the Sacramento, and the bottom is composed of a layer of barren tailings varying from one to twenty feet deep and traveling at varying velocities; then comes the old formation of boulders and gravel interspersed with seams of pay dirt. As there is an immense amount of gold in the bed of the river, it was at once recognized that means must be found to handle it. In the early days the miners worked the banks as far in the river as they could reach with spoon dredges. The next evolution was a small, weak and poorly constructed bucket-ladder dredge driven by current wheels on either side. These proved very inadequate to handle the heavy boulders and were only able to work in the current. The next step was to make the machinery heavier and put on a steam engine. It was about this time that the use of the spud—in New Zealand called a sett—came in, but did not last very long, as it was found inefficient and took more hands to work it. The spud is not found now on any dredge in the country, being quite out of date. In place of the spud the best dredges use a power winch with six drums, all being under the control of one man. Four of these drums carry lines running from the four corners of the dredge, the other end of the line being affixed to "dead men" or backers on the beach. The fifth drum carries the head line. With these five lines the dredge can be made to rapidly take up any position necessary, one man handling her with the greatest ease and nicety and with no loss of time. The sixth winch barrel carries the ladder line, raising or lowering the ladder as necessary. For lifting the large quantities of gravel, rock and boulders, after long and thorough trials, it has been found that the bucket ladder will easily beat the centrifugal pump. The pump dredge was given a very fair test, different makes of pumps being used, but all attempts ended in failure. The failure arose from two causes—first, lack of efficiency. Mr. Richards, who is a leading authority on centrifugal pumps, will bear me out that directly you design a pump to carry large stones you do so at the loss of efficiency. In the second place, unless boulders up to one ton in weight could be handled, a machine was useless in the Molyneux. For sand or slurry the centrifugal pump, I at once admit, is the thing; but not for gold dredging. Two other methods have been tried—one the pneumatic caisson. This would be all right for a rich patch, the locality of which was exactly known; but for regular every-day work, where much barren stuff had to be lifted, it proved a lamentable failure. The last method was the hydraulic elevator—a most excellent appliance in its place, but this place is not in a river bed forty feet below the level of the water, as most of the work of the elevator then consists in pumping water which does not carry gold. The successful gold dredge of the present day is the present dredges are made at least twice as heavy as would be arrived at if calculated to transmit the average horse power used. These sizes have been arrived at by gradually enlarging until a size has been found which will resist the shafts of the

THE PARROT SMELTER.—(See page 213.)

MONTANA ORE PURCHASING COMPANY'S WORKS.—(See page 213.)

THE COLORADO SMELTER AND CONCENTRATOR.—(See page 213.)

THE BUTTE REDUCTION WORKS.—(See page 213.)

evolution of thirty odd years, each dredge built being an improvement on the predecessor. No man can sit down and design a dredge by calculations, the strains the machine is subject to being so variable and impossible to accurately foretell. The main heavy shocks the dredge is subject to. I am now building a dredge on the Yuba river to dredge forty-five feet deep with a gross capacity of ninety-three cubic yards an hour. The dredge consists of two long pontoons, each 96 feet long by 9 feet beam. These are connected at the stern by a small pontoon 17 feet long and 5 feet wide, the bow being connected by a heavy overhung beam. This practically makes one boat 96 feet long, 23 feet wide with a well hole 5 feet wide, running through the center for some 75 feet.

The ladder 67 feet long, built up as a heavy lattice girder, is hung at the stern end by a bar fixed across a heavy wooden framing. The lower end of the ladder carries a five-sided tumbler and is suspended by blocks and tackle to a cross beam. By means of wire rope and blocks the winch can raise or lower the bottom end as required. The top tumbler is carried by the timber framing some three feet above the top end of the ladder. The continuous bucket chain comes up the top side of the ladder on rollers round the top tumbler and back in a catenary curve to the lower tumbler. The top tumbler is driven through a rope transmission and heavy gears by the engine, a vertical compound condensing one which also drives the pump and indicates about 35 H. P.

The material discharges from the buckets onto a dellvery plate, down which it shoots into a revolving screen or grizzly. The centrifugal pump, throwing 3000 gallons per minute, supplies water to a perforated pipe inside the screen. This water thoroughly washes the material, the finer wash dirt and gold going through holes in the screen and falling into a distributing box. From the distributing box it passes on to a set of gold-saving tables, 11 feet wide, and thence into a flume. In this connection I would like to point out that the experience in New Zealand leads us to get the greatest width of table practicable, thus running the wash dirt over it in a thin or shallow stream, whereas the general practice here seems to be to use a narrow, long flume. A wide table with frequent drops and changes of velocity of the stream, together with fairly frequent washing up, is, I feel satisfied, the secret of saving fine gold when mixed with much black sand. The tables are covered with cocoa matting and expanded metal, a finer gold saver than which was never used. The stones and rocks pass through the screen down a stone shoot, either direct into the river or onto a tailings elevator, when working into a high face of gravel. It is now in place to consider the class of ground that can be worked with a dredge and the cost per yard of handling the same. Broadly speaking, any ground which is not deeper than 60 feet below water level, or more than 20 feet above, and which contains boulders of not more than say one ton weight, can be handled at from 3 to 5 cents per cubic yard. The ground need not be in a river, provided the seepage is sufficient to float the dredge and keep the water clean enough to wash the dirt with. I think I can say with confidence there is no other method by which ground, provided it fills the above conditions, can be handled so cheaply.

I have felt a little diffident as to writing the above, as I fear some of your readers may say: "What right has a man from a little country like New Zealand to come here and tell us that their knowledge is much greater than ours." In very many ways California is well in advance of New Zealand, especially in quartz milling, and I have learnt much since I came here; but in this one particular class of mining, viz., dredging for gold, I do claim, and with justice, that New Zealand has had more experience than all the rest of the world, and if any of your numerous readers will do me the honor of coming to see the dredge on the Yuba when working, they will be ready to admit that it does all I claim for it. There is, I believe, in California an immense area of country which can be profitably worked by the above method, and anything which keeps the miner in California is a general and direct benefit to the State.

The Mesa Scaled.

After four centuries of effort the Mesa Enchantada in New Mexico has been scaled. The honor belongs to Prof. Libbey of Princeton University. The mesa rises to a height of 850 feet sheer from the plains and covers a space of ten acres. For ten years the place has challenged the attention of scientific men, because of the rumor that it was inhabited by the remains of an ancient race, and numerous efforts have been made to reach its summit, to no avail. Prof. Libbey was equipped with a number of tandem kite teams, a balloon and a gun used by the United States life-saving service. It was with this latter apparatus that the ascent was made of the rock which Coronado, as early as two centuries ago, stated was more impregnable than Gibraltar, against which the armies of the world would not avail. The cannon was anchored in the desert and a cord of 3000 feet in length was shot over the mesa and made fast in the sand of the opposite side. Then a workman made the ascent, creeping and climbing over the rough edges and shelves to the summit. He was followed by Prof. Libbey, who went up in a traveling chair. Then came others of the party. On the summit were no evidences of inhabitants. The huts that were there are gone. The bones of the 200 women said to have been left on the surface to starve could not be found. It was a bare and desolate place. The only water found was such as stood in hollow places dug out by the Acoma Indians 1000 years ago. There was no animal life of any kind. There were the great rocky battlements used by the tribe before their rocky ladder path was destroyed and by which they defended themselves from attacks of the invaders, but all else was desolate. It is presumed by scientists that the flora found on the surface would be of the kind that grew in the prehistoric world, the summit having just emerged from the ancient sea, and it is presumed that the flora has not changed. Therefore the specimens gathered will be of vast interest to botanists, and may perhaps open a new field of discovery.

California vs. Klondike.

TO THE EDITOR:—That Klondike is a great country there can be no question; I believe in it. Yet it has its disadvantages. But when we consider other points of lesser or greater advantage, we bring almost a balance.

For vast numbers to rush into a comparatively uninhabited wild in winter, suffering must ensue; but soon order comes out of chaos, and comforts out of wealth, and so will it be in all this northwestern country. The question of cold and snow cuts no figure except to the pioneer for a short period. Let the rush go on. California has more to gain than lose in the long run. While the world is talking of Klondike, California will receive its share of consideration. Klondike has great gold fields; so has California. One serious difference here confronts us: on the Klondike you can wash down the mountains, if needs be, while in California barriers are before the miner, and the treasure he could unfold may lie unearthed, unless some change is inaugurated. And here I will say it is time there was a determined sentiment among the people for appealing strongly to the Government to take some active measures whereby our gravel beds can be worked, that California may hold her place with all other sections of the gold-producing world.

Klondike may send a million of gold to San Francisco (to do so would make a great stir for Klondike), while could we of California now work our gravel beds as of old, a million a month would come to San Francisco. Yet but little consideration is given to this.

As to the question which is the richer of the two, when the Klondike can show a production of $550,000,000 for her first ten years of mining then may she claim to be the peer of California. For the present California is hampered with prohibitory mining laws, and must mainly depend upon her quartz interests; and this interest has drawbacks which should be corrected by better mining laws. And here I refer to the dog-in-the-manger policy of holding claims from year to year and doing no development of value. Some few have been well rewarded, but the vast majority have not. So in California we have three obstacles in the way of building up the proper advance in our gold product, and these are: First, the suppression of hydraulic mining; second, the tardiness in development of the quartz interest; third, the unreasonable prices demanded for undeveloped lodes. The "fever" for the Klondike means work to get there, and work on the ground when there. If our California miners, as a whole, would get the same "fever" for working their own now idle properties, the results might be better.

The owners of the Blue Jay were developing their mine, and they "struck it rich." Work is what tells in mining. The possible yearly outcome for California, with provisions for untrammeled hydraulic mining, and a "fever" for developing our quartz lodes, is $30,000,000 per annum; while as it is, $17,500,000 is doubted.

As is the fall of silver, so is the increased value of gold, and the greater the reason for mining more gold. To increase our volume of production, as matters stand to-day, California must mainly depend on her gold-bearing quartz lodes, and, to depend on them, there must be more general development to maintain our status. A. B. PAUL.

San Francisco, August 20, '97.

On Horseback in California.

Many readers will enjoy the enthusiasm of a writer for *Outlook* who has enjoyed a vacation trip on horseback in California. He writes that of all modes of spending the summer holidays, experience has convinced him that this is the most delightful. He has driven, tramped and ridden over a good part of central California in the summer months, but regards his expeditions on horseback as the most delightful of his life.

The Horse's Back.—But the back of the horse must be a matter of serious consideration on the part of all who would travel thus. To begin with, the right sort of horse must be chosen for such a trip. He should not be too large, nor too heavy. A short-legged, good-barreled animal, short in the back, long underneath, high on the withers, and with good feet, is the ideal for a saddle trip. If he is not high on the withers, the saddle should be padded to supply the deficiency. It cannot be remedied by putting a crupper on the saddle. The pulling of this contrivance on the horse's tail, if the saddle slips forward, is sure to cause the animal pain and make him restive. On such a trip, unless the hair cincha is used (and it is greatly superior to the English girth used in the East), the saddle should be provided with a breastplate, as, even with the best of care, some horses become a good deal "tucked up" before the end of such a trip.

Care of the Horse.—It goes without saying that the saddle should fit well. On a long trip do not be afraid to use good, thick saddle-blankets. Then, have made, and carry with you, half a dozen saddle-cloths of linen. One of these should be put on next the animal's back, and a fresh one used every day. If the saddle is taken off at noon, then a fresh linen must be put on in the afternoon. Enough should be taken along to insure having a clean one each day, and they can be washed at different stopping-places. It is best not to remove the saddle when you halt at noon, but the girths should be loosened. A horse will never have a sore back, unless one is an atrocious rider, if the cowboy method of treatment is followed. When the animal is brought in, loose the girths so that the hand may be passed between them and the horse. Lift the saddle for an instant, but do not disturb the blankets. Let the saddle fall back into place, and allow the horse to stand until his back, under the saddle, has completely dried. This will take from half to three-quarters of an hour. Then take off the saddle and blankets, and ten minutes later take off the linen cloth. Never put cold water on the back of a horse when it is warm from the saddle. Some horsemen do this, but it is a piece of cruel folly. If the animal's back looks puffy, use hot fomentations and then dry thoroughly.

I have made many long trips, taking this sort of care of my horse, and have never had a sore-backed mount. If you expect to go through rough country, do not have your horse clipped about the legs; and in any case the hair under the saddle should not be clipped within at least a month before starting on a holiday trip. The short, clipped hair stands up and feels very unpleasant to the creature when pressed by the saddle.

Silver's Continued Decline.

Regarding the present slump in silver, it would seem as though forces in the world's economy were at work that militate against implicit dependence on past conditions. For a hundred years it had been, till the past six months, noticed that wheat and silver rose and fell together. Now while the metal drops the grain advances in price: from time immemorial China was a purchaser—the Orient an absorbent of silver: now is presented for the first time in human history the spectacle of China being a seller of silver instead of a buyer: just what effect these things will have on the party aspect of political affairs in this country is a question which it is neither the province nor the purpose of this journal to discuss. Existing commercial conditions are inexorable in showing that in the case of silver it is not so much a question of overproduction as want of consumption.

"The case with silver and gold in the last thirty-five years has been that the production of both has increased in volume, and the production in the case of each has been at less expense in hours of man's toil. The ratio of increase has been larger in the case of silver than in that of gold, and the ratio of decrease in the cost of mining silver has been less than in the cost of mining gold. At the same time the demand for gold has not been greatly disturbed, while that for silver is much less than used to be the case. At the beginning of the period under survey all the mints of the world, except that of England, were open to the coinage of silver. Now the mints of nearly all civilized nations are closed to the coinage of this metal except in limited amounts and on Government account. With gold it is different. In spite of the increased output and cheaper cost of production, the demand has greatly increased. All the great commercial nations of the world, both on the part of their Governments and of private persons, have been greatly increasing their holdings of gold. Nations like Austria and Russia, where gold was almost unknown, have been accumulating this metal and are still doing so."

In silver producing camps, as elsewhere, the cost of everything is being materially lessened—mining, milling, smelting, freights, living expenses, machinery, and supplies of all kinds. Looking at the matter in its broadest view, the nation as a whole is better off to-day than one year or two years ago. With very few exceptions the silver producing mines yield lead as well, which sells to-day for better prices than a year ago, with a probability of keeping up to the present figure, and everything will necessarily tend to adjust themselves to existing conditions.

Mining Summary.

CALIFORNIA.

Alpine.

Conner and Bottomfield are working a mine four miles below old Summit City. The ore, they claim, shows a mill test of $55.19 in gold and $1.65 in silver. They have a 4-foot ledge which shows 12 inches of solid ore, and have run a 40-foot tunnel. In tunneling 200 feet farther, they expect to strike slate.

Amador.

The Potazuba Mining Company has finished the 200 feet sinking of the shaft, making a total depth of 450 feet on the incline from the surface in four months. The company will sink another 100 feet before doing any development work.

The Oleta Canal & Power Co. through D. R. Thomas will resume work at the dam on the old Case ranch to hold a mile square of water ranging from a few inches to 10 feet in depth, to supply a system of ditches to furnish power for the mines in the Robinson district, the Iron Mass and the Monte Christo.

At the Gwin mine the old south shaft is opened and retimbered. The plan is to catch the waste water from the mill and hoist in a tank below the works, convey it to a compressor at the Mokelumne river in a pipe then convey the air from the compressor back to the old south shaft and use it to operate the hoist and the pumps.

At the Oneida during July they carried the shaft which is 15 feet 4 inches by 5 feet 6 inches inside the timbers down 68 feet. In thirteen months and thirteen days the shaft has been sent down 872 feet—about 6½ feet per month for the time.

Capt. Thomas Mein, in charge of the work at the Oneida mine, reports the shaft down 1200 feet.

Butte.

The Catskill gravel mine near Bangor has been bonded and is to be worked from a drift tunnel.

Last Saturday an attempt was made to blow up the Miocene flume that brings water to Morris Ravine. The effort to wreck it was made near the Wagner mine. Two or three charges of giant powder were exploded. The effort was a failure so far as destroying the flume was concerned. The Golden Feather, Limited, Company offer a reward of $200 to discover the person who committed the act.

Calaveras.

At the Eclipse gravel mine on Tunnel Ridge Supt. Hall has run a 600-foot drain tunnel. The gold taken out is very coarse and is worth $19 an ounce at the mint. The mine is supplied with a Cox pan, capable of handling 200 tons every twenty-four hours, and is run by water from the Mokelumne canal under 200-foot pressure. There are twenty-five men at work in and around the mine.

At the Eclipse mine, formerly the Anthony, on Tunnel ridge, two miles from Mokelumne Hill, in running a bedrock tunnel a rim channel, 15 feet above the channel proper, was discovered, the gravel of which, according to the *Prospect*, will yield $8 to the carload or $10 to the ton.

The Paragon group of mines are being worked by a tunnel that cuts through them at a depth of from 300 to 500 feet from the surface. The mine has a 5-stamp mill well supplied with water power; the premises are lighted by electricity produced on the ground. The ledges average from 3 to 15 feet in width and the rock yields by milling about $10 to the ton. P. L. Shuman is the manager and one of the principal owners.

The North Star gravel mine, in Happy valley, about a mile from Mokelumne Hill, resumed operations on the first inst. They are taking out good $2 gravel and the 10-stamp mill is kept pounding day and night. Wm. Cook is superintendent.

At the Roanoke, formerly the Moser mine, situated a mile from Mokelumne Hill, operations have been suspended in the Moser shaft and all work centered in the Lamphear shaft, where sinking has of late been carried on. Supt. Harris says stoping in the Lamphear will soon commence, when the mill, which had been shut down while sinking was going on, will be started up again.

The Kentucky mine, owned by the Western Mining Company of San Francisco, is being pushed under the superintendency of J. S. White. A 25 H. P. boiler together with gallows-frame and other necessary equipments have been erected, and sinking to strike the contact vein is in progress.

El Dorado.

Rich strikes are reported at Spanish Dry Diggings, Kelsey, Bear Creek, Long Canyon and other places in the vicinity of Georgetown.

The *Gazette* says most of these are never known to the outside world, the finders either shipping their gold very quietly or selling to local merchants, who are requested not to divulge the name of the finder.

Several thousand dollars are reported to have been taken out at the Hines mine, near Spanish Dry Diggings, seven miles west of Georgetown, during the past ten days. Twenty-five hundred dollars was taken out in one day. This mine is bonded to an English company, with William Moss as superintendent.

The shaft at the Grand Victory mine is to be sunk 100 feet deeper; it is 7x12 feet in the clear on an incline of 70°. Power for hoisting the rock and for pumping water is furnished by the company, also timbers framed and delivered at the top of the shaft, to be put in place by contractor.

Inyo.

At the Sherwin mine, northeast of Bishop, is reported the proposed erection of a new mill and cyanide plant.

Duenweg and Girard at the Builion, running parallel with and east of the New Year mine, one of the Inyo G. M. Co.'s properties, have a ledge between lime and slate, the former being the foot wall and the latter the hanging wall, averaging $10 a ton in gold.

The Last Chance mines, Nos. 1 and 2, twenty-five miles from Keeler, were finally bought this week for $80,000, half cash. The Inyo County Mining & Development Company, W. W. Boswell superintendent, has been working the property since Feb. '97 on silver-lead ore and is reported to have taken out $55,000 in that time.

D. Driscoll of Panamint reports from Pleasant canyon removal of the 20-stamp mill, now four miles from the mines, to the property, and proposed addition of a cyanide process plant. On the property are three tunnels leading to a depth of 300 feet. The ledge averages 15 feet and runs $20.

Ballarat, the town of the valley and the main base of supplies for the section, is building up.

Kern.

At Randsburg the Kinyon mine produced over $9000 in July, with the greater part of the month devoted to dead work.

Miner: At Johannesburg the Val Verde has 200 tons of good milling ore on its dump.

One shaft of the Camperdown is now 90 feet in depth, and they are getting out some good ore.

A strike was made in the King Solomon mine last week at the 190-foot level.

Johnson & Ritchie of Los Angeles propose building reduction works.

The Randsburg Placer Mining Company has been organized with $1,000,000 capital stock, of the par value of $1; three-fourths subscribed by Randsburg men. Directors—J. M. Bracewell Jr., P. Carroll, D. C. Kuffel, S. H. Reynolds, W. H. Hevren. The property is three miles from Randsburg.

A Garlock correspondent of the *Herald* writes: "As an indication of the wave of prosperity, all the mills are running except one small one—and they are running on rich ore. The mines here and at Randsburg are producing $60,000 per month, and there is little doubt that the amount will be increased to $250,000 if the mills are kept busy, which is the indication. Their capacity is about 3000 tons per month, and the ore so far has averaged nearly $100 per ton." Garlock is the milling point for most of the Randsburg mines.

Los Angeles.

The Mohawk-Acton Mining Company is organized in Los Angeles under the laws of Arizona, with 1,000,000 shares, par value $1, non-assessable; B. Katzenstein secretary. The company owns three claims on the extension of the Red Rover ledge at Acton, Los Angeles county. Considerable development work has been done on the Banbury claim, showing a ledge of ore, upon which the company will sink a shaft.

Mariposa.

The *Herald* of Boston, where most of the Merced stock is owned, says: The Merced management at the mine has drawn no money from the East for a couple of months and the property is a little more than paying its way. The company has $20,000 cash in the treasury and Merced people say the stock is worth more than when it sold at $10.

Mono.

Last week the men at the Jordan mines were paid off and work suspended for the present, it being the intention to thoroughly test the ores, to ascertain the best and most economical method to work them.

Nevada.

(Special Correspondence).—At the Orleans (which was idle for many years), now comprising four claims, all of which paid many hundred thousand dollars, and to a depth of only 400 feet, the company is driving the shaft and have reached 800 feet, on which level they are drifting north on the course of the ledge. They are also driving a crosscut on this level, expecting to tap the old Filmore, better known as the Rich Hill ledge. An air compressor and electric motor are in course of construction, which will add another to the electric power company's industries. Supt. Brockington will drive the work ahead very rapidly with his new power. During the past week the indications in the ore were very favorable.

Development work on the Wisconsin has reached 600 feet in the shaft, 300 feet on No. 4, 300 feet on No. 5 and 25 feet on No. 6 drifts. The ledge is of fair size. One hundred and twenty-eight wagonloads of ore crushed at a custom mill yielded $30 per load.

Work has been resumed on the old Kentuck, now known as the Blackrock. Mr. Tuttle, the superintendent, is driving the work with energy and effect.

The Central mine, six miles east of Grass Valley, is erecting a 10-stamp mill.

A visit to the Allison Ranch mine reveals a wonderful piece of work in reopening the old plant. The pumping machinery operated by compressed air is capable of hoisting 1000 gallons per minute. The present work has been much retarded because of the small shaft put down in the long years ago. This is being enlarged, straightened and retimbered the entire distance. The water hoist is just completed. Supt. of Construction W. R. Eckert is still managing the work and everything about the place moves systematically as in a well-regulated military camp.

Marwick & Eddy are running a tunnel on the Black Bear property, six miles northwest of town. They have reached 89 feet crosscutting for the ledge.

In the Pennsylvania they are sinking a winze from the 600 and crosscutting from the 700 levels. Supt. Eddie brought in $6500 a few days ago—a cleanup of less than a month's run from only a 5-stamp mill, and working the mine day shift only.

The Massachusetts Hill shaft is down 1400 feet. Drifting is being done on the 1200, 1300 and 1400 levels.

A few days ago I visited one of the famous producers of the county of which one seldom reads or hears. It has but few people in its ownership, and they work quietly along, take out their regular dividends and the outside world scarcely knows that a property of such proportions is in existence. The property comprises the Old Omaha, the Lone Jack and the Homeward Bound, all now in one, and known as the Omaha Consolidated. The company has just completed new hoisting works on the Homeward Bound, and the shaft is down about 80 feet. This will cut into the drift, leading 2300 feet to the Old Omaha, on which the mill (twenty-eight stamps) is in operation. The double track into the new shaft and a separate compartment for the pump are built to last forever. Two new ore bins of 150 tons, a new iron rail tramway 1200 feet and an additional 800 feet reconstructed make quite a railroad line and stations. Hoisting is done also from the Lone Jack. Water power is used in the old plants, steam in the new, and electricity is expected ere many moons to supplant both of them. There are three shafts in use on the line of the vein. The depth attained is 1700 feet. The drifts run 300 feet to the north of the Old Omaha, 3000 feet to the south. There are 100 men employed. Supt. Mainhart is, and for fifteen years has been, the superintendent of this property. He advocated the reopening of it after it had been abandoned a number of years, and for its later development and management he ever holds a place with his people.

Grass Valley, Cal., Sept. 1st, '97.

G. A. Nihell has erected a new 5-stamp mill for the South Fork mines at Graniteville.

The Bullion Consolidated property has closed down until next spring. The shaft of the mine is down 800 feet.

Rich gravel has been struck in the Cotton Hill mine, near Washington. A 300-foot tunnel reaches the channel, which is 70 feet wide.

Placer.

K. L. Dunn has bonded the property of the Dardanelles Consolidated Gravel Mining Company near Forest Hill.

Plumas.

A telegram from Scotland reports the sale of the Halstead mine, on the east branch of the North Fork, and the same dispatch says the new owners are to put up a 250-stamp mill. Mr. Ertz is reported to have so stated. This is a ledge or series of ledges on the east branch of the North Fork. It has been mentioned and described many times and is considered to be a good property.

The California Investment Co.'s ditch, from Taylor lake to the mine, is twelve miles in length, 2½ feet wide on bottom, 4 feet wide on top.

Ten stamps are added to the Little Jamison mill, which is now running.

National-Bulletin: E. H. Benjamin in Granite Basin has a 5-foot ledge of free-milling ore.

At Granite Basin A. L. Shinn has a ledge 18 inches wide.

San Bernardino.

Near Mojave, the Gypsy has been bought by Colorado men for $10,000. The White Peak has been incorporated and a cyanide plant is projected.

San Diego.

Mesquite, a new mining camp, is springing up. It lies thirty miles northwest of Yuma, six miles from Glamis, on the Southern Pacific railroad. The principal mine of the district is the Bay Horse, which was recently sold by Moreland & Co. to a Los Angeles company for $40,000 and a share of the capital stock of the company, incorporated under the laws of Arizona, with a capital stock of $1,250,000.

At Poway the Bidwell mine has a small smelter, furnished by W. Ober.

The *Sun* reports that the Ranchito mill is turning out $100 worth of gold daily from 30 ore. Capt. Farnsworth is preparing to work the North Star at Banner.

In Laguna district, on the Glen Cliff, the shaft has been put down 82 feet and men are working developing the mine. The ledge is 2 feet 6 inches in width. The ore averages about $20 to the ton. The company proposes to erect a small stamp mill, to be run by water power.

At the Escondido mines of the Du Quesne Company the large main shaft is now down about 120 feet; another week will bring it to the water, when the big pumps will be put at work and sinking continue. In the meantime, the mill and concentrators will be put to work on the tailings of the old mill, which, it is understood, assay about $20 per ton.

San Luis Obispo.

The Oceanic, a quicksilver property near San Luis Obispo, is about to be reopened.

Shasta.

C. H. Behrens has contracted with the Mountain Copper Company to deliver fifty tons of quartz flux daily for the smelter. He has ten teams hauling it.

The Mountain Copper Company shipped twenty-one cars of matte from one furnace last week. The *Miner* says this is the most ever turned out in that time by one smelter since the works have been running. Each car contained thirty tons. The company is putting in a large pump with which water will be pumped back out of Spring creek on to the jackets again. This will give enough water to run two furnaces until the rains commence. Then all three furnaces will be kept in operation. The company is building a trestle below station No. 1 on the railroad 200 feet long. On both sides bunkers for roasting ore will be erected.

Sierra.

Wm. Johns Sr., general manager Sierra Buttes Company, is considering the building of a new mill for the Buttes mine. Some of the machinery will be shipped over from the Uncle Sam mine in Shasta county.

Siskiyou.

The *Journal* says very little can be done in the placer mines in this section until the fall rains give the miners a supply of water. A few of the larger companies which have built ditches and put in pipe to give them a supply of water can keep their mines in operation, but the majority of them have to close down when the streams get as low as they are at present. The Klamath is lower than it has been for years, and many of the smaller mines along that stream which usually kept in operation most of the year have had to suspend. The river mines, most of which are operated by Chinamen, are about all that are in operation now.

Casedy & Martin will soon commence work on their ledge, just east of Yreka. They will have to strike the ledge in another place, as it has run out where they have been working. At the last crushing which they had at McCook's mill, on Humbug, from two and a half tons of ore they realized $95.

The Chinese company which is working the old Garret mine, near Hamburg Bar, have done well this season. They are indefatigable laborers, accomplishing work at a small expense which would cost a white man a large sum. When they took the mine the first work was enough to discourage most any one but a Chinaman, as thousands of tons of debris which had been dumped over the pay channel had to be removed. The Chinamen set about it, soon having it out of the way and taking out pay dirt. The mine is hard to manage, especially at the first of the season when such a large volume of water is running in the Klamath. It is impossible to tell just what this company have taken out this season, as they are very reticent about giving any information.

The old Shore ledge in Quartz valley, in which quite a rich strike was made a few days ago, will probably be sold soon to some parties who were looking at it a short time ago. Major Myers, who owns the ledge, has been in the county the past week and will probably make the sale. This ledge has been counted among the best in that section for a long time, and if taken hold of by a company that will put up a good-sized mill and develop it on an extensive scale, it will without a doubt prove to be a splendid paying property.

The owners of the dredger on the Klamath have always claimed that the dredger paid well; it is a well-known fact that the Klamath is one of the richest streams in California, although great doubts were entertained as to the successful operation of the dredger on the Klamath.

It is reported that a miner named Jim McCartner found a nugget of gold at Soda creek, near Dunsmuir, this county, which weighed $300. It is a beautiful specimen, perfectly smooth and shaped like an egg. The diggings where the nugget was found have been worked for over twenty years past. Soda creek is a small tributary of the upper Sacramento.

It is thought that many prospectors who will visit Coffee creek will find their way over the mountains into the Salmon river country, and we may soon expect to hear of a revival of interest in mining circles on the Salmon river. There is a vast amount of good mining ground in that locality which will, with very little doubt, prove to be one of the richest mining sections in the State in a few years.

News: Judah, Pope and Joost of San Francisco have purchased a large tract of patented placer ground near Callahans and are making preparations to secure the necessary water rights and develop the property.

A wing dam has been put in Scott river at a point where the tailings from the Brunt, Shorb & Co. mine have been accumulating for about twelve years past.

J. F. Garrette has bonded the Mattie placer mine at Hamburgh to L. Ramus, who has fitted up the property and will begin operations at once. There is a dip wheel, pump and derrick on the claim.

A large amount of gold has been taken from the mines on Scott river this season without creating a furore, although it would probably have started a boom if the San Francisco papers had correspondents in that locality. The Pidibibeau claim has been paying well, and several good-sized nuggets have been found lately, one weighing $450. Nesbitt & Hunt have been picking up nuggets from the rock worth from $5 to $100. Russell & Walker have taken out numerous specimens worth $60 and less.

Around Callahans: The Siskiyou hydraulic mine has finished assessment work. With two men working for two months $10,000 was cleaned up.

The Montezuma has completed a cleanup and from the statements of the Chinese manager the amount was about $100,000. This mine is operated by hydraulic and adjoins the Last Chance.

The Tacoma Company, B. S. Grosscup manager, is enlarging ditches from Sugar creek and Wild Cat to operate on land adjoining the Last Chance.

The Jamestown Mining Company of Jamestown, N. Y., are running a tunnel to tap a vein which is supposed to be the feeder of the whole county. The surface indications are very promising. They have been at work for two years and expect to soon realize handsomely.

The Last Chance mine, owned by a Portland company, has suspended operations owing to lack of water. They did not reach bedrock and obtained gratifying results as far as they went. The long ditch under construction will not be completed in time to use this year. They intend to carry a line of pipe across to rim rock and work there the balance of the season.

The Crawley quartz mine, owned and operated by Geo. A. Warder, has resumed operations. This property promises to be one of the best in the county. The vein matter is 150 feet in width and contains small strings and streaks of very rich sulphurets. Taking the vein as a whole, the good with the bad, it will average $4 to $5 per ton. The mine has an excellent location.

The Beaudry Mining Company on Wild Cat have five miles of ditch completed and are at

work upon three miles more. These ditches are 4x3½ and 7 feet on top.

The Salt Lake (Utah) Company, operating on the north fork of Coffee creek, about ten miles from Callahans, are having difficulties owing to complications in the company about railroad lands. They still have a few men doing preliminary work.

Trinity.

The Coffee Creek "boom" is subsiding. J. F. Boyle, from Coffee creek, says that Hickory creek, Hardscrabble, North Fork and Union gulches are overrun with hundreds of men looking for something, and some of them are also looking for the man who started the boom. In conversation with Murphy, of the Burgess & Murphy mine, whom the San Francisco papers reported had taken out $80,000, he said they had taken out just $300. When asked how the reports of such a big strike got out, he said the reporter came to the mine and they had just taken out $80. When the reporter got to Nash's it had increased to $800, and when he reached Carrville it was $8000, and when the story reached Redding it was $80,000. At the mouth of Hickory creek and in a few other places stringers have been found which paid well, and some good pockets have also been taken out on Coffee creek, but this is occurring every day with little notice being taken of it.

At New River, P. Larcine has found a cinnabar ledge and is developing it. The *Journal* says it compares favorably with the ore of the Altoona Company's mine.

At the Black Oak mine the *Democrat* says the principal portion of ore reduced at present comes from between the 8 and 10. The average twenty-five tons of ore reduced daily at the mine's mill keeps up, as does also the 200 tons of rich material shipped monthly for treatment to the Selbys. The new 7-drill compressor has started up. It is reported that one machine in the Black Oak, worked two shifts, showed $120,000 for six months' work. The property is being operated full-handed by Superintendent Scott.

Journal: At Know Nothing creek the Gold Run Company have finished a 1100-foot tunnel and a 400-foot upraise for air and are stoping. They have 500 feet of stope. There is a 10-stamp mill, with electric plant. A. Dannenbrink is superintendent.

Tuolumne.

At Cherokee the *Banner* reports the Carlotta, Pennsylvania and Little Carlotta started up, and all necessary machinery and improvements to operate the Carlotta have been placed. A shaft will be sunk 100 feet and tunneling will follow.

Ventura.

The Bunker Hill is to have a 20-stamp mill. New York men are developing the property.

NEVADA.

In the Big Injun mine, near Corville, Esmeralda county, twelve miles from Hawthorne, the ledge that has been found is said to be the biggest thing in the country, with the exception of the Silver Peak mine.

The leaching plant erected in Six Mile canyon by Blood and Harris will be in operation Nov. 15th, and consists of twelve leaching vats, 24 feet in diameter and 5 feet high, two sump tanks 24 feet in diameter 8 feet high; two supply tanks 16 feet in diameter 12 feet high. In all other respects the plant will be similar to the one at Bodie and will be operated by water power, the supply being obtained from the canyon; a ditch 3330 feet long and a pipe line of about 900 feet being necessary to convey the water to the Pelton wheel which will run what machinery there is in the plant. The plant is being erected to work the Park tailings, of which there are about 130,000 tons, at the rate of 200 tons per day.

The concentrator at El Dorado canyon is in charge of E. W. Kay.

The Austin Mining Co. and the Reveille keep the old town of Austin, Lander Co., alive and going. The uniform wages are $2.50 a shift each in the mines, the tunnel and the mill; $20,000 are distributed every month.

The Union mine at present is the principal one, worked by fifty men under T. O'Connell, by the Clifton tunnel, 7,000 feet in length, with over 2,000 feet of crosscuts. Water in Lander hill was tapped about 600 feet below the surface. A bunch of mines, chief of which is the Frost shaft, filled with water to a depth of 400 feet, were drained and rendered fit to be operated after ten years. The tunnel is lighted by 220 incandescents 100 feet apart. The mill, daily capacity eighty tons, is near the entrance.

At Bald mountain, White Pine county, Eastern men have located and patented all the desirable mining land in the vicinity. With the exception of one or two claims, they have a corner on the mineral land. Engineers have been surveying for the company for four months. The company has purchased the Hot Springs ranch for $5000 to secure water for its mills. Bald mountain is sixty miles south of Elko, in the Ruby range.

OREGON.

The men who bought the Horn Silsby-Tucker mine, Jackson county, have organized a joint stock company with Capt. A. M. Brown as superintendent. The mine hereafter will be known as the Oak Flat mine.

G. W. Treffen, superintendent Rogue River mine, on Rogue river, reports running fifteen men and cleaning up from $5 to $12 per day per man

Sharp, Morrison and Hosley made a cleanup at their Powell creek, Josephine Co., mine after a run of fifty-four days, giving $2000.

There are several wing dams in Rogue river between Tolo and Grant's Pass, and many of them are worked to good advantage.

P. H. Oviatt of the Evans Creek Mining Company has a load of coal in Grant's Pass from their mine, tested by the water works engine with satisfactory results.

The Jackson Mountain Mining Company has incorporated in Jackson county; capital, $750,000; office, Portland: D. M. Watson, C. L. Carr, A. J. Farmer. The company is developing a quartz mine a few miles west of Jacksonville.

Brobst Bros. of Denver and Dekum Bros. of Portland have a group of claims on Elk creek under the title of the Apollo Mining & Milling Company, and are working a night and day shift of fourteen men running two tunnels on their property. James L. Brobst is superintendent.

The Ox Heart and the K. S., adjoining the Oro Fino mine, Josephine Co., have been sold to Spokane parties.

The first money on the Horn, Silsby-Tucker placer mine is paid. Baltimore men take the property; price, $20,000.

J. H. Weston of the Summit mine, on the Oregon and California line, reports the crosscut tunnel progressing. He has cut a 30-foot vein of low-grade sulphuret ore.

J. W. and M. A. Robinson of Wimer have a placer mine, Josephine county, on Brass Nail gulch, a tributary of Jump-off Joe creek, a few hundred feet below the Hamersly quartz mine: $1892.26 was the cleanup for ninety days' run with two men.

BAKER COUNTY.

T. Morcom, manager of the Sanger mine, took charge two months ago and has it unwatered.

The Polar Star, near the Bonanza mine, is sold to A. H. Mallory of Spokane.

BRITISH COLUMBIA.

(Special Correspondence). — Klondike will claim very few Vancouver victims. Not a dozen citizens have left for the far-away diggings, owing to the entire city being more or less interested in British Columbia mining, and all expecting big returns from their numerous ventures.

There is little to state that is new. All the camps within a radius of 200 or 300 miles from the seaboard cities are doing development work, assessment work, mining and proving up prospects, and wholesalers who are supplying these camps say that trade was never so good in British Columbia as now, while Victoria business houses have been kept very busy outfitting passengers for Klondike.

Philips Arm, a district a comparatively few miles north of Vancouver, has attracted the attention of several American capitalists of late, who have purchased several claims with a view of development.

The Lillooet and Fraser river hydraulic claims, owned principally by W. Dietjen of New Westminster, have been sold, through a former San Francisco citizen, Mr. Luckenbach, to Ottawa capitalists for $75,000 cash. This is a well known claim on the Lillooet, near the Fraser river, held last year at $110,000. The gravel is said to be very rich.

At Fairview Camp, Okanogan district, the Smuggler crusher has been running night and day with good results. The 20-stamp mill of the Tin Horn will commence to reduce the company's big dump on Sept. 1st.

Vancouver, Aug. 24, '97. GOODMAN.

The Slocan & Liberty Hill Company, in Slocan district, have let a contract for 2000 feet of tunnel work.

The Pilot Bay smelter will start about Oct. 1st, there being more repairing and renovating to be done than was at first estimated. J. N. Walker, who is to be superintendent and metallurgist of the smelter, has arrived from Everett, Wash. The Blue Bell mine will not be worked at first, the smelter having enough contracts to keep it busy on Slocan, Ainsworth and Rossland ores.

The building of a new lead stack at the Nelson smelter and the proposed addition of one at Trail makes it appear as though the silver-lead ores would not have to go out of British Columbia for treatment to the extent that they have formerly done.

At Horsefly, Cariboo, the Horsefly Mining Company's hydraulic elevators are working. No washup has been made and no general one will be until the close of the season. A few thousand have been taken out of sluice boxes, but the main flume will not be disturbed until the close of the season, when an output of $60,000 may be looked for. The working expenses are about $40 per day.

The cement mill returns are satisfactory. The cement yields from $4 to $6 per ton.

R. H. Campbell is down about 250 feet. He has coarse wash carrying some gold.

The ore shipped from North Kootenay via Revelstoke for the fiscal year ending July 1, '97, was valued at $823,387.

The Poorman mine at Rossland will shortly resume operations.

The Slocan ore shipments via the K. & S. railway for July, '97, are as follows:

Payne	2,568,000
Ruth	2,160,000
Slocan Star	360,000
Washington	221,000
Whitewater	210,000
Noble Five	129,095
Great Western	91,000
Ibex	90,000
Surprise	34,000
Slocan Boy	30,000
Wonderful	28,000
Coin	24,060
Ruby Silver	16,000
Total	5,964,095

Applications have been received at Ottawa from persons who desire to lease stretches of the Saskatchewan river and dredge for gold among the sand at the bottom. The Department has decided to grant the leases under stringent conditions, one of which is that a royalty on all gold brought up shall be paid to the Government. After advertising Stewart river, in the Yukon country, as open to tender for dredging for gold, and receiving several offers, the Department decided that it would not be right to hand over the gold in that river except with a proviso that a royalty should be paid to the Government, and no contract was awarded. The gold in the Saskatchewan being very fine and difficult to obtain by washing, and therefore not so much sought after by gold-hunters, it is considered wise to lease five-mile stretches to parties who wish to dredge.

The Dominion Development Company has sold 100,000 shares in the Golden Cache mine on Cayoosh creek, Lillooet district, for $180,000 to M. Oldroyd.

A telegram from the superintendent of the Cariboo Hydraulic Mining Company states that the result of the cleanup which was completed on the 26th ult. is that the amalgam amounts to 5685 ounces, of the estimated value of $60,500—the product of forty-seven days' washing with two giants.

ALASKA.

(Special Correspondence). — Upon the arrival of the Alaska Commercial Company's steamer Excelsior on the 11th we found the Portland from Seattle (the Alaska Transportation Company's steamer) in port with her full complement of gold seekers awaiting the departure of their new river boat, the Hamilton.

The passengers on our boat have been somewhat disappointed and annoyed at the delay that we will be subject to, as the steamer that will take us up the river will not be here before the 20th and cannot depart before the 25th.

In regard to the news from the mines, it is very limited and not of a particularly encouraging nature. In fact, there was more news in San Francisco than here. There have been a few new strikes made since the last news went out to the world from here, and more may have been made since the last reports from the river.

Stampedes of from twenty-five to fifty men have occurred on Dominion creek, Henderson creek and Minuck creek, the latter being about 400 miles below Circle City.

The amount of work on these claims has been insufficient to determine their values, and no doubt it will be some time before the work can be done, owing to the scarcity of labor away from Dawson City, which at present is the headquarters for all mining news.

The question of food supply is a very serious matter at present, and unless the companies interested are able to get more steamers up the river than usual starvation is a certainty, for a very large number of the people have started for the gold fields entirely unprepared to withstand the hardships or to purchase supplies.

There are quite a number of miners camped at Fort Get There, the North American Transportation Company's station here, a number of whom I have talked to, and it is the same old story of the fabulous richness of the Klondike mines and the hardships to be endured and the probability of extreme want and privation.

The fifteen or more miners here at present from up the river have brought down with them not over $150,000, which has been obtained mostly from the sale of claims on the Klondike, and the result, on the whole, is disappointing to those going up.

The price of furs in this northern country, owing to the enormous rush, has advanced to an almost prohibitive figure; and the furs are not of a particularly fine quality.

When I get nearer the gold fields I shall send you a letter concerning the mining news from a mining standpoint, which will be of interest to your readers; so I will leave the padding of news items to the newspaper correspondents, with whom we are plentifully supplied.

St. Michaels, Alaska, Aug. 15th, '97.

A letter from C. G. Yale, dated at St. Michaels, August 25th, states that he and the rest of those who left here on the Excelsior July 28th, were to start up the Yukon the following day. He adds: "All the miners who are waiting here on their way down corroborate the richness of the diggings, but say they are limited yet to the Klondike section, but that others are bound to be discovered as soon as winter permits any prospecting. The ground is too wet now. Prices are enormous here for everything; money is of no use at all as representing grub. They predict a scarcity of food of certain kinds up the river, but supplies are being rushed up. We take 1200 tons up on the new steamer Hamilton. Wonderful to relate, they leave barrels of whisky worth $25 per gallon, to make room for flour, beans and bacon. We paid $30 for a Russian bath yesterday for five of us—that is, $6 each, and $1.35 for a towel. Furs are higher here than in San Francisco. The flush miners pay $5 for a 25-cent article, and everything has gone up sky-high. Tell nobody to come up before spring. They all say that it is best by all odds. It will be rough here this winter. There are altogether too many men for the work and supplies, if reports be true."

IDAHO.

At Florence the recent purchase of the Blossom mine by N. D. Moore of Spokane has given the camp a "boom." The price was $10,000 cash.

At the Tiptop mine on the Hailey gold belt, recently purchased by J. Q. Packard of Salt Lake City, work is being pushed; a reduction plan is promised for next spring. There are two ore chutes, one about 300 feet the other 100 feet in length. The mine is being developed by an inclined shaft from the surface and by two tunnels. The Tiptop was discovered in the '70s; but very little work was done upon it until about three months ago.

Hailey *Times*: The company that is to recover the values in the old tailings of the Camas No. 2 is known as the Idaho Recovery Company. It is an offshoot from the American Cyanide Company, whose process it will use, with such modifications as the constituents of the tailings deposit will require. The Recovery Company, it is generally believed, is to pay $40,000 for the tailings. It will cost $1.25 per ton to work them. That will be about $40,000 on the 30,000 tons at the old millsite. If they extract $5 per ton, they will net $70,000 on the operation.

Near Elk City, the American Hill Mining & Development Company, which took out $123,000 last season, have a large force following the old river channel. A hydraulic plant is being used.

UTAH.

The producer of a certain class of ore that is marketed in Salt Lake City, says the *Tribune*, each day is getting a better margin than the miner who was putting out a similar class over twenty years ago. Twenty-one years ago he was receiving $1 an ounce for his silver; yesterday the market price of the same metal was 52 cents.

That this is true is disclosed in a little book that has been preserved by Jos. Galigher since September 19, 1874. On that date he was marketing ore from the Spanish mine at Bingham. The metallic contents of the ore consisted of lead, silver and gold, with a very small amount of the latter. The miner at that early day was anathematizing conditions that rendered his margins very narrow, and with silver at 52 cents, the same man was profaning them yesterday. It was while a group of them were expressing their grievances that they were invited to go back into the past and measure the hardships with which the miner of '76 had to contend as compared with those that are reducing his profits to-day. Upon the leaf at which Mr. Galigher's record was opened was engrossed the story of a shipment of ore made in August, 1876, from the Spanish mine, of which W. G. Galigher was the manager. The returns from the sampler showed that the ore contained 45 per cent lead, 10.20 ounces silver and gold of the value of $2.99 per ton. The settlement discloses that the seller received $15.20 per ton, whereas had the same lot been marketed yesterday, he would have received $21.80 per ton for the same lot. On his lead the shipper of '76 was allowed $1 per unit for all in excess of 40 per cent lead, the 40 per cent being exacted by the smelter. From his lead he accordingly derived $5. For his silver he received $1 per ounce, which on the shipment would have earned him $10.20, while nothing was allowed him for the particle of gold contained in the lot. In fact, he was allowed nothing for his gold unless it reached $3.

The copy of another shipment was found further on in the same book, where a lot of ore was marketed that showed 40 per cent lead, 22.74 ounces silver and gold of the value of $6.01 per ton. This consignment was from the Storey mine at Bingham. The smelter for reducing it to bullion exacted 35 per cent of the lead, and settled with the shipper at 50 cents a unit for all in excess of that amount, which allowed him $2.50 out of his lead. For his silver he received $1 an ounce, or $22.74, and for his gold $3, making a total of $28.25 per not. But at that time the producer did not have the facilities for extracting his ores and marketing them that are afforded at the present time. The book discloses that in the marketing of the lot of ore on September 8, 1876, from the Storey mine, the consignor was compelled to shell out $3.75 per ton for transportation from Bingham, whereas at this time the rate is $1.25. The same settlement shows that the shipper paid $3.75 for the sampling of his ore, whereas to-day he is required to pay about 60 cents per ton save where the output is under contract, when he pays but 50 cents. In addition to this the producer was made to pay $4 for an assay that may be obtained to-day for $1.50. In the shipment from the Spanish mine, where the presence of gold of the value of $2.99 is certified to, and which was ignored in the settlement, he would have yesterday been allowed $1.85, according to a local smelter, and with this added to the settlement, the man who sold his ore in 1876 would have received $9.70 per ton more had he marketed it yesterday.

These examples are given that the miner of the present may grasp an idea of the hardships with which the miner of the past had to contend. As the time has sped on the methods of smelting have been simplified and improved, the price of the supplies has been reduced, the railroads are operating at less expense, and a variety of changes has wrought a revolution in the production and the marketing of ore.

It is the silver miner who has neither lead, copper nor gold upon which to rely at this time whose wounds are bleeding him to death. Where the same properties in the ore described in the settlements contained in Mr. Galigher's record exist to-day, the producer is realizing more from his product than he was twenty years ago or a year ago.

Tribune: The Mercur mine has made another shipment of seven flasks of quicksilver.

At present Superintendent Bamberger is securing about two flasks of "quick" per month, derived from the cyanides during the process of drying them in an ordinary retort. The mercury contained in the cyanides passes off in fumes that are conducted through a pipe that is connected with the bottom of a small tank which is filled with water. In the contact between the two elements the fumes are "solidified" and the mercury is deposited on the bottom, from which at regular intervals it is drawn and placed in the flasks. From a piece of ore taken out of the Mercur there is derived quicksilver, gold and the barest percentage of silver.

Were it not for the gold contained in the ores of the Centennial Eureka, it is not unlikely that the management would join the movement looking to the closing down of certain mines in Tintic district. Where the ruinous decline in silver is offset by the advance in lead in some properties, the effect is overcome by the presence of gold in the Centennial Eureka.

MONTANA.

Around Philipsburg: The Bi-Metallic Mining Company shipped to one of their properties in Pocahantas, Mariposa county, California, a small sinking pump.

The owners of the Red Lion property are overhauling the 10-stamp mill preparatory to starting crushing ore.

Butte parties are considering the advisabil-

(Continued on page 222.)

Mechanical Progress.

By-products in Coke Making.

The chief of the by-products utilized by the by-product oven systems is ammonia. Hitherto the sole source of supply of ammonia in the United States was in the illuminating gas plants, but the use of electricity and of water gas has decreased the production of the article, while the demand for it has been on the increase. Ammonia has many uses. It is an essential material in ice manufacturing, in electrical batteries, in chemical manufactures, and in the manufacture of fertilizers it is substituted for nitrate of soda. The yield of ammonia from regular coking coal is about twenty pounds per ton of coke produced, and at the minimum value of $20 per ton this product alone would be worth 20 cents for each ton of coke.

Two kinds of gas are obtained from coal by means of the retort coke oven system. These are illuminating gas and manufacturing or fuel gas. The latter makes a very good substitute for natural gas. The production of illuminating gas in the retort oven involves a change in the operation of the oven, so that ordinarily produced gas, with the recuperation of both gas and air, may be burned in the flues instead of the rich coke oven gas. It has been estimated that for each ton of coke produced upward of 8000 cubic feet of gas are given off, and the entire product yielded annually in the United States by the coking of coal, allowing one-half to be consumed in the coking process, is upward of 60,000,000,000 cubic feet, or but little less than one-fourth of the annual natural gas production during the height of that excitement.

By-product oven tar is superior to the tar which comes from the gas works. It contains less pitch. The yield for each ton of coke varies from forty to one hundred pounds, according to the amount of volatile matter contained in the coal. It has a fuel value equivalent to $5 per ton, or that obtained by coking a ton of coal is worth from 10 to 25 cents. As a roofing and paving material this tar has a value of about $8 per ton.

As a material for the manufacture of fuel briquettes, coke oven tar stands pre-eminent. In addition to the above uses, this tar, after passing through the complex processes of modern chemistry, comes to us in the form of aniline dyes, saccharine, benzol and other products.—William G. Irwin in Cassier's Magazine.

Mounting Machinery on Springs.

"Should machinery be mounted on springs?" is a question of present discussion. Those who argue in favor of mounting an engine or dynamo on springs say "if gear wants to wobble let it wobble."

If one considers say a direct-acting pump in space, it is a system that of course cannot move its center of gravity as a whole. If, then, its pistons and plunger move in one direction, the rest must move in another direction, the distance depending on their masses. Any imperfectly balanced machinery must, therefore, move its bed plate if freely suspended. A perfectly balanced engine is thus an engine whose center of gravity never varies relatively to its bed plate. This definition is really too small, because a moving system, such, for instance, as two cranks at 120° on opposite ends of a shaft, do not change their center of gravity, but give the bed plate a rocking but non-transitional movement. A gas engine with a flywheel similarly tends to rotate its bed plate at each impulse around an axis parallel to that of the shaft. A balanced engine is, therefore, really one which does not move its bed plate if freely suspended. Such an engine is practically never realized.

When an engineer sees an engine bed plate moving, his first instinct is to bolt it down; it then moves a little less, but still moves, and he has a sort of feeling that it must shake itself to pieces if allowed to move. Bolting down an engine to a bed of concrete is merely increasing the size of its effective bed plate, but the whole bed plate, including the concrete, must now be moved. It rests on the earth, moves slightly, and communicates vibration to neighbors who are longing to be compensated for disturbance. Sometimes the concrete bed plate is isolated by mounting it on felt. That means that the larger bed plate is mounted on imperfect springs.

"The question is, if the bed plate of an engine wants to move, why should it not have free play? As far as the engine goes, a little thought will show that all its parts are subjected to smaller stresses if the bed plate is free to move. An engine will, therefore, wear longer if it is allowed to move its bed plate."

Knocking in Engines in Steam Spaces.

When an engine knocks heavily at starting at each end of its piston stroke, even a tyro knows that there is water in the cylinder, and that he has probably forgotten to open the drain cocks. The warning given by the engine is clear and emphatic, and must be attended to instantly. But sometimes the message is conveyed in another way: There is a muffled blow of the piston and a sharp crack is heard with each stroke. This does not come from the piston, but from the slide valve. This message also tells of water, but from the dull sound of the piston knock we learn that an early compression, by cushioning the steam, drives out the imprisoned water before the piston can strike it with a hammer action. We also know that, as the exhaust port of the valve is shut, something must give way to allow of the escape of the water. The line of least resistance to this escape is at the valve, which is driven back from its face. It is true that the steam in the valve chest is pressing the valve down, but the pressure below it being greater for the moment, the valve rises slightly to allow a thin sheet of water to rush across the port bridge to the exhaust. Then, with the normal motion of the valve moved by the valve rod, a free course is given through the ports; the steam pressure reasserts itself, and with a sharp sound the valve is clapped down upon its face again.

But here, again, we may have variations in the message. The knock of the valve may be of less loudness than is usual when water is imprisoned, and at the same time there might be a total absence of a cylinder knock. Also, the engine may have been running for some time, while the valve click still continues. The engineer has drained the cylinder well, and the cylinder walls are thoroughly heated. The indicator diagram is examined. Then, if the steam compression line shoots higher than the steam line, the clicking of the valve tells that too much compression is being caused by a faulty proportion or setting of the valve.

If the valve has been recently set, and the knock is a new one to the engine, then the valve setting alone is wrong. In this case the knock will be at one end only of the valve stroke, and the excessive compression will be seen only at one end of the double diagram. Thus, by reflection, the engineer can interpret accurately the meaning of the message imparted to him by the engine.

But there is yet another case where the valve is knocked off its face. The valve has been set correctly, and the engine has been at work for some time before the clicking sound is heard. In this case, also, the diagram shows a compression higher than the steam pressure from the boiler, and also only at one end. Other peculiarities of the diagram will also be seen. The compression as it begins on the exhaust line will be right at the end, but be too late at the other end. In fact, on the return stroke everything will be late. Originally the diagram was good, but now the valve has got out of setting at one end, while it is right at the other. For this there is only one explanation, which is that the valve has got partly adrift on its rod. The cotter pin at one end has dropped out and the nuts have slackened back at the end, while the nuts at the other end have retained their position.

Though in this, as in some other cases, the knocking in steam spaces may not by itself tell us everything, yet by comparing the written with the spoken message of the engine we soon arrive at a right conclusion as to what the engine is complaining about. But in all ordinary cases it is not always realized, except by those "in the know," how valuable a guide to defects is given by the varying sounds of an engine, not only in the steam spaces, but in every other part of the mechanism.

THE steel for locomotive boilers is supplied by contract in the shape of flat, rectangular sheets. Before it is accepted the tensile and breaking strength of each one is tested. Next it is marked off by measure with chalk lines for rivet holes, which are punched through it by a machine that does the work as quickly and easily as if it were a slice of cheese. Then the sheet is trimmed to the proper size by a great steel knife, which cuts off the edges like paper. Finally it is turned into a curved shape by passing between huge rollers, and is riveted to other sheets, which make up the cylindrical tube of the boiler, by means of redhot iron bolts. A boilermaking shop is notoriously the noisiest place on earth, but it is surprising to find how soon one gets used to the clamor, so that it would be possible to lie down and sleep amid it all. There is nothing like getting used to things. Every now and then a man is killed in the works by having a boiler roll upon him. He has had such long practice in eluding dangers of the sort that he becomes too indifferent, stepping out of the way a moment too late.

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1. Increased mechanical efficiency.
   Decreased vibration;
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   Less fuel per ton of quartz crushed.
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On the top of a frame is a crank shaft with five cranks at equal angles, each of which is provided with a connecting rod jointed to a cylinder in such a way that, as the crank revolves, the cylinder moves up and down. Within the cylinder is a deep plug or piston, the rod of which passes through the cylinder bottom, and constitutes the stem to which the stamp head is attached. A jacket surrounds the cylinder, and at a distance from the bottom is an aperture or port communicating with the jacket space; another port at the top of the cylinder also makes the cylinder and jacket common to one another. The cylinder below the lower port is filled with liquid, the jacket also contains liquid, and above the liquid is air space—both in the cylinder and in the jacket. When the bottom of the piston closes the lower port and the cylinder moves upwards, the piston and stamp head are supported by a body of liquid. If none of this escapes, and the down strokes of the cylinder do not exceed the number which the stamp head could make under the action of gravity, minus the retardation through friction, and if the length of stroke of stamp head is the same as that of the cylinder, the position of the piston within the cylinder remains constant, and the liquid is practically undisturbed. If, however, the stroke of the stamp head is less than that of the cylinder,

and the speed of rotation is, as before, within practical gravity limits, it follows, when the shoe strikes the die, and the cylinder has completed its stroke, that the position of the bottom of the piston is above the cut-off point by an amount equal to the difference of stroke between the stamp head and the cylinder, this space being filled with liquid, which has been drawn in from the jacket. On the upstroke of the cylinder this liquid is forced into the receiver until the cut-off position is reached, when the piston is again raised on a liquid medium as before. It is evident that if the point of pick-up occurs before mid-stroke, that the stamp head will acquire the same upward velocity as the cylinder; the latter comes to rest, however, by the action of the crank, whilst the former is governed by the retarding influences of gravity and friction, so that at the ordinary working speeds the piston will continue its upward motion after the upstroke of the cylinder by an amount dependent on the velocity acquired at about mid-stroke. At certain velocities of rotation, when the stamp head commences to fall, the cylinder will have completed a portion of its down stroke, and if the velocity of fall of the cylinder is not less than that due to gravity, minus friction, the velocity of fall of the stamp head will be increased by the assisting effect of the friction between the surfaces of the cylinder and piston, and also between the rod and the packing, with the result that a very much greater number of drops can be obtained than is possible with the cam arrangement.

The liquid used is water, with a sufficient addition of soap for the purpose of lubrication and to prevent corrosion, and the quantity of liquid is maintained by the continuous flow from a small supply pump from a fixed tank—inflow and outflow being by means of small tubes, one small pump being sufficient for any number of stamps. The upper part of the cylinder above the top port is grooved longitudinally, so that, if a stamp head is hung up, the air passes from one side of the piston to the other without resistance.

In order to provide for the wearing of the shoe, and the consequent lowering of the piston within the cylinder, several cut-off holes are provided at about 1½-inch pitch, so that on the shoe and die wearing to that extent, all that is necessary is to unscrew the next lower plug—thus establishing a new cut-off port 1½ inches lower than the previous one. It has been found that the piston, floating as it does on a quantity of liquid, renders the stem so susceptible to rotation that the shoe rarely strikes the die without certain rotary movement resulting, and it is probable that this will be found sufficient in practice to ensure the even wearing of the surface of the shoe and die; but, if desired, a very simple system of turning gear can be fitted, which works very effectively. No trouble is experienced through leakage at the gland, as midway in the stuffing box is a lantern bush connected to the jacket, so that the packing below this bush is only subjected to the head of liquid in the jacket, or under one pound per square inch. Special attention has also been given to the danger of any lubricant falling into the mortar—the lower supporting frame being constructed of trough form, with an inclined base, so that all waste lubricant is caught and retained.

Exploring South Polar Regions.

The course of at least one expedition will be directed to the south polar regions during the present summer. The expedition of Lieut. Gerlache, which was to have sailed from Antwerp last year, but which for various reasons — especially financial — was obliged to postpone its departure for a time, sailed from European waters on Monday, the full guarantee fund of 250,000 francs having apparently been raised, largely, it is said, through the agency of influential women who took an interest in the enterprise. The destination of Lieut. Gerlache is the region about Graham Land, or more properly Graham archipelago, that part of the Antarctic world which lies almost due south of the apex of the South American continent. It is this tract which is now generally assumed to have been at one time, a time not very remote in geological history, united with the northern land, the fragments of disruption between the two being still seen in the island groups—Falkland islands, South Shetland islands, South Georgia, etc.—which lie in the twist of the broken Andean system. The Norwegian Larsen visited the region in the latter part of 1893, and succeeded in penetrating beyond the 68th parallel of south latitude. To him is due the discovery of the first traces of organic life contained in any rock mass appertaining to Antarctica, a discovery which has thrown new and unexpected light upon the physical conditions which are bound in with the southern pole of our planet. The fossils are of most interest in their botanical relations, for in the discovery of the remains of a forest of the Chilean pine or araucaria we have a most marked contrast presented to the utter barrenness which is exhibited by the floral display of to-day, not a trace of vegetation higher in organization than a lichen having up to the present moment been detected in the entire Antarctic world. This climatic contrast between the past and the present sees itself repeated in the antipodal north, where the stone remains of Atane, Atanekerdluk, and Patoot, in Western Greenland, read the history of giant forests and foresters in place of the lowly vegetation of 6 or 8 inches of today. To Capt. Larsen is also due the discovery of volcanic activity in this part of the Antartic world, Lindenberg and Christensen islands being in a condition of eruption at the time of his visit. A half century earlier Ross had found Mt. Erebus, on Victoria Land, south of Australia, in a similar condition of activity, the fiery volcano rising to the stupendous elevation of 12,000 feet, presenting one of the most sublime spectacles that it has been the good fortune of man to gaze upon.

What may be the extent of Mr. Gerlache's discoveries it is naturally impossible to foretell, but certain it is that opportunity exists for making a most important contribution to a knowledge of our earth. Surprising though it may appear, the Antarctic terra incognita covers an area of at least 4,000,000 square miles, or considerably more than the area of the semi-continent of Europe. The main object of the expedition is, naturally, the attainment of the farthest southern point possible, and probably an effort will be made to follow in the path of Weddell, who, in 1823, reached the surprisingly high latitude of 74 degrees 15 minutes south. It will be most interesting to note if the methods of traveling over the ice cap introduced by Peary and Nansen will be possible here, a condition that will probably be largely determined by the practicability, or impracticability, of an ascent of the vertical face of the so-called Antarctic barrier—the great Chinese wall of the south. In whatever manner conceived, the work of the expedition will be looked forward to with much interest, especially at this time when scientists are inclined to believe that the earth is top-shaped rather than spherical, and that the apex of the top is approximately the south pole.

LORD KELVIN has invented and put into successful operation at Shoreditch, England, a garbage crematory. Its action is mainly automatic, by means of electricity. The lifting and emptying are done by automatic electric hoists, which deposit the garbage into cells, where it is burned. The heat of the furnace is intense, and it is increased by forced draft. The air to produce the tremendous draft in the furnaces is drawn by pumping machines from the city sewers. Thus the sewers are ventilated and their noxious gases destroyed. The heat produced incidentally is used for making steam, and that runs dynamos for any firm wanting manufacturing power.

Electrical Progress.

Telephony from a Layman's Standpoint.

Electrical engineering, as applied to the innumerable improvements in the construction of telephone instruments, is accomplishing new triumphs daily. The rapidity with which the distance over which telephonic communication can be had exceeds the most vivid imagination.

The mystery of it all is a cause of never-ceasing wonder. One can arise from the place where he is writing and call, from his desk, a friend in Los Angeles. The impulse of his voice goes out through a gimlet hole in the wall, speeds away over the housetops, through the smoke and noise of roaring shops and factories, out across fields, rivers, lakes and mountains, through towns and villages. It passes through forests, where birds are singing; it passes the farmer's wagon toiling along the country road; it goes past schoolhouses where children are droning over their books. It perhaps encounters a thunder storm, but on it goes through every sort of sight and scene, over the roofs and through the roar of cities, straight from the vocal chords to the tympanum of the receiver at the other end, which little bit of metal transposes the vibrations into articulate speech, and it in turn tells to his friend the thoughts that he is uttering. It not only does this, but it does it so faithfully that one is able to recognize the tones of the other's voice and would probably be able to discover the identity without the necessity of announcing it. The performance of this little tympanum in the receiver is one of the most curious of the many curious things about it. It had been supposed that in order to produce articulate speech certain motions of the mouth, which could not be imitated, were necessary, but here is a little flat piece of metal that actually talks, and talks plainly, too. The vibrations of the vocal chords, modified by the mouth, teeth, tongue and lips—for we use them all in talking—has set up similar vibrations in the transmitter; and these vibrations, unseen and unfelt, have somehow or other, by the aid of electricity, traveled a great distance. Imperceptible and weak as they are, they have in all their long journey lost not one whit of their quality, tone or accuracy. Every infinitesimal inflection has been retained; and, all in their proper order, they strike the diaphragm of the receiver and the receiver talks.

It gets there. But how? Does it drive straight through the hundreds of miles of copper wire which stretch out between the two cities, or does it travel on the surface of the wire? Ask the telephone expert and he will tell you he does not know. It is certain that the wire has something to do with it in the present state of the art. But it may be done without a wire. In an experimental way, telephone messages have been sent by the aid of a ray of light. It has carried the vibrations of sound and reproduced them in the same way as is done by the aid of a wire and the electric current.

Reflection on the subject leads to doubt whether there is really any such thing as distance. Maybe one's friend could hear ordinary conversation at so great a distance without any instrument if he had the right kind of an ear. It has been recently demonstrated that telegraphing can be carried on through long distances without any wires, provided the proper instruments are at hand to catch the vibrations and make them perceptible to the human ear. It has been discovered that there are invisible rays of light which penetrate opaque substances, and that there are sounds which the human ear is incapable of apprehending. All sound and light is caused by vibrations, and only those within a certain compass produce any effect upon organs of sight and hearing.

If a beam of light can so arrange the medium for the conveyance of sound that the vibrations that produce it will follow its direction and be reproduced, is there any limit to the range of sound? May we not one of these days hear the roar of the conflagration on the sun? May our ears not catch the sounds on Mars and on the other planets and stars, and may we not converse with their inhabitants, if they have any? None of these are much more wonderful than the performances of the little talking disc which repeats our conversation to our friend so far away.

Storage Batteries for Electric Power Stations.

For electrical plants the use of accumulators as a means of steadying the load diagram is a favorite method. Theoretically, the generators could be operated uniformly, provided sufficient accumulator capacity were arranged to absorb and store the surplus energy developed during hours of light load, and European experience has justified the value of this practice. In America results have not been so favorable. This is partially attributable to the higher load factors there, the average being 35 to 40 per cent against 15 to 20 per cent in Europe. In America the storage-battery industry has for so long been involved in legal complications that central station managers have been reluctant to invest in plants as possible subjects of litigation.

The accumulator has been passing through a period of experimental development, involving its action in so much obscurity as to preclude reliable estimates of life and prevent any accurate knowledge of the true rates of deterioration. Spurred by competition, manufacturers overrate their product, and the resulting list of battery plats consigned to the scrap heap is disheartening. Finally, the prices charged by American makers, together with their reluctance to assume the responsibility for imperfect manufacture, have made the American storage battery installation almost an unknown type. As German prices are about 0.6 as much per unit of capacity as American, and as German manufacturers will insure perpetual maintenance at 4 per cent on the cost of the cells, the slow progress of American accumulator plants is not difficult to understand.—A. V. Abbott in Cassier's Magazine.

THE danger peculiar to electrical generating works is the liability to shock, which is often fatal if by accident any one comes into contact with the conductors when charged to a high pressure, says the London *Electrician*. The contact need neither be very perfect nor direct. Provided two parts of the body are made to touch conducting materials which themselves differ in pressure by 1000 volts or more, or even by much less if the contact with the flesh is very good, a dangerous and possibly fatal shock will result. The ground, especially if damp, is sufficient for one of the contacts, damp leather boots affording no protection, so that any one standing on the ground or on metallic or damp wood flooring cannot safely touch a single object charged to a dangerous pressure. If, however, he should be standing upon a dry india-rubber mat, which is an excellent non-conductor, he will come to no harm on touching any number of dangerously charged bodies which are at the same electrical pressure; but if he should simultaneously touch, even through his clothes, two bodies which differ from one another in pressure by about 1000 volts, the actual amount depending largely on the perfection of the contact; or, if while safely touching highly charged metal, he should touch or pass by hand any conducting article to some one else who is not also insulated, then a fatal shock may follow.

MONS. C. CHENEVEAN suggests, as a means of removing the thin film of oxide from aluminum goods, preparatory to electroplating them, to immerse the goods in a solution of an alkaline carbonate, followed by treatment with hot dilute hydrochloric acid (one in 20), and final immersion in a dilute solution of copper sulphate.

Mechanical Progress.

By-products in Coke Making.

The chief of the by-products utilized by the by-product oven systems is ammonia. Hitherto the sole source of supply of ammonia in the United States was in the illuminating gas plants, but the use of electricity and of water gas has decreased the production of the article, while the demand for it has been on the increase. Ammonia has many uses. It is an essential material in ice manufacturing, in electrical batteries, in chemical manufactures, and in the manufacture of fertilizers it is substituted for nitrate of soda. The yield of ammonia from regular coking coal is about twenty pounds per ton of coke produced, and at the minimum value of $20 per ton this product alone would be worth 20 cents for each ton of coke.

Two kinds of gas are obtained from coal by means of the retort coke oven system. These are illuminating gas and manufacturing or fuel gas. The latter makes a very good substitute for natural gas. The production of illuminating gas in the retort oven involves a change in the operation of the oven, so that ordinarily produced gas, with the recuperation of both gas and air, may be burned in the flues instead of the rich coke oven gas. It has been estimated that for each ton of coke produced upward of 8000 cubic feet of gas are given off, and the entire product yielded annually in the United States by the coking of coal, allowing one-half to be consumed in the coking process, is upward of 60,000,000,000 cubic feet, or but little less than one-fourth of the annual natural gas production during the height of that excitement.

By-product oven tar is superior to the tar which comes from the gas works. It contains less pitch. The yield for each ton of coke varies from forty to one hundred pounds, according to the amount of volatile matter contained in the coal. It has a fuel value equivalent to $5 per ton, or that obtained by coking a ton of coal is worth from 10 to 25 cents. As a roofing and paving material this tar has a value of about $8 per ton.

As a material for the manufacture of fuel briquettes, coke oven tar stands pre-eminent. In addition to the above uses, this tar, after passing through the complex processes of modern chemistry, comes to us in the form of aniline dyes, saccharine, benzol and other products.—William G. Irwin in Cassier's Magazine.

Mounting Machinery on Springs.

"Should machinery be mounted on springs?" is a question of present discussion. Those who argue in favor of mounting an engine or dynamo on springs say "if gear wants to wobble let it wobble."

If one considers say a direct-acting pump in space, it is a system that of course cannot move its center of gravity as a whole. If, then, its pistons and plunger move in one direction, the rest must move in another direction, the distance depending on their masses. Any imperfectly balanced machinery must, therefore, move its bed plate if freely suspended. A perfectly balanced engine is thus an engine whose center of gravity never varies relatively to its bed plate. This definition is really too small, because a moving system, such, for instance, as two cranks at 120° on opposite ends of a shaft, do not change their center of gravity, but give the bed plate a rocking but non-transitional movement. A gas engine with a flywheel similarly tends to rotate its bed plate at each impulse around an axis parallel to that of the shaft. A balanced engine is, therefore, really one which does not move its bed plate if freely suspended. Such an engine is practically never realized.

When an engineer sees an engine bed plate moving, his first instinct is to bolt it down; it then moves a little less, but still moves, and he has a sort of feeling that it must shake itself to pieces if allowed to move. Bolting down an engine to a bed of concrete is merely increasing the size of its effective bed plate, but the whole bed plate, including the concrete, must now be moved. It rests on the earth, moves slightly, and communicates vibration to neighbors who are longing to be compensated for disturbance. Sometimes the concrete bed plate is isolated by mounting it on felt. That means that the larger bed plate is mounted on imperfect springs.

"The question is, if the bed plate of an engine wants to move, why should it not have free play? As far as the engine goes, a little thought will show that all its parts are subjected to smaller stresses if the bed plate is free to move. An engine will, therefore, wear longer if it is allowed to move its bed plate."

Knocking in Engines in Steam Spaces.

When an engine knocks heavily at starting at each end of its piston stroke, even a tyro knows that there is water in the cylinder, and that he has probably forgotten to open the drain cocks. The warning given by the engine is clear and emphatic, and must be attended to instantly. But sometimes the message is conveyed in another way: There is a muffled blow of the piston and a sharp crack is heard with each stroke. This does not come from the piston, but from the slide valve. This message also tells of water, but from the dull sound of the piston knock we learn that an early compression, by cushioning the steam, drives out the imprisoned water before the piston can strike it with a hammer action. We also know that, as the exhaust port of the valve is shut, something must give way to allow of the escape of the water. The line of least resistance to this escape is at the valve, which is driven back from its face. It is true that the steam in the valve chest is pressing the valve down, but the pressure below it being greater for the moment, the valve rises slightly to allow a thin sheet of water to rush across the port bridge to the exhaust. Then, with the normal motion of the valve moved by the valve rod, a free course is given through the ports; the steam pressure reasserts itself, and with a sharp sound the valve is clapped down upon its face again.

But here, again, we may have variations in the message. The knock of the valve may be of less loudness than is usual when water is imprisoned, and at the same time there might be a total absence of a cylinder knock. Also, the engine may have been running for some time, while the valve click still continues. The engineer has drained the cylinder well, and the cylinder walls are thoroughly heated. The indicator diagram is examined. Then, if the steam compression line shoots higher than the steam line, the clicking of the valve tells that too much compression is being caused by a faulty proportion or setting of the valve.

If the valve has been recently set, and the knock is a new one to the engine, then the valve setting alone is wrong. In this case the knock will be at one end only of the valve stroke, and the excessive compression will be seen only at one end of the double diagram. Thus, by reflection, the engineer can interpret accurately the meaning of the message imparted to him by the engine.

But there is yet another case where the valve is knocked off its face. The valve has been set correctly, and the engine has been at work for some time before the clicking sound is heard. In this case, also, the diagram shows a compression higher than the steam pressure from the boiler, and also only at one end. Other peculiarities of the diagram will also be seen. The compression as it begins on the exhaust line will be right at the end, but be too late at the other end. In fact, on the return stroke everything will be late. Originally the diagram was good, but now the valve has got out of setting at one end, while it is right at the other. For this there is only one explanation, which is that the valve has got partly adrift on its rod. The cotter pin at one end has dropped out and the nuts have slackened back at the end, while the nuts at the other end have retained their position.

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The high-speed gravitation stamp mill is constructed as follows:

On the top of a frame is a crank shaft with five cranks at equal angles, each of which is provided with a connecting rod jointed to a cylinder in such a way that, as the crank revolves, the cylinder moves up and down. Within the cylinder is a deep plug or piston, the rod of which passes through the cylinder bottom, and constitutes the stem to which the stamp head is attached. A jacket surrounds the cylinder, and at a distance from the bottom is an aperture or port communicating with the jacket space; another port at the top of the cylinder also makes the cylinder and jacket common to one another. The cylinder below the lower port is filled with liquid, the jacket also contains liquid, and above the liquid is air space—both in the cylinder and in the jacket. When the bottom of the piston closes the lower port and the cylinder moves upwards, the piston and stamp head are supported by a body of liquid. If none of this escapes, and the down strokes of the cylinder do not exceed the number which the stamp head could make under the action of gravity, minus the retardation through friction, and if the length of stroke of stamp head is the same as that of the cylinder, the position of the piston within the cylinder remains constant, and the liquid is practically undisturbed. If, however, the stroke of the stamp head is less than that of the cylinder,

and the speed of rotation is, as before, within practical gravity limits, it follows, when the shoe strikes the die, and the cylinder has completed its stroke, that the position of the bottom of the piston is above the cut-off point by an amount equal to the difference of stroke between the stamp head and the cylinder, this space being filled with liquid, which has been drawn in from the jacket. On the upstroke of the cylinder this liquid is forced into the receiver until the cut-off position is reached, when the piston is again raised on a liquid medium as before. It is evident that if the point of pick-up occurs before mid-stroke, that the stamp head will acquire the same upward velocity as the cylinder; the latter comes to rest, however, by the action of the crank, whilst the former is governed by the retarding influences of gravity and friction, so that at the ordinary working speeds the piston will continue its upward motion after the upstroke of the cylinder by an amount dependent on the velocity acquired at about mid-stroke. At certain velocities of rotation, when the stamp head commences to fall, the cylinder will have completed a portion of its down stroke, and if the velocity of fall of the cylinder is not less than that due to gravity, minus friction, the velocity of fall of the stamp head will be increased by the assisting effect of the friction between the surfaces of the cylinder and piston, and also between the rod and the packing, with the result that a very much greater number of drops can be obtained than is possible with the cam arrangement.

The liquid used is water, with a sufficient addition of soap for the purpose of lubrication and to prevent corrosion, and the quantity of liquid is maintained by the continuous flow from a small supply pump from a fixed tank—inflow and outflow being by means of small tubes, one small pump being sufficient for any number of stamps. The upper part of the cylinder above the top port is grooved longitudinally, so that, if a stamp head is hung up, the air passes from one side of the piston to the other without resistance.

In order to provide for the wearing of the shoe, and the consequent lowering of the piston within the cylinder, several cut-off holes are provided at about 1½-inch pitch, so that on the shoe and die wearing to that extent, all that is necessary is to unscrew the next lower plug—thus establishing a new cut-off port 1½ inches lower than the previous one. It has been found that the piston, floating as it does on a quantity of liquid, renders the stem so susceptible to rotation that the shoe rarely strikes the die without certain rotary movement resulting, and it is probable that this will be found sufficient in practice to ensure the even wearing of the surface of the shoe and die; but, if desired, a very simple system of turning gear can be fitted, which works very effectively. No trouble is experienced through leakage at the gland, as midway in the stuffing box is a lantern bush connected to the jacket, so that the packing below this bush is only subjected to the head of liquid in the jacket, or under one pound per square inch. Special attention has also been given to the danger of any lubricant falling into the mortar—the lower supporting frame being constructed of trough form, with an inclined base, so that all waste lubricant is caught and retained.

Exploring South Polar Regions.

The course of at least one expedition will be directed to the south polar regions during the present summer. The expedition of Lieut. Gerlache, which was to have sailed from Antwerp last year, but which for various reasons — especially financial — was obliged to postpone its departure for a time, sailed from European waters on Monday, the full guarantee fund of 250,000 francs having apparently been raised, largely, it is said, through the agency of influential women who took an interest in the enterprise. The destination of Lieut. Gerlache is the region about Graham Land, or more properly Graham archipelago, that part of the Antarctic world which lies almost due south of the apex of the South American continent. It is this tract which is now generally assumed to have been at one time, a time not very remote in geological history, united with the northern land, the fragments of disruption between the two being still seen in the island groups—Falkland islands, South Shetland islands, South Georgia, etc.—which lie in the twist of the broken Andean system. The Norwegian Larsen visited the region in the latter part of 1893, and succeeded in penetrating beyond the 68th parallel of south latitude. To him is due the discovery of the first traces of organic life contained in any rock mass appertaining to Antarctica, a discovery which has thrown new and unexpected light upon the physical conditions which are bound in with the southern pole of our planet. The fossils are of most interest in their botanical relations, for in the discovery of the remains of a forest of the Chilean pine or araucaria we have a most marked contrast presented to the utter barrenness which is exhibited by the floral display of to-day, not a trace of vegetation higher in organization than a lichen having up to the present moment been detected in the entire Antarctic world. This climatic contrast between the past and the present sees itself repeated in the antipodal north, where the stone remains of Atane, Atanekerdluk, and Patoot, in Western Greenland, read the history of giant forests and foresters in place of the lowly vegetation of 6 or 8 inches of today. To Capt. Larsen is also due the discovery of volcanic activity in this part of the Antartic world, Lindenberg and Christensen islands being in a condition of eruption at the time of his visit. A half century earlier Ross had found Mt. Erebus, on Victoria Land, south of Australia, in a similar condition of activity, the fiery volcano rising to the stupendous elevation of 12,000 feet, presenting one of the most sublime spectacles that it has been the good fortune of man to gaze upon.

What may be the extent of Mr. Gerlache's discoveries it is naturally impossible to foretell, but certain it is that opportunity exists for making a most important contribution to a knowledge of our earth. Surprising though it may appear, the Antarctic terra incognita covers an area of at least 4,000,000 square miles, or considerably more than the area of the semi-continent of Europe. The main object of the expedition is, naturally, the attainment of the farthest southern point possible, and probably an effort will be made to follow in the path of Weddell, who, in 1823, reached the surprisingly high latitude of 74 degrees 15 minutes south. It will be most interesting to note if the methods of traveling over the ice cap introduced by Peary and Nansen will be possible here, a condition that will probably be largely determined by the practicability, or impracticability, of an ascent of the vertical face of the so-called Antarctic barrier—the great Chinese wall of the south. In whatever manner conceived, the work of the expedition will be looked forward to with much interest, especially at this time when scientists are inclined to believe that the earth is top-shaped rather than spherical, and that the apex of the top is approximately the south pole.

LORD KELVIN has invented and put into successful operation at Shoreditch, England, a garbage crematory. Its action is mainly automatic, by means of electricity. The lifting and emptying are done by automatic electric hoists, which deposit the garbage into cells, where it is burned. The heat of the furnace is intense, and it is increased by forced draft. The air to produce the tremendous draft in the furnaces is drawn by pumping machines from the city sewers. Thus the sewers are ventilated and their noxious gases destroyed. The heat produced incidentally is used for making steam, and that runs dynamos for any firm wanting manufacturing power.

Electrical Progress.

Telephony from a Layman's Standpoint.

Electrical engineering, as applied to the innumerable improvements in the construction of telephone instruments, is accomplishing new triumphs daily. The rapidity with which the distance over which telephonic communication can be had exceeds the most vivid imagination.

The mystery of it all is a cause of never-ceasing wonder. One can arise from the place where he is writing and call, from his desk, a friend in Los Angeles. The impulse of his voice goes out through a gimlet hole in the wall, speeds away over the housetops, through the smoke and noise of roaring shops and factories, out across fields, rivers, lakes and mountains, through towns and villages. It passes through forests, where birds are singing; it passes the farmer's wagon toiling along the country road; it goes past schoolhouses where children are droning over their books. It perhaps encounters a thunder storm, but on it goes through every sort of sight and scene, over the roofs and through the roar of cities, straight from the vocal chords to the tympanum of the receiver at the other end, which little bit of metal transposes the vibrations into articulate speech, and it in turn tells to his friend the thoughts that he is uttering. It not only does this, but it does it so faithfully that one is able to recognize the tones of the other's voice and would probably be able to discover the identity without the necessity of announcing it. The performance of this little tympanum in the receiver is one of the most curious of the many curious things about it. It had been supposed that in order to produce articulate speech certain motions of the mouth, which could not be imitated, were necessary, but here is a little flat piece of metal that actually talks, and talks plainly, too. The vibrations of the vocal chords, modified by the mouth, teeth, tongue and lips—for we use them all in talking—has set up similar vibrations in the transmitter; and these vibrations, unseen and unfelt, have somehow or other, by the aid of electricity, traveled a great distance. Imperceptible and weak as they are, they have in all their long journey lost not one whit of their quality, tone or accuracy. Every infinitesimal inflection has been retained; and, all in their proper order, they strike the diaphragm of the receiver and the receiver talks.

It gets there. But how? Does it drive straight through the hundreds of miles of copper wire which stretch out between the two cities, or does it travel on the surface of the wire? Ask the telephone expert and he will tell you he does not know. It is certain that the wire has something to do with it in the present state of the art. But it may be done without a wire. In an experimental way, telephone messages have been sent by the aid of a ray of light. It has carried the vibrations of sound and reproduced them in the same way as is done by the aid of a wire and the electric current.

Reflection on the subject leads to doubt whether there is really any such thing as distance. Maybe one's friend could hear ordinary conversation at so great a distance without any instrument if he had the right kind of an ear. It has been recently demonstrated that telegraphing can be carried on through long distances without any wires, provided the proper instruments are at hand to catch the vibrations and make them perceptible to the human ear. It has been discovered that there are invisible rays of light which penetrate opaque substances, and that there are sounds which the human ear is incapable of apprehending. All sound and light is caused by vibrations, and only those within a certain compass produce any effect upon organs of sight and hearing.

If a beam of light can so arrange the medium for the conveyance of sound that the vibrations that produce it will follow its direction and be reproduced, is there any limit to the range of sound? May we not one of these days hear the roar of the conflagration on the sun? May our ears not catch the sounds on Mars and on the other planets and stars, and may we not converse with their inhabitants, if they have any? None of these are much more wonderful than the performances of the little talking disc which repeats our conversation to our friend so far away.

Storage Batteries for Electric Power Stations.

For electrical plants the use of accumulators as a means of steadying the load diagram is a favorite method. Theoretically, the generators could be operated uniformly, provided sufficient accumulator capacity were arranged to absorb and store the surplus energy developed during hours of light load, and European experience has justified the value of this practice. In America results have not been so favorable. This is partially attributable to the higher load factors there, the average being 35 to 40 per cent against 15 to 20 per cent in Europe. In America the storage-battery industry has for so long been involved in legal complications that central station managers have been reluctant to invest in plants as possible subjects of litigation.

The accumulator has been passing through a period of experimental development, involving its action in so much obscurity as to preclude reliable estimates of life and prevent any accurate knowledge of the true rates of deterioration. Spurred by competition, manufacturers overrate their product, and the resulting list of battery plats consigned to the scrap heap is disheartening. Finally, the prices charged by American makers, together with their reluctance to assume the responsibility for imperfect manufacture, have made the American storage battery installation almost an unknown type. As German prices are about 0.6 as much per unit of capacity as American, and as German manufacturers will insure perpetual maintenance at 4 per cent on the cost of the cells, the slow progress of American accumulator plants is not difficult to understand.—A. V. Abbott in Cassier's Magazine.

THE danger peculiar to electrical generating works is the liability to shock, which is often fatal if by accident any one comes into contact with the conductors when charged to a high pressure, says the London *Electrician*. The contact need neither be very perfect nor direct. Provided two parts of the body are made to touch conducting materials which themselves differ in pressure by 1000 volts or more, or even by much less if the contact with the flesh is very good, a dangerous and possibly fatal shock will result. The ground, especially if damp, is sufficient for one of the contacts, damp leather boots affording no protection, so that any one standing on the ground or on metallic or damp wood flooring cannot safely touch a single object charged to a dangerous pressure. If, however, he should be standing upon a dry india-rubber mat, which is an excellent non-conductor, he will come to no harm on touching any number of dangerously charged bodies which are at the same electrical pressure; but if he should simultaneously touch, even through his clothes, two bodies which differ from one another in pressure by about 1000 volts, the actual amount depending largely on the perfection of the contact; or, if while safely touching highly charged metal, he should touch or pass by hand any conducting article to some one else who is not also insulated, then a fatal shock may follow.

MONS. C. CHENEVEAN suggests, as a means of removing the thin film of oxide from aluminum goods, preparatory to electroplating them, to immerse the goods in a solution of an alkaline carbonate, followed by treatment with hot dilute hydrochloric acid (one in 20), and final immersion in a dilute solution of copper sulphate.

Mining Summary.

(Continued from page 219.)

ity of purchasing the Gray property, which lies between the Red Lion and the Frick properties. Should the deal be consummated, it is the intention of the purchasers to experiment with the cyanide process on the ores of the property.

SOUTH DAKOTA.

G. E. Bretelle, of Lead, manager of the Rochester-Greenback Mining Company, has begun the erection of a 1200 H. P. electric plant on Spearfish creek, a mile below Elmore station. The erection of this plant will be followed by the establishment of various manufacturing and milling industries on Spearfish creek, power for which will be furnished by this electric plant.

WYOMING.

At Douglas the copper properties of Messrs. Hazen & Scnoenfeldt are showing increased value as the vein is opened up. At a depth of 38 feet the vein is 4 feet thick and assays $56 to the ton.

W. E. Anderson, in the Four Mile placer district, has decided that the necessary water for working the placers can be obtained by the means of artesian wells, and will let contracts for 5000 feet of well digging for gold-washing purposes. The wells will be twenty in number, with an average depth of 250 feet, at a probable cost of $6 per foot; $20,000 will be expended in the construction of ditches, flumes and gold-saving plants.

B. E. Shear and New York capitalists have 5000 acres of placer ground in Timberlake gulch. The owners contemplate building a canal forty-five miles long.

NEW MEXICO.

In the Red River country, on Bitter creek, a ten-ton Kincaid mill is going up on the Midnight property. The owners are putting in an 80 H. P. hoist and a pump of sufficient capacity to handle the water.

C. C. Cotton, manager of the Memphis, is figuring on putting the mine in good working order and then putting in a mill to treat the ore from the property, in place of shipping to Pueblo, as has been done for some time past at considerable expense.

In Taos county a German company is putting in machinery to work the placers at the head of Red river, and is also putting in plants for the same purpose at La Belle, near Elizabethtown, and at Red River City. On Gold Hill the find made by the Gusdorfs is proving all that was expected of it. The Franklin Placer Company on Red river is reported to have met with very satisfactory results. The cyanide process for treating ores is being introduced in a number of the camps.

At Hopewell the company operating the Red Jacket mine and electro-cyanide mill has had a satisfactory cleanup. E. Sterling will start a cyanide mill this week to treat ores.

COLORADO.

Col. Havens says a claim in Leadville in which he spent $60,000 he recently leased to some Kansas farmers, who organized a company with a capital of $150,000. They spent $82,000 more before they shipped a pound of ore. "But they are making money now, and are paying us royalties running up to 50 per cent. This on $35 ore. They have paid us $213,000, and will probably continue to pay for years. The lease is for ten years, but we told them they could have twenty years if they wanted them. I know of many leasing companies that are making money."

Receipts of gold at the United States branch mint in Denver for the fiscal month of August amounted to $1,215,237.58. The receipts for August, 1896, were $329,459.89. The total receipts this year since January 1 amount to $7,288,722.97. It is estimated that the amount of gold received at the mint during '97 will be in the neighborhood of $11,000,000.

Another oil well has been put down by the Carbon Oil Company at Florence. The hole, 1300 feet deep, has filled up 600 feet with oil.

At Cripple Creek the following figures on the June and July production and expenses for the same period are furnished by the Isabella Gold Mining Company:

	June.	*July.*
June, gross earnings	$28,700	$34,100
Net earnings	18,700	23,150
Expenses	18,700	20,350

There was a profit for July of $2800. The cash reserve on hand August 1st stood at $103,000.

At Manhattan the Monte Cristo tunnel has attained a depth of 400 feet and runs in 4 feet of ore, which averages $20 to the ton. J. H. Whedbee is having the ore examined with a view of putting in reduction works.

At Black Hawk the output of the Nevadaville mines, operated by the Gold Coin Mines Company, for the past month was $24,000. The Phœnix Burroughs mine on Quartz Hill continues to be the largest single producer in this county, its daily ore output being fifteen cars, or at least 100 tons. At the Nugget mine in Illinois Central district sinking is being carried on with three eight-hour shifts. At the Topeka mine sinking is being carried on with eight shifts, on a lift of 100 feet, commencing at a depth of 850 feet. The present force consists of thirty men.

A recent Denver invention is the Parker rotary stamp mill, in which the stamps have a rotary, grinding motion upon the ore in the mortar. The mill is a battery of four stamps in a quadrangular frame; the motion is imparted from a central upright shaft and cogwheel geared into cogwheels on the stems of the stamps, which give the grinding motion on the ore. The cams which lift the stamps are cast on the cogwheels of stems of the stamps, and are half the circumference of these cogwheels. This gives the stamps a rotary motion of half their circumference every time the stamps drop. It is claimed that the best results in grinding are secured with a speed of sixty drops to the minute, and that at this rate of speed better results are obtained than with the ordinary stamp mill at a speed of ninety drops to the minute. A special feature of the mill is the feed arrangement. The ore is carried to a hopper above, from which it is fed through spouts to the mortars. The valves in these spouts are opened by a collar on the stems of the stamps as the stamps strike the ore. When the ore in the mortar gets too high, the collar does not touch the spring connected with the valve and no ore escapes. The stamps weigh 932 pounds.

Correspondence of the Denver *News* says the Casper refinery has within the last few months been exhaustively improved and also extended in its actual scope. A new 150-barrel still has been added, at an expense of $2500, making the capacity of the refinery 200 barrels per day instead of fifty barrels; a filtering press of thirty faucets and capable of filtering 300 barreis of oil per day, has been put in at a cost of $1000; a large number of electrically molded iron barrels for shipping purposes has been added, and the refining fuel has been changed from coal to oil itself, with the advantages of labor-saving, superior sevice, and an actual economy of $7 per day in fuel cost.

The Colorado Fuel Company has cut the price of anthracite coal from $9.25 to $6.50 per ton. This is the lowest figure ever quoted in the Denver market for this class of coal.

ARIZONA.

Thomas Withers, superintendent Table Mountain Copper Co., is building a road begun near Dunlaps to the Table Mountain mines. Captain Burgess is the general manager of the company.

The Dry Roller Process Quartz Company of Los Angeles, capital stock $300,000, has incorporated with the Territorial secretary at Phœnix. Incorporators are S. G. Lyons, D. E. Young, H. M. Moulton, Los Angeles.

Winningham, Dillon & Nichols of Jerome have bonded the Winningham group of five mining claims to Galveston, Texas, parties, who pay $50,000 in eighteen months and six months $75,000. Winningham is to receive $100 monthly until the bond expires. The Galveston men must do certain work continuously for two years.

Wickenburg correspondence of the *Republican* says Helm & Bro. are making inroads on 60,000 tons of dump from the Vulture stamp mill of twenty years ago. The cyanide plant is doing good work.

At the Vulture the cyanide plant is in operation, besides a 10-stamp mill. A 10-inch water pipe from the Hassayampa to the mine is projected, with pumping station close to the river.

The Buckeye mine at Mineral Park is shipping ore.

The Schuylkill mine at Chloride is receiving a large amount of machinery. F. M. Theis is superintendent.

LOWER CALIFORNIA.

The sulphur mines on the Gulf coast, twenty miles above the mouth of the Rio Colorado, are a series of low hills—part of an extinct crater which, probably, as the heat subsided, allowed the liquid sulphur to solidify. The ore is found in immense masses, nearly pure, averaging over 80 per cent. Mr. Dubbs has arranged for transportation with the Colorado River Navigation Company and Southern Pacific Railroad Company, and the first shipments of ore will be made over these lines. The ore will be loaded on the river boats at the landing, five miles distant from the mine, and taken to Yuma, from which point it will be shipped by rail to its destination. The plans for an extensive refining plant, to be located at the mines, have been completed, and it is probable that within a year Lower California will be furnishing the Pacific coast with a part if not all of its refined sulphur. In addition to the property which Mr. Dubbs has leased of Mr. Godbe, he has located six other sulphur locations in the same vicinity.

At the Alamo gold diggings there is great excitement; the ground is reported rich; about twenty men have started for the new diggings.

MEXICO.

The Esperanza Mining Company, operating near Tultonango, State of Mexico, is on the Bonanza lead. They are taking out in gold ore $100,000 a month. A 40-stamp mill, ninety-five strokes to the minute and a 950-pound stem, works unceasingly. Another shaft is being sunk west of north of the Salzburg shaft by the Esperanza people, and it is down 130 feet, with identical ore indications. The camp at the Salzburg shaft is from 9000 to 10,000 feet above sea level.

In Durango, Chihuahua and Coahuila unusual activity is exhibited. Old districts are employing more men, putting up improved machinery, and turning out more ore than ever before.

The districts of El Oro, Inde and Guanacevi, Durango, and the Parral district in Chihuahua, show increased outputs. Guadaloupe y Calvo and Batopilas, in Chihuahua, are flourishing. At Mapimi a smelting plant, consisting of five furnaces, reducing 200 tons of ore per day for several years, has machinery on the ground to double its capacity. At Velardena, where the smelting plant is running to its full capacity upon ores belonging to the company, new discoveries of high grade silicious ores necessitate the construction of another reduction plant. The output of silver for '97 may reach 60,000,000 ounces. The El Oro property, in the State of Mexico, is paying $35,000 per month in gold, and a representative of Messrs. Haggin & Tevis, part owners, say they had refused an offer of the Rothschilds of $2,000,000 cash. The State of Oaxaca, south of the State of Mexico, has long been known to be rich in gold, and a good deal of work has been done by the arrastra system, driven by water or horse power. By this old-fashioned method a great deal of gold was lost in the tailings, and it is stated upon excellent authority that there are dumps containing several thousands of tons which will assay as high as an ounce to the ton. There is a field there for some process which will recover this gold. The State of Sonora is just now attracting attention, owing to the fact that the Yaqui Indians, who have always been so troublesome as to render prospecting absolutely impossible, have surrendered and their reservation is now open to the public. Of the six millions of gold exported from Mexico last year, Sonora furnished three and a quarter millions. The State of Guerrero is also showing up well in placers.

At Creston, Minas Prietas, Sonora, the roasters and cyanide plant are treating stuff at the rate of 100 tons per day. The method of treatment is unique, and these plants are believed to be the only ones in the world which are adopting the method in vogue at Prietas. The tailings are mixed with low-grade concentrates and then passed through the roaster with salt, in order to convert the silver into the form of chlorides. From the roaster the pulp goes on to cooling tanks, each tank taking 100 tons.

RUSSIA.

From Russia and Siberia come official reports to the State Department to the effect that the newly-found gold mines give promise of an enormous production. A report on the subject, recently made to this Government, estimates that eastern Siberia alone will give an annual production of gold amounting in value to $14,599,900. It is said that nowhere in the world are there such vast stores of gold, and nowhere is gold spread over so large a surface. The majority of the mines are situated far from the towns, and provisions have to be drawn. Considerable difficulties in regard to transportation are also experienced. The conditions in this respect and in regard to climate are similar to those of Alaska, and it is interesting to notice that the two great new gold fields of the world are so situated as to present the greatest difficulties for miners. Work in the Siberian gold fields can be carried on only for about 120 days in the year, from May to September, for the water and earth of the country are frozen during the rest of the year. During the cold season prospecting is carried on, however. The Siberian railway, now in process of construction, is expected to give gold mining a great impetus in the country.

AUSTRALIA.

The West Australia gold yield for '96 is as follows, with official details:

Total amount of gold exported during 1896, in ounces	281,265
Total yield of alluvial and dollied gold during 1896, in ounces	26,327
Total yield from auriferous quartz during 1896, in ounces	257,699
Total quantity of ore milled during 1896, in tons	166,015
Average yield of gold per ton of ore milled	1 oz. 11 dwts.
Number of gold-mining leases in force December 31, 1896	4,067
Area in acres of gold-mining leases in force December 31, 1896	58,676
Number of men employed at mines and upon prospecting work	20,818
Number of batteries	112
Number of stamps	1,349
Number of other reducing mills	35
Number of cyanide plants	10
Estimated value of mining machinery erected	£840,201
Total amount of gold exported to December 31, 1896, in ounces	967,625
Value	£3,676,977

Consul-General D. W. Maratta, at Melbourne, Australia, on the subject of treatment of gold ores in Australia, reports that the veinstone, which contains from about 1 to 12 per cent pyrites, but generally only from 3 to 5 per cent, is crushed wet in stamper boxes. The crushed material passes through stamper gratings containing from 80 to 290 holes to the square inch, and is as a rule delivered on amalgamated copper plates and mercury wells 7 inches deep at the back of the slide board and 2 inches in front of it, or simply onto plates having only mercury riffles; thence by gravitation onto blanket strakes or Halley's percussion tables or zigzag boxes; if onto blankets, thence onto Halley's table; but if onto Halley's table, thence onto blanket strakes; and if onto a labyrinth or zigzag boxes, thence into a buddle. In the first of these three cases the pulp collected on the blankets, and the refuse from the same, together with the tails, is concentrated or amalgamated in a revolving barrel, and from the barrel is then pumped into an inverted pyramidal box, whereby the slimes are, to a great extent, separated from the coarse sand, which is treated on vanners, while the slimes are collected in large settling tanks and then similarly treated. At times, without concentrating it or treating it by amalgamation in a barrel, the pulp being very poor in pyrites, the tail sand from the end of the blanket strakes is pumped into several pyramidal boxes, when the coarse sand and the slimes are treated on separate vanners. With the concentrates thus obtained, the blanket sand is treated by chlorination. Again, in some instances, though seldom, wooden strakes (boxes) and tyes are placed at the end of the blanket strakes, and thereafter, lastly, a canvas table.

In another crushing establishment the pulp from the blanket strakes is concentrated in percussion tables, the tailings from which flow into a sump. A tailings pump lifts the pulp onto a high platform, where it is distributed, without classification, on two long, fixed, threefold canvas tables, each about 110 feet in length. Although not treating veinstone only in one of the largest reduction works of the colony, the tailings from the blanket strakes, which are placed immediately below the amalgamated copper plates, flow into a pit and are raised thence and delivered into a trommel. The pulp passing through it is then classified in a long series of Spitzkasken (inverted pyramidal boxes) and the different grades obtained by that means are then concentrated on a number of Luhrig vanners.

Lately, the overwork of these has been somewhat relieved by the introduction of a great number of what may be termed endless intermittently revolving canvas vanners, about 120 feet in length, as a concentrate on a wooden platform during about a quarter of an hour, more or less, according to the mineral contents of the pulp, and are then made to revolve on rollers a length of about 8 feet, to enable the concentrates gathered on the upper portion of the canvas belt to be washed into the collecting trough. The "blanket sand" in that establishment is treated with a large quantity of mercury in what may be called a large Berdan basin, but without balls or drag. In the second of the three cases above mentioned, the Halleys tables having concentrated a large percentage of pyrites, mainly the coarsest particles, the pulp falls by gravitation onto blanket strakes; thence, without further classification, onto vanners; thence into wooden strakes, and finally, before running to waste, it is passed over canvas frames. In other instances the blanket sand collected at the end of the percussion tables is concentrated and the tailings from it flow into the battery tailings sump, thence the whole is pumped into a slime-separating, inverted pyramidal box. The coarser material issuing from the apex is concentrated, while the slimes, conveyed into settling tanks, are subsequently dressed on different vanners of the same type. Finally, the whole of the tailings pass over canvas frames.

Other reducing plants convey the blanket tailings directly by gravitation to the head of a series of wooden strakes and tyes, then pump them onto a platform, and then, in some cases, distribute the pulp, without any attempt at classification, onto a fixed canvas table.

Referring to the third method of treatment noted, the crushed material flowing from the end of the amalgamated plates into zigzag boxes is roughly classified in them. The heads and middles are concentrated in a Borlase concave buddle, fitted with iron scrapers set at an angle, but the tailings from the labyrinth and those of the buddle are collected in a sump, and thence raised by a tailings pump onto and distributed over an extensive area of blanket strakes. The large quantity of rich sand, collected from the sluicing of the blankets, is concentrated by an oscillating convex concentrator, which collects a considerable quantity of mercury and gold amalgam, separating it from the iron and arsenical pyrites, concentrate, and this from the sand which flows back into the pit. The tail sand from the fall of the blanket strakes is conveyed by a launder into an inverted pyramidal box, whence the coarser pulp escapes at the apex and is treated on vanners, while the slimes flow into another inverted pyramidal box, from the apex of which the heavier stuff, classified, is delivered onto slime vanners, and the overflow is concentrated onto a fixed canvas table about 30 feet in length.

There are a few establishments in which the treatment is differently effected. For instance, those in which the pulp, dropping from the end of the amalgamated copper plates, flows at once into a Denny & Watson grinding and amalgamating pan or other similar appliance to effect the same purpose, the overflow from which is allowed to run to waste, and the one establishment in which the veinstone is comminuted in a ball mill (Kugelmuhle) and the escaping pulp is treated more or less in the usual manner.

The concentrates obtained by the stamp-mill process, which consist generally of a mixture of arsenides and sulphides, arsenical pyrites (mispickel mostly), iron pyrites, and a slight admixture of galena, zinc blende, bournonite, etc., are roasted in either long (about 45 to 50 feet), slightly inclined furnaces or in 12 to 14 feet high revolving furnaces until most, if not all, of the iron contained in the concentrates has been oxidized to the state of sesquioxide of iron. The roasted ore is then, according to the grade of the particles of the gold therein, either subjected to the process of amalgamation in C. I. arrastras or treated by chlorination. In some establishments the Newberry and Vautin process is adopted, while in at least one mill the system of open vats is adopted, as at Mount Morgan in Queensland. In both cases the gold is precipitated from its solution on charcoal by percolating it through charcoal filters.

As an exception to the usual course of roasting the concentrates (pyrites) before the gold is extracted by amalgamation or chlorination, 112 tons of clean iron and arsenical pyrites were treated a few years ago by amalgamation by, first of all, grinding the pyrites in a Chilean mill to an impalpable pulp, then passing it in a diluted state through the force dollies charged with quicksilver, and thence in several sets of Rittinger's Hungarian mills, the whole of their working surfaces being covered with amalgamated copper plates and the basins charged with mercury. The result was very satisfactory, as the yield exceeded that obtained from the amalgamation of the roasted stuff, but the process was too slow, only from twelve to fifteen tons per month per Chilean mill being put through.

The actual loss of gold, on the average, in the treatment by open vats of concentrates averaging, as per assay, 6 ounces of gold to the ton, is 2 pennyweights of 23-carat gold to the ton, i. e., the gold saved equals 98.34 per cent of the assay value.

In another large establishment, in which the concentrates are treated by the Newberry-Vautin method, the loss of gold per ton averages 6 pennyweights from concentrates averaging, as per assay, 3 ounces 11 pennyweights 3 grains to the ton, i. e., the gold saved is equal to 91.66 per cent of the assay value. The cost per ton for treatment in the first case is $5.87 and in the second $9.91.

Very few mining companies extract gold from the concentrates in their works. Most of them either sell them to the amalgamating-chlorinating firms at Bendigo or Ballarat, and other centers of large fields, or have them treated at those establishments on account.

Commissioner Ogilvie's Opinion.

Regarding the Klondike this paper from the first has aimed to give the exact facts and to warn the inexperienced against believing the exaggerations so current. Experienced men need no admonition of the kind, but lured by sensational statements thousands of adventurers are rushing to their death.

Wm. Ogilvie, the Canadian dominion land surveyor, was recently interviewed, and, like others who have been there, gives a fair statement of facts. He says that more substantial home-takes have been taken out in "lays" on Bonanza and El Dorado during the past season than were taken out of all the Forty Mile, Sixty Mile and Birch Creek (Circle City) districts combined during the three best years. In this way all the other creeks tributary to Klondike, even branches of the Bonanza and El Dorado, were practically abandoned for the time being. All the rest of the Dawson district remained undeveloped, and as all the claims located in Canada have to be represented within twelve months from the date of their record, the claims on the other creeks will have to be developed or abandoned. Very few of them will be given up.

Bonanza creek joins the Troandike, commonly known as the Klondike, two miles above its mouth, Bear creek six miles above, Gold Bottom creek twelve or fourteen miles above and "Too Much Gold," thirty-five or forty miles above. Bonanza is about twenty miles in length and El Dorado, one of its branches, joining about midway of its length, is eight or nine miles in length. A claim is 500 feet in length, measured in the general direction of the stream. Bonanza thus furnishes upward of 200 claims, El Dorado about 80 and the several tributaries of these two will give nearly as many more—about 1500 claims in the valley of the Bonanza; 1000 of these may be worked with profit.

These 1000 claims will require 6000 men directly and indirectly for their proper development. We may safely assume that the other creeks mentioned tributary to the Troandike will furnish as many more claims—in all 2000. Of course, much depends upon whether the hillsides pan out as they have heretofore. If they do not, we can estimate that at least 1200 claims will be worked in the Troandike valley. Adjacent to the Troandike is the valley of the Indian creek. So convenient are the water systems to each other that it is only the labor of an hour or two to cross from one to the other. Indian creek, close to the head of Bonanza and El Dorado—two tributaries—has been prospected with fair success. We may assume, then, that considerable mining will be done on Indian creek, possibly as much as on the Troandike. This will give say 2500 claims, combined with Troandike diggings. Assuming the same ratio per claim as before, we require 15,000 men for the proper development of this area. The emporium for this will no doubt be the town of Dawson, situated about half a mile below the mouth of the Troandike. It cannot, in the nature of things, be seriously doubted that good paying quartz will be found in the vicinity of these placer claims, which will more than double the importance of this district. Several quartz claims have already been recorded.

The tops of the higher hills and ridges are devoid of vegetation except arctic mosses and lichens, but all the rest of the country is covered with a thick layer of moss, which again supports scrub spruce, some scrub white birch and a thick growth of northern shrubbery. This completely conceals the surface of the rocks, and to remove it to a sufficient extent to search for quartz prospects would entail a vast amount of labor—much more than the ordinary every-day prospector can afford. The cheapest and most expeditious methods of quartz prospecting here would be by diamond drill. A light portable machine of that description, a compact, light engine and boiler sufficient to work it could be easily made and set up at various points along the various creeks. From the cores thus obtained experts could readily determine what the probability and prospects were. This requires capital, but I have no doubt a company formed with this object in view—prospecting in this way—would find it a profitable investment. All the gold I have seen taken out of El Dorado and Bonanza—for that matter of other creeks, too—bears no evidence of having traveled any distance. I have seen no evidence of glaciation anywhere in that district. Whether it is concentrated enough to pay for the expense of quartz mining can only be determined by proper search.

Stewart river, sixty-five or seventy miles farther up, is about 400 miles in length; its tributary is easily double this. This gives in the neighborhood of 1000 miles of stream on which a great deal of surface prospecting has been done and fine gold found everywhere. Upward of 100 miles farther up, where the Pelly joins this, fine gold has been found.

This is an extensive area of vast possibilities. What it wants for its proper development is increased transportation facilities, with the certainty of sufficient food supplies to sustain the number of people required. At present and during the past a visit to the country entailed a long period of time and considerable expense and much uncertainty as to whether or not one can remain there more than a few weeks. With increased, quicker and cheaper ingress and egress, with a certainty of food, this part of Canada and Alaska will furnish employment to thousands. At present food is so expensive that ordinary, every-day diggings are entirely neglected. The food supply available at Dawson and to be laid down there this season will not much if any more than furnish the requirements of those now there. If the rumors concerning the number seeking access to the country is true, there will be much dearth of provisions. To make one's way out of that country during the winter to the nearest point where supplies are available, which is at Dyea or Juneau, is an arduous labor requiring about one month with a dog team for its completion; the people making this trip consume more food while doing so than they otherwise would. The dogs, too, consume a tremendous amount. The old adage that cure is worse than the disease is particularly applicable. If those on their way succeeded in reaching Dawson they will either have to make their way down the river at once and return to Seattle, or remain at Dawson and run the danger of starvation, unless they have brought in with them sufficient food for one year's use. Says Mr. Ogilvie: "I would emphatically warn all contemplating coming into this country for the betterment of their fortunes to come well prepared with provisions, clothing and miner's tools, with a few necessary carpenter's tools. In saying this I do not wish to be understood as at all reflecting upon the companies now trading there. They are making strenuous efforts to meet the new requirements, but the transition from two small mining camps to such a world-famous place as Dawson was so sudden that it found them for the purpose unprepared. Next year their freighting facilities will possibly treble that of this year, but even that will probably be found short. Then again, the ocean voyage from Seattle or San Francisco to St. Michael, and from St. Michael to Dawson, some 1600 miles, is long, tedious and expensive. More important still is the shortness of the time in which the route is available. Steamers seldom reach St. Michael before the end June, owing to the ice is Bering Sea, and captains of vessels care little about risking a voyage there after the middle of September, as storms are so violent and so shallow is Bearing Sea. From these causes it cannot be claimed that the route via St. Michael is available for more than three months in the year, July, August and September. The ice in the upper Yukon river breaks about the middle May. Generally about the 20th the river is clear enough for steamboat navigation. Ice begins to run again about the middle of October, so that we can count on nearly five months steamboat navigation in that river, as against three via St. Michael.

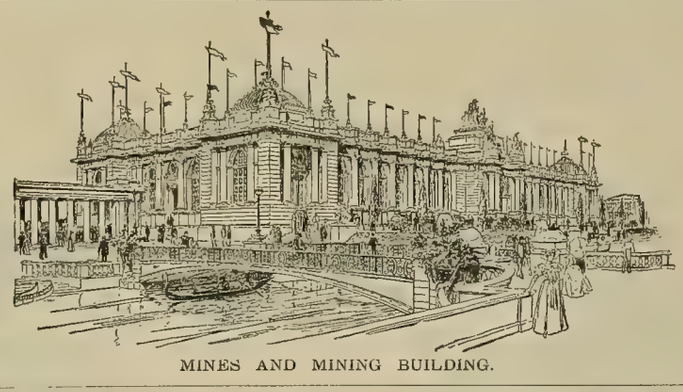
"Give us some easy continuous route for the south down the river to these points and we nearly double our available route for transport, and this, were there no difference, would be quite an item in the development of the country. But it will probably be found that the cost will be considerably reduced too. Of course the cost will be regulated considerably by the amount of demand, but give us the facilities and I believe the demand will rise and meet it more than half way. To those coming into the country contemplating getting a claim on Bonanza or El Dorado I would say do not think of it. As I said before both of these creeks were located last fall, and if you have money enough to purchase an interest in any of them you have money enough to remain where you are, possibly with as much benefit and assuredly with much more comfort to yourself. The rich claims which have given these two creeks world-wide fame aggregate about 130 in number. From these spring all the stories of fabulous wealth of this region, and these stories are largely true. But as far as I know up to the present time there is only one Bonanza and one El Dorado.

"The other creeks I have mentioned prospected very good, but, as I have already stated, they are practically undeveloped. That creeks as rich as these two will be found I can neither assert nor deny. That there is a very extensive gold-bearing area here, which will be an important factor in the world's supply of that metal for many years to come, I am positive. But I would solemnly adjure you to come prepared for serious and long-continued disappointment."

Transmississippi and International Exposition at Omaha, June to November, 1898.

The facade presents a frontage of 400 feet; height to top of main cornice, 40 feet; height of center pavilion to top of crowning group of statuary, 85 feet; end pavilion, 65 feet to top of dome; center entrance, 24x34 feet high.

The ceiling will be a large barrel vault, with intersecting cross-vault, richly coffered and elaborately decorated. On the walls it is proposed to have mural paintings emblematic of mining, placer working, packing of ores and other mining scenes.



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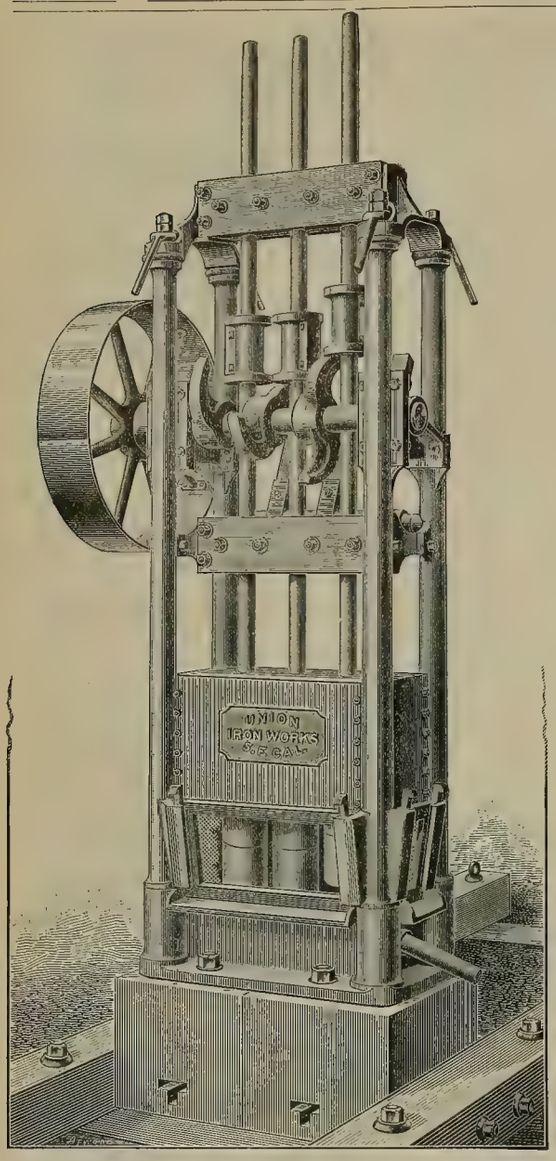

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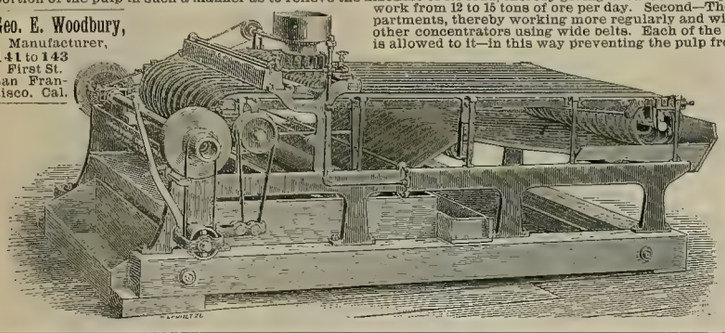

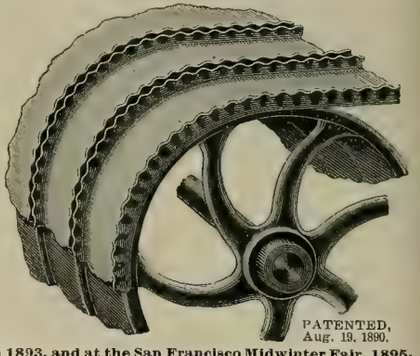

PATENTED, Aug. 13, 1890.

This Concentrator took the 1st prize at the San Francisco Mechanics' Institute in 1890, 1891 and 1892, and at the California State Fair in 1892: it took the 1st, prize at the World's Columbian Exposition 1893, and at the San Francisco Midwinter Fair, 1895.

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Illustration (Fig. 1.) shows a cross-section, and (Fig. 2.) shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. *We avoid this Mechanical Defect by our Spadone Curved Edge.* Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

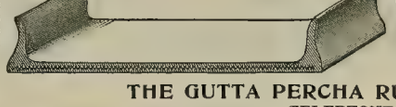

FIG. 1.

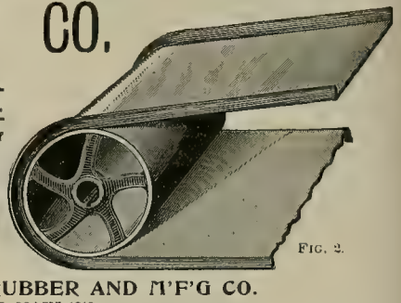

FIG. 2.

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Coast Industrial Notes.

—Washington State has a population of 350,000.

—Fruit is now shipped from Sacramento, Cal., to London in fourteen days.

—The $2,175,000 in gold which came from Australia, and the $2,350,000 in gold now on the way from Melbourne is to pay for California wheat.

—Since Jan. 1, '97, 1000 mules have been shipped from California to Hawaii for use on the plantations and as many horses from northern ports to the Klondike.

—Oil in Los Angeles now sells at 60 cents a barrel. A producers' pool is mooted to sell the large surplus in San Francisco, including storage tanks of 150,000 barrels capacity.

—The San Francisco *Call*, under its new management, displays considerable nerve in opposing a project for another San Francisco park. The *Call* is right, and is to be commended for its advocacy of true public interests.

—The forty-fourth annual California State Fair begins at Sacramento next Monday and continues till the 18th inst. Electric power, space and light are furnished free to exhibitors of mining machinery, and a large attendance is probable.

—The Elizabeth, a steel steamer built for the Pacific Mail Steamship Company, was launched at the Union Iron Works last Thursday. She is built for the water service of the company at Panama, where, on account of the insufficient harbor facilities, vessels have to anchor some distance from the shore.

—Consul Robertson at Hamburg has sent to the State Department a letter addressed by him to the California Commissioner to the Hamburg Exposition, stating that an exceptional demand exists for California products, and urging that a permanent California exhibit be established at Hamburg and other European cities.

—An English engineer is at Phœnix, Arizona, to make an examination of the Verde canal project and report to English capitalists, who will invest in the enterprise if the report is favorable. The Minnesota & Arizona Construction Company, S. R. H. Robinson manager, have already expended about $150,000 on the enterprise.

—Japan is importing cheap laborers from Korea to work in her coal mines. Five years ago the wages of carpenters were 33 cents a day. Now they advertise that their wages have risen to 80 cents a day—40 cents in United States currency. The cost of living has nearly doubled in five years and the cost of labor has risen in proportion. Rice in 1890 was $4 90 a koku; to-day it is $8 90 to $9.10—about $4 50.

—General Shafter, commanding the Department of California, U. S. A., has been directed by the Secretary of War to station troops at Lime Point to man the three 12-inch breech-loading rifles recently placed in position. The battery at Lime Point is regarded as one of the most formidable in the United States. It is on the bluff, 490 feet above the water, and commands an ocean range of ten miles. Each gun throws a solid steel projectile weighing 1,000 pounds.

—The wheat blockade in the interior of California is being transferred to the San Francisco water front. The seawall is packed, but steamers continue to arrive with heavy cargoes of grain. The ships that are to take the wheat to Europe cannot be loaded at the seawall fast enough, and some of them have taken berths along the front and other available places. The result is that every wharf is crowded and ships are lying in the bay because they cannot get a berth at a wharf.

—The live stock interests of California are looking up, prices are better than they have been for years in Modoc, Lassen, Shasta and Siskiyou, the principal grazing counties of the northern portion of the State. Eastern buyers are in the market and 15,000 head of cattle have been shipped from these counties within a few months past, mostly to Kansas City, via Reno. The prices realized are from $5 to $12 a head more than they would have brought a year ago. Calves now fetch from $5 to $6, yearlings about $12 and two-year-olds $18 to $22. These are for beef grades.

—E. W. Nelson, in a report on the meteorology of St. Michaels and vicinity, gives some information about the seasons on the Yukon river. During the first four years of his residence there, he says, the first mush ice has begun to form in the bays from the 15th to the 18th of October, and the bays have been frozen over so as to bear up a man from the 25th to the 28th of October. Up to the 15th of October vessels can enter without fear of meeting the ice. In the spring much more uncertainty exists, as to a great extent the depth of open water depends on the nature of the winds. Long-continued north winds following a severe winter, as in 1880, may keep the ice barrier in until the 20th of June, and it has even remained until near the 1st of July. But these late dates are exceptional. As a rule, the ice will be thoroughly broken up and a strong vessel may enter Norton sound, the mouth of the Yukon, by the 10th of June. There is usually but little risk in entering the ice at that season.

—R. C. Johnston, who discovered the lake of oil in Alaska a year ago, writes to his brother in National City, Cal.: "I had fair luck washing the beach sand. The water we used from a creek contained oil, and bothered us in saving the gold with quicksilver, which we had to use, so I concluded I would try and find the oil. After a few days' search, I saw it was an oil country and after six weeks' hard rustling I found a very large flow of about twenty springs running into a lake 300 by 120 feet in size, which makes quite a pond. A man can dip up fifty barrels per day with a bucket. It is the best lubricating oil that has ever been found. We are offered $4 a barrel for all we can land at Seattle. I have no desire to go to Klondike or Yukon at all, as I have a better thing than three Klondikes, which I can go to in seven days from San Francisco. Our company will ship 30,000 feet of pipe and tanks that will hold 100,000 barrels of oil, and all necessary supplies to operate both the oil and coal fields."

—As late as the middle of July the Mexican silver dollar was worth 48 cents in gold. Then gold was at a premium of 108 per cent in Mexico, and a draft on New York for $100 cost $208 in Mexico. Then it cost the Mexican importer $208 to pay for a bill of $100 of goods bought in New York. At this date the Mexican dollar is worth but 40 cents in gold, and a draft to settle a bill for $100 of goods in New York costs the Mexican importer $250. In other words, the cost to the Mexican importer of everything bought from gold using countries has been increased 20 per cent by the recent fall in silver. He has had to mark up the price of all imported articles by 20 per cent, and this has made a great opportunity for the Mexican manufacturer. The fall in silver since the middle of July has been equivalent to an increase of the tariff by 20 per cent to the Mexican manufacturer. Naturally, manufacturing in Mexico has been stimulated.

Recent California Mining Incorporations.

Rodman-Morrell M. & M. Co., San Jose; R. H. Rodman, F. F. Johnston, G. P. Burkett, C. H. Nash; capital stock, $100,000; subscribed, $51,000.

Oro Fino Company, San Francisco; G. H. Pettis, W. Schilling, J. H. Rawe, J. E. Lee, G. O. Dean, all of San Francisco; capital stock, $10,000; subscribed, $2100.

Marian G. M. Co., Berkeley; A. D. Glace, E. J. Stewart, H. B. Sharps, D. J. Greger; capital stock, $150,000; subscribed, $250.

E. M. Co., Eureka, Cal.; S. B. Foster, R. C. Rose, A. A. Redmond, J. O'Neill, A. T. Crane; capital stock, $350,000; subscribed, $32,000.

Topeka G. M. Co., Los Angeles, Cal.; H. T. Gage, J. Gilbert, E. B. Millar, H. O. Collins, J. Schoder, S. M. White, R. B. Carpenter, G. J. Denis; capital stock, $240,000; all subscribed.

Red Room G. M. Co., Los Angeles, Cal.; same as above; capital stock, $1,200,000; all subscribed.

Cochabamba M. Co., San Francisco; G. W. Silver, G. W. Platt, C. H. Spinks, M. McKenzie; capital stock, $500,000; all subscribed.

Eagle Oil and Mining Co., San Francisco; W. S. Duncombe, A. W. Craig, B. S. Spencer, J. A. Armitage, B. E. Loomis; capital stock, $100,000; $1000 subscribed.

Innis G. M. Co., Oakland, Cal.; J. C. Matthews, R. McKillican, W. A. Fine, F. M. Farwell, J. P. Bandin; capital stock, $60,000; $6000 subscribed.

Consolidated Superior M. Co., San Francisco; D. L. Munson, W. F. Howe, R. H. Webster, E. W. Thomas, W. D. Evans, C. A. Murdock, N. J. Manson; capital stock, $1,000,000; subscribed, $17,000.

Gold Standard G. M. Co., San Francisco; J. M. Kaufman, E. Schmidt, L. Schenck, A. P. Davis, H. S. Smith; capital stock, $50,000; subscribed, $25,000.

Mohawk-Acton M. Co., Los Angeles; O. W. Roberts, E. D. Brown, G. B. Katzenstein, P. McCabe, M. V. Hartranft, T. Summerland; capital stock, $1,000,000.

Commercial Paragraphs.

THE Pacific Rolling Mill Co. has moved its office from 100 Market street to the corner of First and Mission streets in the Union block.

THE Colorado Iron Works Co., Denver, Colo., reports the shipment of a carload of mining machinery to the Midnight Mining Co., Vasquez, New Mexico.

THE cities of New York and Boston are trying to keep abreast of the times in the matter of mail transportation, and both are hurrying forward the completion of the pneumatic tube conduits that form part of the Batcheller rapid postal dispatch system which they have adopted. To operate the system New York is to have two air compressors with steam cylinders of 13 inches diameter and air cylinders 26 inches diameter by 20 inches stroke, and one compressor with cylinders 10 and 24 inches diameter, respectively steam and air, by 20 inches stroke. Boston is to have two air compressors of the latter size. All five are to be "duplex," and the Rand Drill Co. of 100 Broadway, New York, has the contract for making them.

THE Jeffrey Manufacturing Company of Columbus, Ohio, manufacturers of coal mining machinery and other specialties, have just received a letter from Mr. S. W. Farnham, mechanical engineer of the Coal Companies of St. Louis, enclosing a report from Mr. James Cameron, superintendent of their No. 2 Western Coal and Mining Company's mine, located in Arkansas. In this report Mr. Cameron states that at their mine, with a Jeffrey electric machine equipped with self-propelling truck, they were able on the 13th of this month (August) to make ninety-five cuts in nine and one-half hours. This record was made by two of their men, all cuts being made with the same machine. This work was done in five rooms and two entries and necessitated the changing of bits a number of times. It was necessary to load and unload the machine seven times. This run beats any record that has ever been made in their mine and up to this date there has never been a report from any mine in the United States of such a record. There have been records made by other machines when several separate machines were set ready to do the work and the number of cuts made by all machines counted, having only one set of men to move quickly from one machine to another and thus save loss of time incident to moving machine from room to room or one entry to another. There seems to be no limit to the amount of work that the Jeffrey chain machine can perform, as on account of strength of its construction and capacity of motor it has been able to keep far in the lead.

Personal.

ARTHUR L. PEARSE of London is in Cripple Creek en route to San Francisco.

T. A. BENNETT AND C. M. ROLKER are examining the Dexter, Utah, property.

R. T. FARNSWORTH has resigned the management of the Mammoth, Utah, mine.

GEO. E. AMES of the Union Iron Works has returned from a protracted sojourn in Montana.

ROSS E. BROWNE is examining the Hydraulic Mining Co.'s property at Minersville, Trinity Co., Cal.

DR. P. LANGHAMMER is now in charge of the Quintette G. M. Co., Oroville, Okanogan Co., Wash.

M. O'ROURKE of Marysville, Mont., is the new superintendent of the Sioux mill, Mammoth, Utah.

O. B. HARDY has organized the Boston & Nevada Copper Co., to work the property at Yerington, Nevada.

J. N. WALKER of Everett, Wash., is to be superintendent and metallurgist of the Pilot Bay, B. C., smelter.

HERBERT VISCHER, assistant to the Debris Commission, is examining Plumas county mines, his present headquarters being Quincy.

MR. LOUIS GLASS, assistant general manager of the Pacific Telephone & Telegraph Company, has returned to San Francisco from New York.

M. CURRAN is again superintendent of the Gold Hunter M. Co., at Mullan, Idaho. It is understood that a new mill will be built this fall to replace the one recently destroyed by fire.

I. B. HAMMOND of Portland, Or., is on his twentieth trip to Alaska. He is going prospecting to investigate the feasibility of putting dredgers on the Yukon and tributaries to hoist up gold.

C. K. BANNISTER has been appointed chief engineer of the Union Light & Power Company, which recently absorbed nearly all of the electric power companies in Utah, including the Pioneer Power Company.

C. S. HERZIG, mining engineer, who some months ago left for South America to accept a position as engineer with the Playa de Oro Mining Company in Ecuador, has returned to the United States on account of ill health.

BYRON E. JANES of the University of California returned last Wednesday from Dawson City. Mr. Janes' letters to the MINING AND SCIENTIFIC PRESS from the Klondike were the first authentic published accounts of that region. His last letter was sent from there under date of June 22nd, '97. Mr. Janes left there July 17th on the steamer Alice, transferring at St. Michaels to the schooner J. M. Colman, arriving at Port Townsend, Wash., on the 30th ult., thence to San Francisco by rail. He came down to complete his scientific mining course with Prof. Christy at the State University at Berkeley, Cal., and subsequently contemplates return to the Klondike. He anticipates considerable distress there this winter.

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THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from E. H. Adams, in the King Bird Mine, in Yuba Co., near Clipper Mills, to deposit tailings in Grizzly Creek; from J. T. Coffman and George T. Miller, in the Lost Camp Mine, near Blue Canyon, Placer Co., to deposit tailings in Blue Canyon, and from Mrs. E. A. Cox, in the Washington Mine, in Whisky Diggings, Sierra Co., to deposit tailings in Slate Creek, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on September 7, 1897, at 1:30 P. M.

Recently Declared Mining Dividends.

Moon-Anchor G. M. Co., Colorado, 2 cents per share, $12,000; Sept. 1st.

Elkton Con. M. & M. Co., Colorado, 2 cents per share, $20,000; Aug. 20th.

Ætna Con. Quicksilver Co., Cal., 10 cents per share, $10,000; payable Sept. 10th. The seven months' statement shows: Gross earnings Jan. 1st to Aug. 1st, $73,500; expenses, $37,830; net, $35,669.

New Idria Quicksilver Co., Cal., dividend No. 2 of 10 cents per share, $10,000; September 1st. The three months' statement of the company shows: Gross earnings May 1st to Aug. 1st, $37,625; expenses, $20,358; net, $17,265.

Pennsylvania, Nevada Co., Cal., 5 cents per share, $2575; Aug. 30.

Fortuna G. M. Co., 10 cents per share; Aug 30.

Morning Star, Placer Co., Cal., No. 81, $5 per share; payable immediately.

Books Received.

"*The Mining Laws of the State of California from '47 to '97*," by F. Hall, sold by J. Bell, Los Angeles, Cal., price 25 cents, postpaid; a handy compilation of State statutes.

"*Practical Mining and Assaying*," by Frederic Milton Johnson of San Francisco, sold by Hartwell, Mitchell & Willis, 107 Montgomery street, San Francisco, price $1; a practical book by a practical man for the prospector and miner, in compact shape and conveniently arranged.

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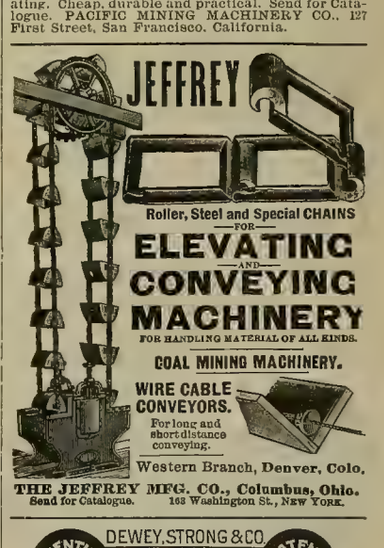

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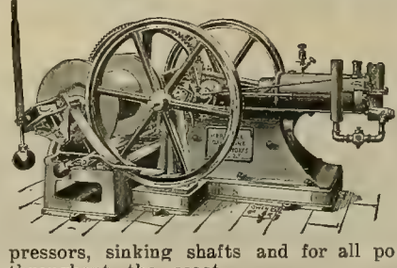

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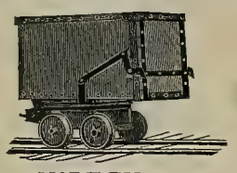

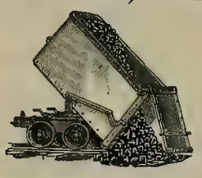

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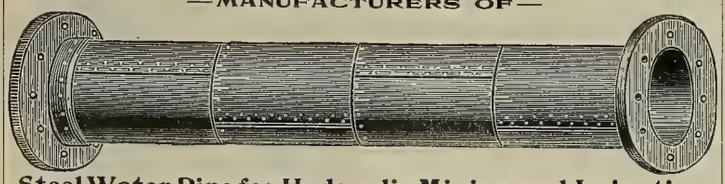

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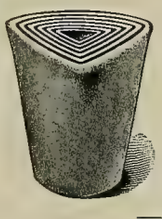

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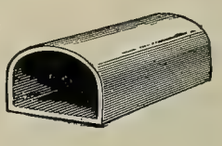

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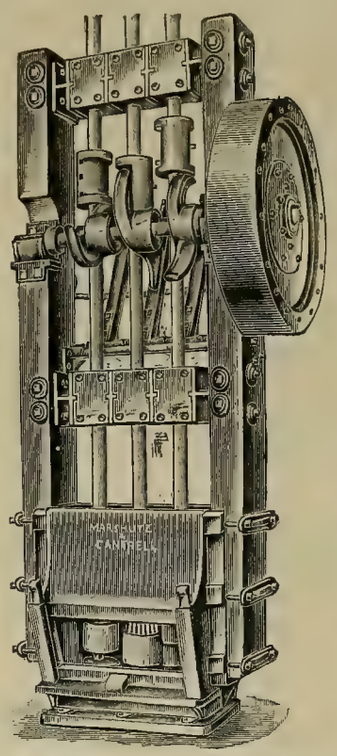

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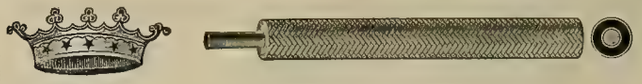

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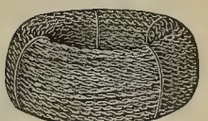

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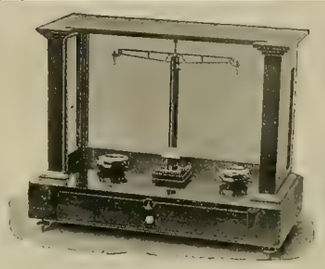

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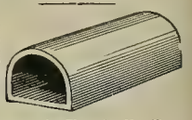

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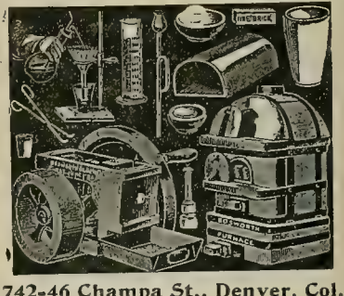

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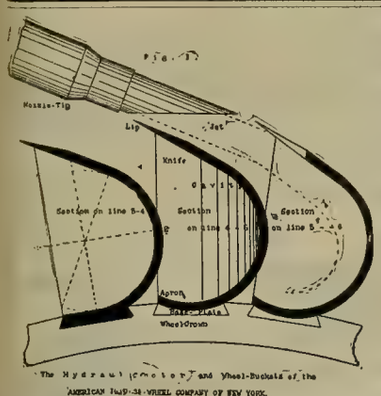

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING AUG. 24, 1897.

588,808.—CAN SOLDERING MACHINE—N. M. Bain, Portland, Or.
588,626.—THRESHOLD—C. Baumann, Oakland, Cal.
588,764.—CARTRIDGE—M. P. Boss, San Francisco.
588,895.—GRIPPER—E. Campbell, Dayton, Wash.
588,814.—BUTTER CUTTING MACHINE—C. T. Colby, Los Angeles.
588,641.—WAVE MOTOR—T. Harding, San Jose, Cal.
588,575.—BOTTLE SEAL—Heath & Nagell, Tacoma, Wash.
588,747.—LOCK—S. C. Houghton, San Francisco.
588,923.—TROLLEY WIRE HANGER—G. E. Johnson, Los Angeles, Cal
588,800.—CAN—A. W. Livingston, San Jose, Cal.
588,771.—ELECTRIC CONNECTION FOR R. R. RAILS—F. Marsellis, Peralta, Cal.
588,836.—NEEDLE—G. W. Raymond, Warrington, O
588,837.—ROLLER BEARING—J. H. Richardson, Madera, Cal.
588,806.—STAMP MILL—G. M. Ross, San Andreas, Cal.
588,783.—ADVERTISING VEHICLE—C. S. Stafford, San Francisco.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ELECTRIC CONNECTION BETWEEN RAILWAY RAILS.—Ford Marsellis, Peralta, Cal., assignor of one-half to Wm. W. Slater of Oakland, Cal. No. 588,771. Dated Aug. 24, 1897. This invention relates to a device for providing an electric connection between railway rails. It consists of a curved elastic plate having the ends bent to one side and adapted to engage and make a metallic connection with the abutting rail ends and in a means for clamping and securing the plate in place. These plates are made segmental longitudinally and also concave-convex and have angular projections which contact with the ribs of the rails. They are laid across the joint, and the fish-plates by which the rails are united are bolted over them so as to clamp them securely in place. This construction maintains a bright metallic connection at all times, so that the conductive power of the rails is not diminished.

CAN.—A. W. Livingston, San Jose, Cal. No. 588,800. Dated Aug. 24, 1897. This invention relates to improvements in the construction of hermetically sealing containing vessels. It consists essentially in forming a can with depressions upon opposite sides and with a surface formed upon its upper edge. The cover has a corresponding opposing surface and a gasket is adapted to be compressed between these surfaces to form an air-tight joint and to be maintained in place between the upper and lower flanges of the cover. An elastic clamp is so constructed as to press upon the cover to retain the surfaces in contact, this clamp having a concave central portion resting upon the cover, and the opposite ends extend down upon opposite sides of the can and are provided with inwardly projecting lugs which engage with side depressions of the can.

ADVERTISING VEHICLES.—C. S. Stafford, San Francisco, Cal., assignor of one-third to Thomas Leach, same place. No. 588,783. Dated Aug. 24, 1897. This invention relates to advertising vehicles and its object is to provide a wagon or vehicle with movable flexible sides or surfaces and a mechanism interposed between these and the wheels of the wagon, so that the rotation of the latter will advance the movable surfaces periodically and intermittently. The structure is mounted upon bearing wheels and has a series of parallel rollers journaled at top and bottom. An endless band or surface containing the advertisements passes about said rollers, and a gear or mechanism is so devised as to connect the lower rollers in series to rotate in unison, and this gear mechanism is connected directly with the driving shaft by means of mutilated gears, which serve to rotate the mechanism and advance the advertising surfaces periodically so as to expose new advertisements and allow them to remain in view for a certain length of time, after which they are again advanced.

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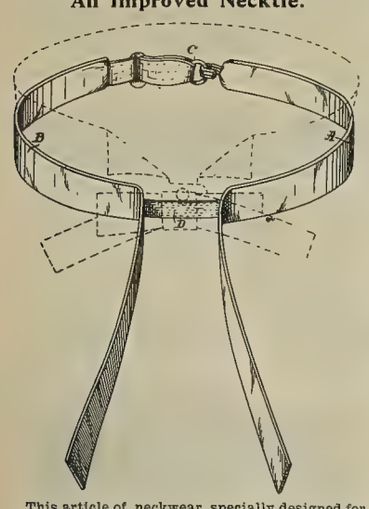

This article of neckwear, specially designed for ladies' or gentlemen's use, is the invention of C. W. T. Davies of this city. It consists essentially of a center piece, two side pieces secured thereto, said side pieces extending rearwardly from the center piece to form a back band and also extending forwardly from the said piece to form the tying portion or means for the attachment of the tie and a separable attaching means for connecting the free ends of the rear extensions, or, if preferred, if the tie is permanently made up, one end of the center piece may be so arranged as to connect and disconnect. The device serves to keep the tie well in place about the collar, to hold it up in front, and also prevents it slipping up or down with relation to the collar. The ends of the tie being loose, a bow-knot, an Ascot, or any other form of tie, can be readily made, which cannot be done with the old style of necktie. Mr. Davies has assigned all his interest in the patent for this tie to the Hand-Tied Tie Co., of 238 Montgomery St., S. F.

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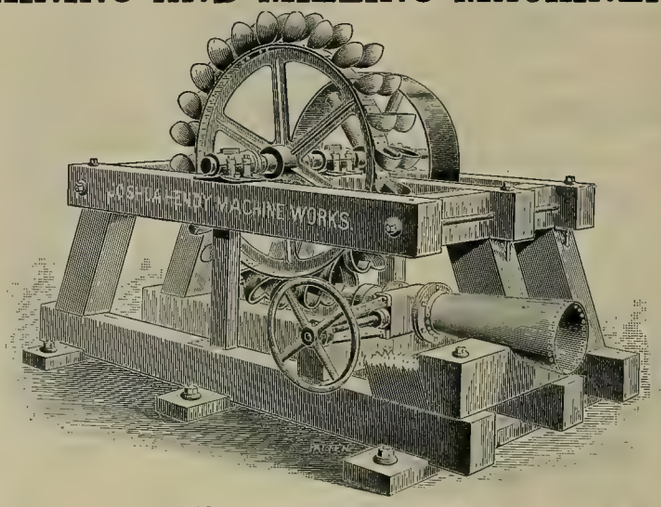

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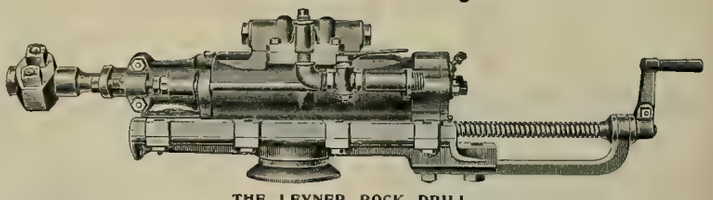

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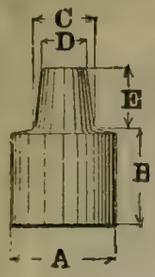

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We have attached a sketch showing sizes; fill in the size of your Shoes and Dies, and order a trial set.

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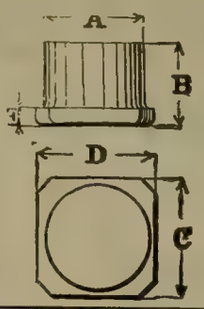
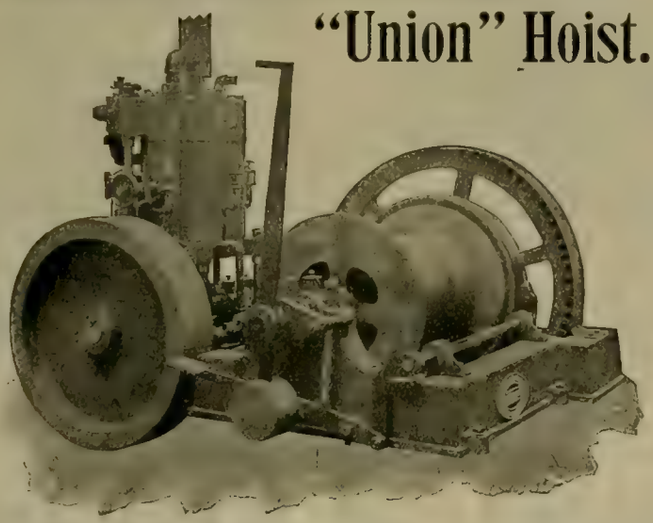


A=.....inches.
B=..... "
C=..... "
D=..... "
E=..... "

"Union" Hoist.



The above cut represents our 10 h. p. Double Cylinder Engine of latest type, and Hoist combined on strong iron base. This hoist is designed to raise one ton 25 feet per minute from an inclined shaft, or 1500 pounds at the same speed vertical lift. The drum will hold over 600 feet of ⅝-inch cable. The outfit weighs 3500 pounds.

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Which use either Manufactured or Natural Gas, Ordinary Stove Gasoline (Naphtha or Benzine), Distillate or Kerosene.

STATIONARY ENGINES for All Kinds of Work, Built in Sizes from 3 to 200 h. p.
"UNION" COMBINED HOISTS in Sizes from 2 to 40 h. p.
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HOISTS and COMPRESSORS Can Be Built in Larger Sizes to Order.
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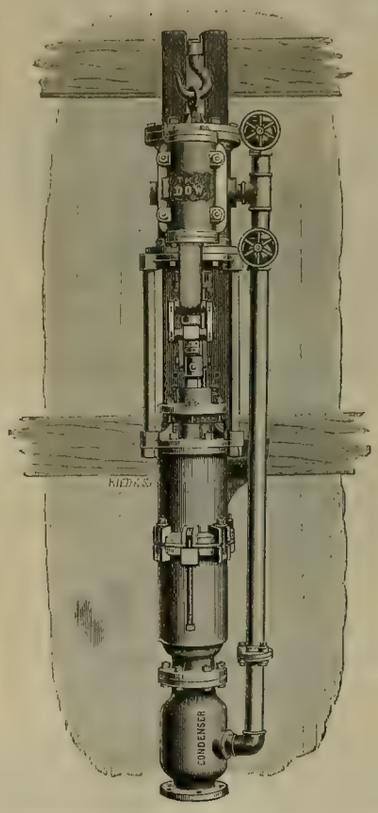

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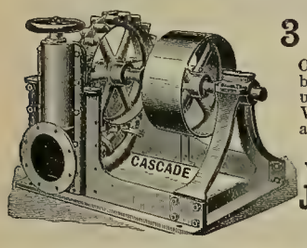
3 Feet to 2000 Feet.



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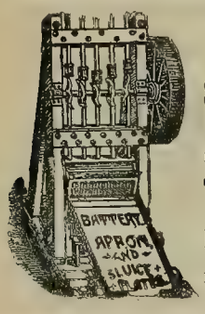

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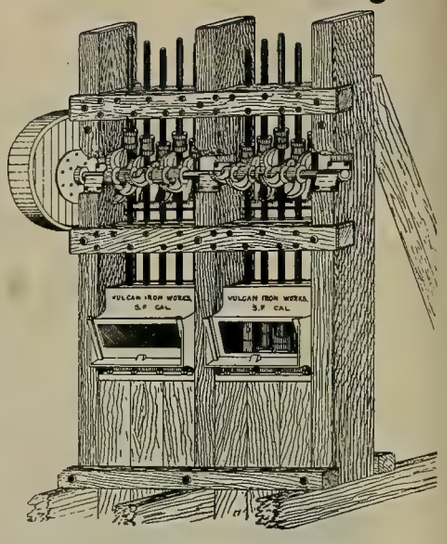

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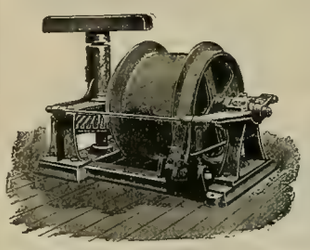

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CHROME CAST STEEL

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STAMP SHOES.

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These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

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SMELTING WORKS:
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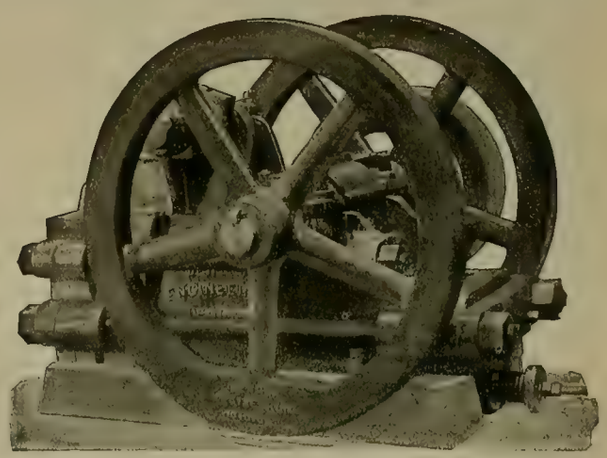

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FINLAYSON PATENT WIRE ROPE TRAMWAY.

It is of the double rope pattern and the newest and best thing in its line ever placed on the market. The automatic features, simplicity of construction, ease of running and economy in operation places the

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far ahead of all other systems of aerial ropeways. It is unsurpassed in tonnage capacity. It is on the principle of "You push the button and the machine does the rest." If interested send for special catalogue.

Our Line of Manufactures includes all kinds of Modern Equipments for the Successful Milling and Smelting of Metalliferous Ores. Special Catalogues on Application.

Compressors Hoisters Air-Drills Blowers
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When in the market for machinery or supplies send specifications to us for our prices. Our stock is the largest and most select carried in any mining district in the United States.
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Shafting Buckets Castings Blocks Valves

Market Reports.

The Markets.

SAN FRANCISCO, Sept. 2, 1897.

General trade shows a continued enlargement, with individual buying in excess of purchases at the corresponding time last year. The growing feeling of confidence is promoting more disposition to operate on larger lines than at any time since 1893—the panic year. This feeling of increasing confidence is due to high prices ruling for farm and orchard products, with farmers having a net profit instead of a loss. It is the belief that, at present prices, the large majority of farms will be cleared of mortgages and payments made, so as to make it lighter in the future. Lower inland transportation to all points reached by water and the San Joaquin Valley railway, makes it possible for producers to market their products at a considerable reduction on former charges. The gold mining industry continues to forge ahead, but silver mining is going back, owing to the low and declining price of the white metal. Machine shops and iron foundries are doing a good business, with the outlook favorable for increased orders for next year. These orders will be for structural and other material and also mining machinery.

The local money market is reported to be more active for crop moving purposes, but owing to the liberal supplies held and the trade generally easy the rates of interest do not stiffen. It is now conceded that the advance in farm products will add from $2,000,000 to $3,000,000 to farmers' receipts in excess of what would have been received had the market kept down to where it was three or four months ago. The gold mines in this State alone are adding from $1,500,000 to $2,000,000 a month to the general circulation. Heavy importing of sovereigns from Australia in the nature of exchange is calculated to add still greater ease to the market; £450,000 have already come and £600,000 is on the way with other shipments to follow. Our New York correspondent writes:

The money market is puzzling the bankers very much owing to its failure to respond to the improvement in business. Everybody seems to be flush of money just now, and to need little or none. Shipments of currency to the west by certain banks have been fairly large this week, but on the other hand shipments of currency to the south have fallen off materially. Demand for time money is nothing like as good as it was, and rates have yielded decidedly from the best, and it is also noted that commercial paper is decreasing in supply. The effect of this is, that the surplus of loanable funds continues very large, and it is impossible to get rates up. No doubt the explanation is to be found in the fact that the long liquidation of the last few years has left everybody free of debt to an unprecedented extent. Hence, the fact that improvement in business has failed to cause the borrowing of very much money.

New York Silver Prices.

NEW YORK, Sept. 2. — Following are the closing prices for the week:

	Silver in—	
	London.	N. Y.
Friday	23⅞	51¼
Saturday	24	52
Monday	24⅛	52½
Tuesday	24	51¾
Wednesday	23¾	51¼
Thursday	23¾	51⅜

	Copper.	Lead.	Iron.	Tin.
Fri.	11 10 @11 35	4 02½	9 50@12 25	13 65
Sat.	11 10 @11 25	4 10	9 50@12 25	13 70
Mon.	11 10 @11 25	4 15	9 50@12 25	13 70
Tue.	11 10 @11 25	4 20	9 50@12 25	13 65
Wed	11 10 @11 25	4 22½	9 50@12 25	13 65
Thur.	11 10 @11 25	4 25	9 50@12 25	13 65

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	2½@5c Prem
New York Telegraphic Transfer	5@7½c Prem
London Bankers' 60 days	$4.84
London Merchants	$4.83
London Sight Bankers	$4.86
Refined Silver, per oz., 1000 fine	51⅝
Mexican Dollars, nominal at	41

SILVER.—The market continues demoralized, with no buying except on order. The metal does not seem to have a friend, and therefore it is singular that the price does not sink still lower. The advance in lead helps it some, but not enough to keep mines from shutting down. One report was out that India would increase the import duty on silver, and a still later one is that no more Council bills will be put on the market for several months. But why this should be accepted against silver is more than we can tell, for before these bills were a factor the price of silver was quite higher and it was wanted for remitting, but since the bills have been put on they have been used to a considerable extent. If India's wheat crop turns out large, then silver will be wanted for exchange.

QUICKSILVER. — The market is barely steady. The last steamer for Mexico took out 120 flasks.

Our market is quoted at $38 for domestic consumption.

MEXICAN DOLLARS.—There has been fair buying, but at irregular prices. Bullion dealers do not carry much in stock, owing to the unsettled market for silver.

COPPER.—The market has ruled steady. The East continues to report a good export and home demand.

Our market is quoted as follows:

Ingot casting, jobbing	13@—
Ingot " wholesale	12½@—
Sheet copper	—@16½
Bolt ¾ and 5-16, 20c; ⅜ and larger,	16½

TIN.—The market is easy.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

LEAD.—The market has firmed up in sympathy with the East, where quite an advance has taken place.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	5 00 @	5 25
Sheet	6 25 @	6 50
Pipe	5 50 @	6 00

SHOT.—The market is firm.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 40
Drop, B and larger sizes, " "	1 65
Buck, Balls and Chilled, do, " "	1 65

POWDER.—The market is active, but not quotably higher.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9c to 11c, according to strength and quantity.

COAL.—There is an improving demand for steam and domestic. The near approach of winter months is causing more inquiry for the latter. Another vessel will leave soon for Cook's Inlet to load coal for the North Pacific Mining & Transportation Company.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$8 00@— —
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 50@ 6 00
Coos Bay	—@ 4 75
Cannel	8 00@— —
Egg, hard	12 00@13 00
Wallsend	6 50@— —

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	— —
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— — — —
English, to load	9 50 @ — —
" spot, in bulk	10 00 @ — —
" in sacks	11 00 @ 12 00
Cumberland	— — @ — —

IRON.—The consumption is large. The advance in wheat charters is likely to cause more vessels to come here with iron as part cargo.

AMERICAN.

	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

ANTIMONY.—The market is steady.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 7¾c for Cookson's, 7¼c for Hallett's and 7c for Japanese.

NAILS.—The market is higher and strong.

Wire, carloads, basis per keg	....
" jobbing, " "	$2 35
Cut, carloads, " "	....
" jobbing, " "	2 25

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4¼

PLATINUM.—The market is quiet.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is steady.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

Chemicals.

The market is not in the most satisfactory condition, for jobbers are still shading several articles below what it would cost now to import at. The East is in a similar condition, as the following from a leading New York exchange shows: "The entire market remains in a quiet condition and prices are momentarily at a standstill, but light cuts on manufacturers' prices are being made quietly from second hands.

SULPHURIC ACID.—The demand is light. We quote in a jobbing way at 1¾c per lb for 66%.

ACETIC ACID.—The market is firm at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported steady from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is barely steady.

We quote in a jobbing way at 4½c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is firm.

Our market is quoted in a jobbing way at $1.50 a pound.

BONEASH.—The demand is fair.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is firm.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firm at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is steady at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—There is a fair demand at 2½c a pound from stores.

NITRATE OF SODA.—Thomson Aikman, Jr., London, states that the estimate of shipments nitrate of soda in August is 79,000 tons to Europe and 9,000 to United States, with about 48,000 tons now loading for September dispatch. Last year shipments in August were 101,000 and 13,000, and loading 1st September, 105,000 and 2,000 tons. The production in July shows a falling off of about 20 per cent on that of June. The market has become firmer.

Our market is quoted from store at 4c for 95%.

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied, Delinq't and Sale.	Secretary.
Altoona Q M Co, Cal	1	75c	Aug 3..Sept 6..Oct 11	C Allenberg, 206 Sansome
Andes, S M Co, Nev	44	10c	Sept 1..Oct 4..Oct 25	J W Twiggs, 309 Montgomery
Bullion Con G M Co, Cal	11	22c	June 22..Aug 23	C A Grow, Mills Bldg
Con Cal & Va M Co, Nev	9	25c	Aug 3..Sept 8..Sept 29	A W Havens, 309 Montgomery
Chollar M Co, Nev	44	25c	Sept 1..Oct 7..Oct 28	C E Elliott, 309 Montgomery
Crown Point G & S Co, Nev	71	10c	July 27..Aug 31..Sept 21	Jas Newlands, Mills Building
Eureka Con D M Co, Cal	9	2c	June 30..Aug 7..Aug 28	D M Keat, 330 Pine
Gold Ridge Con M & M Co, Cal	5	4c	Aug 3..Sept 18..Oct 9	H Sylvester, 43 Sixth
Hale & Norcross S M Co, Nev	112	10c	Aug 18..Sept 22..Oct 13	R U Collins, 331 Pine
Horseshoe M Co, Cal	3	40c	July 12..Aug 23..Sept 20	C E Green, 532 Market
Inyo Marble Co, Cal	30	10c	July 27..Aug 28..Sept 20	M A Cahn, 323 Phelan Bldg, S F
Marguerite G M & M Co, Cal	7	10c	July 28..Sept 10..Oct 11	F Mettman, 237 Twelfth
Mexican G & S M Co, Nev	57	20c	July 28..Sept 1..Sept 23	C E Elliot, 309 Montgomery
North San Juan G M Co, Cal	3	7c	July 16..Sept 8..Oct 4	H W Morris, 141 First St
Occidental Con M Co, Nev	28	10c	Aug 3..Sept 7..Sept 30	A K Durbrow, 309 Montgomery
Osborn Hill G M & M Co, Cal	6	35c	Aug 4..Sept 6..Sept 27	R R Grayson, 331 Pine
Red Cap M Co, Cal	1	$9	Aug 25..Oct 1..Oct 23	E deK Townsend, 125 Beale
Rose Creek M Co, Cal	1	15c	June 28..July 28..Aug 30	J M Wilmans, Crocker Bldg
Savage M Co, Nev	93	20c	Sept 3..Oct 5..Oct 25	E B Holmes, 309 Montgomery
Sierra Nevada S M Co, Nev	113	30c	Aug 18..Sept 22..Oct 12	E L Parker, 309 Montgomery
Thorpe M Co, Cal	7	2½c	June 9..Aug 14..Sept 4	A F Frey, Phelan Building
Utah Con M Co, Nev	25	5c	July 6..Aug 9..Aug 30	A W Havens, 309 Montgomery

Mining Share Market.

SAN FRANCISCO, Sept. 2, 1897.

The market moved to higher figures the past week, with Occidental showing the most strength. It is stated that a pool has been formed in Occidental and that still better figures are looked for. The advance has been already very good—moving from below 10 cents a share to $1.40 a share. When the upmove was first started 60 cents and $1 were the figures put out to sell at. A large number sold at 60 cents—some even shorted—and when $1 was reached more sold, but there is considerable still held on the outside. It ought to be in order to soon report good strikes of ore and that dividends are in sight, so as to help the pool to unload on bull points of the shares going to much higher figures. The upmove in the Comstock shares has been the most marked in the shares that have been kicked about for over a year or two past with the life assessed out of them. This has admitted of concentration, and whenever this occurs neglected work is started and the street filled with all kinds of bull points. But it must be admitted that the market has been too low for several; yet if the shares are not well in hand even at 10 cents or less they are high unless bought after a drag and buyers are willing to pay assessments when they come along, for sooner or later they will get out at a good profit. The advance in Utah is due to the starting of a crossdrift and that some ore will be struck, provided the public do not buy too many shares. The work in the joint west workings of Yellow Jacket, Crown Point and Kentuck ought to gain in interest. Con. Imperial has strengthened some. They ought to be near the west ledge, which has evidently dipped to the west. The lawsuit brought by Justice, terminating in the company's favor, admits of work where the jumpers left off. The latter made the ore pay, but whether the Justice Company will remains to be seen. Assessments are the order. Cholar wants more money, for the company has been milling ore and the mill company does not work for glory. Several other companies are said to be in the same box, but the majority do not report milling ore, but report work in the mines. Even this costs money, and when added to office and other expenses aggregate a considerable sum.

From the Comstock mines the news, officially, so far made public, is rather bearish which is accepted by older traders as favorable for an upmove before long, yet before setting in on a bull campaign lower prices are not improbable. Heretofore all bull campaigns have been started when advices from the mines did not warrant it and in several instances when other conditions seemed unfavorable. A down market is made on big ore strikes and when everything would seem to justify expecting a big bull campaign. It is the unexpected and not the expected which seems to govern the mining share market. From Utah private advices state that a crossdrift has been started, but the official letter only reports continued work in the north drift. No change is reported in Union, either in the work or material encountered. The Sierra Nevada letter is as barren of good news as a desert of springs of water. The work is still confined to the 900-foot and Layton tunnel levels. This may all change after awhile provided the shares are better concentrated. In Mexican they are still pegging away on the 1000-foot with nothing reported as yet that is calculated to encourage assessment paying. In Ophir they are still going west on the 1000-foot level while on the central tunnel level they are going south. In Con. Virginia the work is confined to the 1550-foot and 1650-foot levels. The work on these levels is practically the same as reported last week. The ore found is of two low a grade to extract and mill. The final result of a test milling of some low grade ore at the Kinkead mill has not been reported so far as we are advised. No change is reported in Best & Belcher and Gould & Curry work. In Savage fair work is being done on the level heretofore reported. Considerable repair work is being done in Potosi which indicates that more active work is in contemplation this month, probably to collect an assessment. It is reported that new work is to be started in Andes. The absence of news from Bullion looks as if some one is after the shares. From Con. Imperial, Confidence and Challenge nothing new comes to hand. The same can be said of Yellow Jacket, Kentuck, Crown Point, Belcher, Seg. Belcher and Overman. The work in these mines looks as if something better ought to be looked for before long in at least one of them.

From the Brunswick lode our advices state that active exploiting is being done, with fair to good results looked for, judging from present prospects in the different mines. The joint work of Gould & Curry, Best & Belcher and Con. Virginia is confined to the 300-foot and 600-foot levels. On the 300-foot they are doing some exploiting work, while on the 600-

WE are exclusive handlers of Automatic Acetylene Gas Generators for Northern and Central California. We are desirous of establishing responsible agencies for our territory. Correspondence solicited. WESTERN ACETYLENE GAS CO., Room 75, 916 Market Street, San Francisco.

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foot level they are running both north and south.

In Occidental they ought to be ready to start a crossdrift on the 650-foot level. This may be delayed until connection is made with the 550-foot level. On the 550-foot the east crossdrift is out over 800 feet. In Chollar they are exploiting and stoping on the 300-foot and 400-foot levels. On the 600-foot level they will be soon far enough in to start to crossdrift for the downward continuation of the ore found above. They have commenced milling ore.

Occidental sold at the 2:30 session at $1.80, with buyers at the same figure. Savage advanced under buying on reports of an improvement on the Brunswick lode. A 20-cent assessment was levied by the company to-day. A 20-cent assessment was levied yesterday by Chollar and a 10-cent one by Andes. It is the belief that the market will do better when all the assessments are levied.

The following illustrates the changes of the week:

MINES.	Aug. 26.	Sept. 2.
Alpha	$ 15	$ 20
Alta Consolidated	12	11
Andes		18
Belcher	35	38
Best & Belcher	09	80
Bodie		
Bullion	06	10
Challenge		44
Chollar	72	72
Confidence		
Consolidated California and Virginia		1 35
Consolidated New York	04	
Crown Point	22	32
Exchequer		05
Gould & Curry	45	54
Hale & Norcross		1 05
Justice		11
Mexican	23	52
Ophir		73
Overman		13
Potosi	33	38
Savage	29	39
Sierra Nevada	64	67
Union		41
Utah	14	25
Yellow Jacket	36	34

San Francisco Stock Board Sales.

SAN FRANCISCO, Sept 2, 1897.

9:30 A. M. SESSION.

200 Alpha	20	400 Justice	11
100 Alta	11	300 Keutuck	06
100 Andes	18	400 Mexican	51
400 Belcher	38	100 Occidental	1 40
400 Best & Belcher	76	400 Ophir	73
900 Bullion	10	1000 Potosi	38
200 Caledonia	25	700 Savage	53
400 Chollar	72	500 Seg Belcher	09
250 Con Cal & Va	1 35	500 Sierra Nevada	69
200 Crown Point	32	500 Union	41
600 Gould & Curry	54	300 Utah	20
150 H. & N	1 05	200 Yellow Jacket	34

SECOND SESSION—2:30 P. M.

450 Ophir	73	300 Alpha	20
500 Mexican	52	100 Sierra Nevada	69
1400 Gould & Curry	56	500 Utah	25
500 Best & Belcher	80	500 Bullion	09
550 Con Cal & Va	1 35	300 Exchequer	06
2300 Savage	37	100 Overman	13
200 Chollar	72	400 Caledonia	25
200 Potosi	38	100 Challenge	44
300 Yellow Jacket	32	650 Occidental	1 80
500 Con Imperial	03	200 Scorpion	06
100 Kentuck	06	50 Belcher	38

A New Mexican Opinion.

No man interested in the mining industry can afford to be without the MINING AND SCIENTIFIC PRESS, published in San Francisco. This is the oldest mining journal on the American continent, and its reputation for absolute reliability was established long ago. In mining news and scientific progress it always keeps abreast of the times. It is by all odds the best mining journal published in America, and only by a weekly perusal of it can a man hope to keep up with the great and growing industry of which it is the leading exponent in this country.—*Editorial in the leading paper of New Mexico, the Santa Fe New Mexican, issue of Aug. 25.*

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AND
Silver Ores.

By C. H. AARON.

A Standard Work.

This work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist nor the pratical miner can mistake his meaning.

The work, like Mr. Aaron's former publications ("Testing and Working Silver Ores," "Leaching Gold and Silver Ores,") that have been "successfully popular," is written in a condensed form, which renders his information more readily available than that of more wordy writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:—Perface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of cupellation; Weighing of Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests of Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 126 12-mo pages, with illustrations, well bound in cloth; 1896. Price **$1.00** postpaid. Sold by the **Mining and Scientific Press**, 330 Market St., San Francisco.

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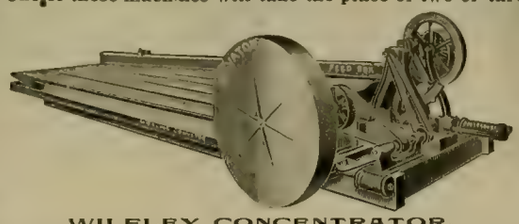

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Rainfall and Temperature.

The following data for the week ending 5 A. M., Aug. 25, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

CALIFORNIA STATIONS.	Total Rainfall for the Week	Total Seasonal Rainfall to Date	Total Seasonal Rainfall Last Year to Same Date	Average Seasonal Rainfall to Date	Minimum Temperature for the Week	Maximum Temperature for the Week
Eureka	.12	.17	.70	0.31	48	70
Red Bluff	00	T	.54	0 08	58	94
Sacramento	00	.01	.20	T	82	51
San Francisco	00	T	.13	0.05	52	69
Fresno	00	T	.22	0.03	54	104
San Luis Obispo	00	00	.24	....	50	82
Los Angeles	00	00	.03	0.05	54	84
San Diego	00	.01	.13	0.08	62	74
Yuma	.45	.57	.73	0.52	70	106

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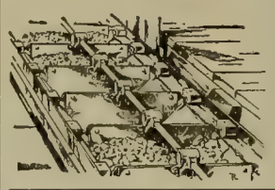

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Assessment Notices.

OSBORN HILL GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Grass Valley, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 4th day of August, 1897, an assessment (No. 6) of 35 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, room 11, No. 331 Pine street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of September, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 27th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

R. R. GRAYSON, Secretary.

Office—Room 11, No. 331 Pine street, San Francisco, California.

CONSOLIDATED CALIFORNIA AND VIRGINIA Mining Company.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 3d day of August, 1897, an assessment (No. 9) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of September, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 29th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office—Room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING Company.—Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 3d day of August, 1897, an assessment (No. 28) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of September, 1897, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 30th day of September, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DUREROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 3rd day of August, 1897, an assessment (No. 5) of 4 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of September, 1897, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 9th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

H. SYLVESTER, Secretary.

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RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 25th day of August, 1897, an assessment (No. 1) of Nine Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, No. 125 Beale street, City and County of San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of October, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 23d day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

E. deK. TOWNSEND, Secretary.

Office—125 Beale street, City and County of San Francisco, California.

SAVAGE MINING COMPANY.—LOCATION OF principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Trustees, held on the 2nd day of September, 1897, an assessment (No. 93), of 20 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, No. 309 Montgomery street, Room 50, Nevada Block, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 5th day of October, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

E. B. HOLMES, Secretary.

Office—No. 309 Montgomery street, Room 50, Nevada Block, San Francisco, California.

ANDES SILVER MINING COMPANY.—Location of principal place of business, San Fraacisco, California; location of works, Virginia City, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of September, 1897, an assessment (No. 44) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, rooms 20-22 Nevada block, 309 Montgomery street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 4th day of October, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of October, 1897, at 1 o'clock P. M., to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

JOHN W. TWIGGS, Secretary.

Office—Rooms 20-22, Nevada block, 309 Montgomery street, San Francisco, California.

DELINQUENT SALE NOTICE.

INYO MARBLE COMPANY OF CALIFORNIA.—Location of principal place of business, San Francisco, California; location of works, Inyo County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 30) levied on the 27th day of July, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
Percy Beamish, Trustee	546	500	50 00
Percy Beamish, Trustee	547	225	22 50
Voss, Conrad & Co	545	301	30 10

And in accordance with law, and an order from the Board of Directors, made on the 27th day of July, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at their office, Room 323, Phelan building, San Francisco, California, on MONDAY, the 20th day of September, 1897, at the hour of 3 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

M. A. CAHN, Secretary.

Office—Room 323, Phelan building, San Francisco, California.

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Colorado has within its limits some of the greatest gold mines that has ever been discovered. In Cripple Creek in 1892 there were a few prospectors looking over the hills; in 1895 the camp turned out over $8,000,000 in gold. Leadville, the old bonanza camp and the mineral product of which made Denver what it is to-day, is becoming a big producer of gold. New inventions for working low-grade gold ores, together with the discoveries made to work rebellious ores, have opened up a field for the miners such as they have never enjoyed before, and Colorado has inducements to offer such as no other district in the world possesses; the record of the State in gold production for the last three years speaks for itself. Among the other prominent camps in the State are Telluride, Ophir, Rico, Silverton, Mineral Point, Durango, La Plata, Ouray, Saw Pit, Ironton, the Gunnison district and many others. New finds are being made and new camps are springing into existence every day. The Denver & Rio Grande Railroad, which is the pioneer road of Colorado and which has always been the miner's friend, reaches all the mining camps in Colorado. For elegantly illustrated descriptive books, free, of mines in Colorado send to

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Office and Works: Cor. Beale and Howard Sts., San Francisco.

READ WHAT MINERS THINK OF THE BRYAN PATENT ROLLER QUARTZ MILL AND JOHNSTON CONCENTRATOR.

OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO.,
SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

RISDON IRON WORKS, San Francisco—Gentlemen: Our company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60 mesh screen. Our mills run 55 revolutions per minute, and each ... sh through 60-mesh screens 12 tons in 24 hours; through 50-mesh, and through 40 mesh, 18 tons. This proportion has been cont...
One set of dies will crush from 1500 to 1600 tons.
One set of tires will crush 1500 tons.
One ring plate will crush from 2200 to 2300 tons.
The mills require very little attention. At our mill ... nary "peon," earning one dollar per day, has complete charge ...
In regard to sliming, in comparison with stamps, by ... of the discharge surface and the continuous agitation by t... pers, a MUCH less amount of slime is created. A three ye... perience teaches me that, in every respect, the mills are a co... success, and of material benefit to the mining world. They ... set up and running in forty-eight hours and can be dismount... same time and removed to wherever desired. Ours were pa... n our mule trail over as difficult a road as any in Mexico. As ... amalgamator it is unequaled by any mill now in existence. Yo... ly.
D. M. BURNS, ... perintendent.

BULLION-BECK AND CHAMPION MINING COMPANY,
EUREKA, UTAH, August 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz.: capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK, Pres.
SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec't'y.

BULLION-BECK AND CHAMPION MINING COMPANY.
EUREKA, UTAH, Aug. 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly, JOHN BECK, Pres.
SIMON BAMBERGER, Director. W. J. BEATIE, Sec't'y.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY.
S. BAMBERGER, President and Manager.
SALT LAKE CITY, UTAH, October 10, 1895.

B. R. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly,
[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO.
C. C. MCIVER, President; D. CUSHMAN, Secretary.
MISSION SAN JOSE, CAL., Oct. 17th, 1895.

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year. CHAS. C. MCIVER, President.

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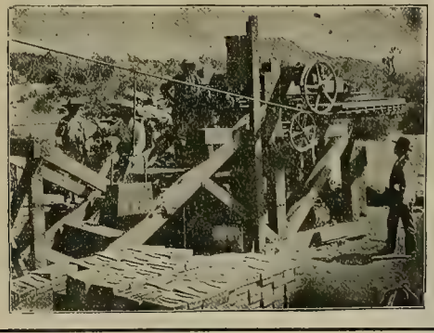

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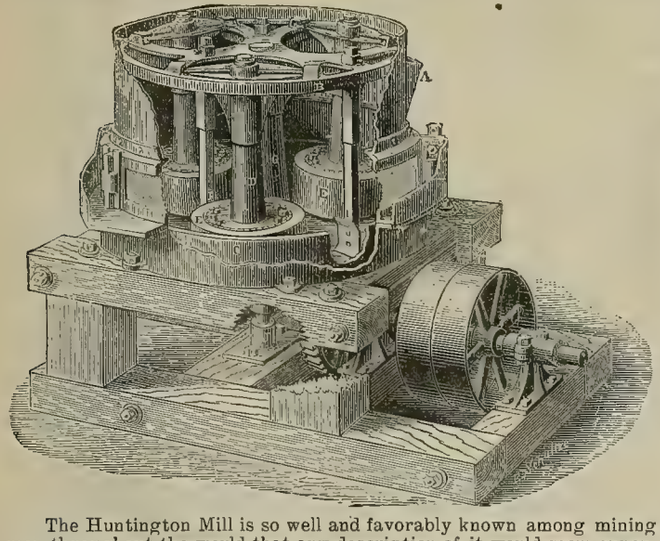

The Huntington Mill is so well and favorably known among mining men throughout the world that any description of it would seem superfluous. They are in use in the United States, Canada, Mexico, Central and South America, Australia, China, Japan and South Africa—in fact, wherever mines exist, and have given the best satisfaction of all quartz-crushing mills. The construction of this Mill has lately been much improved and we claim it to be the cheapest, most efficient, simplest and most durable Mill upon the market. Catalogue upon application.

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AND PACIFIC ELECTRICAL REVIEW.

No. 1940.—VOLUME LXXV. Number 11. SAN FRANCISCO, SATURDAY, SEPTEMBER 11, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

The Klondike Region.

Without any meretricious statements this paper has all along been first with authentic news and illustrations of the new northern El Dorado, and in this issue presents the first half-tone engravings ever made from photographs taken recently in that region. The dump on El Dorado creek shows the spot from which C. J. Berry of Fresno, Cal., took the $135,000 that has set so many people wild. The view of Dawson City, the Klondike on the left, shows a most desolate and forbidding region. The sluice-boxes depicted in another view do not show anything new to a California miner, the picture being solely interesting from the fact that the man who sent that photograph assured the MINING AND SCIENTIFIC PRESS that those sluice-boxes were on a claim which, it was calculated, would turn out $2,500,000. Let us hope so; too many ciphers cannot be put after figures to indicate the amount of gold that such a country ought to yield in part payment for the misery occasioned to all who live there. The water wheel with rude buckets attached for raising water on the famous "Claim No One," above Discovery, on Bonanza creek, and in that locality is considered a splendid piece of engineering construction.

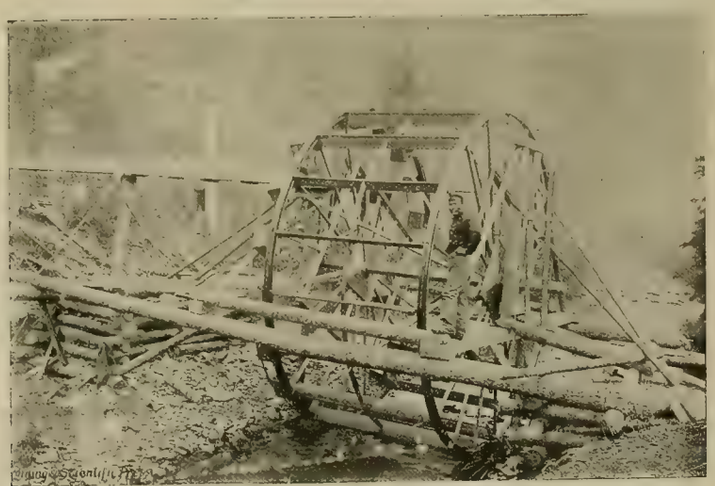
The Klondike placers are similar in surroundings and amount to those in Siberia, and similar in origin to placer gold the world over—gold set free from its lode matrix by climatic action, running water and gravity being the two later factors in placing it where reached by man. Despite the theory and arguments of so many, it is believed that glacial action has had little or nothing to do with the Klondike gold placers. In the æons of ages during which the gold now coming to light was being ground out of the lode the glacial period forms a very insignificant proportion, being but part of a comparatively recent epoch. As in California the placers were formed long before the period of glacial action, that age only serving to hold them in structural place. As in California the Klondike placers are but beds of eocene and miocene streams, river channels ancient as the sun. The main difference between the two localities is that the glacial age was over in California before that northern region where in some places the mighty effect of glacial power is still apparent in the still living rivers of ice.

It will be interesting, as research goes on, to note the geological similarity as reported by Government scientific and topographical expeditions. Still more interesting will be the final demonstration of the source of all this placer gold of the Klondike. It is simply a matter of analogy to assume that quartz as rich but no richer than that of California has been the rock matrix from which the frost freed the nuggets now being so eagerly reached after by the adventurous. From a vertical depth of 1700 feet and a horizontal extent of 1000 feet the Idaho quartz mine in Nevada Co., this State, has yielded gold to the value of $17,000,000. The slow eroding action of Nature in such a lode would grind out a placer fully as rich as the whole Klondike, so far as sounded. A "mother lode" or a "father lode" in far Alaska, through a million years of Nature's slow abrasion, would yield as much placer gold as man in a few brief years could mine from the original quartz. It is probable that some time in the twentieth century machinery to sink on the ledge, hoist the ore, crush it in a mill, catch the gold on the plates, concentrate the sulphurets and chlorinate or cyanate them will be moving northward, but it is not likely that in the present generation any other form of gold mining than that practiced in California's earliest placer days will be followed in the dreary country that for the past sixty days has attracted more attention than any other gold-producing region on the globe.

SLUICE BOXES, ETC., ON BONANZA MINE.

VIEW OF DAWSON CITY AND THE YUKON—THE KLONDIKE IS IN EXTREME LEFT.

ON EL DORADO CREEK, SHOWING DUMPS AND MODE OF MAKING SAME BY CRIBBING THE SHAFT.



CURRENT WATER WHEEL WITH BUCKETS ATTACHED, CLAIM NO. 1, BONANZA CREEK.

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J. F. HALLORAN.....General Manager

TO THE PUBLIC.

No one is authorized to solicit business for this paper unless in possession of proper credentials and regularly numbered and stamped blank subscription receipts.

San Francisco, September 11, 1897.

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Of Practical Value.

In an article on page 216 in the issue of September 4th Mr. Postlethwaite tells of New Zealand river dredging for gold, giving some practical pointers on what has proved to be a valuable method, and modestly suggests that while California can teach the rest of the world a good deal about gold mining, this is one of the methods in which another gold-producing section of the globe can teach California. Costly experience and effort in New Zealand have evolved a system of river dredging which California can note and follow with profit. The inventive California miner has in the last fifty years produced a great many devices that others, elsewhere, have adopted, but this State has no feeling of self-sufficiency, and gladly gains from any and every source anything of practical value. While there is no corner of the globe where gold mining is carried on that a California device is not found, yet, "everybody is wiser than anybody," and collective genius is needed to solve the many hard problems encountered in mining gold.

There are miners who know it all; who can not be told anything; who have learned everything, and have reached perfection. Such degree of knowledge is sometimes manifested by millmen, and to hint that their methods and practices might be improved would not to their ideas be orthodox. But such hide-bound operators are, fortunately, few, and California possesses a very small percentage of them. It is only by interchange of ideas, publication of experience and result of experiment that general knowledge can be secured. Science is simply organized knowledge, and is resultant on such articles as that furnished in this journal by Mr. Postlethwaite. For nearly thirty-eight years this paper has encouraged the publication of such articles written by men who know what they are talking about, and it is believed that the means of intercommunication thus afforded those who guide and control the operation of mines, mills and mining systems the world over has, more than anything else, aided in the progress of scientific mining. The thousands of technical and descriptive articles on different mining matters published herein constitute a record of experiment, experience and practical knowledge unequaled elsewhere, and any communication from a practical mining man is always gladly given the prominence that its merits warrant.

Coinage of Silver Dollars.

There was no coinage of standard silver dollars under the Sherman law during August, and there will probably be no such coinage during this month. These facts do not indicate an absolute abandonment of the coinage of standard silver dollars by Secretary Gage, but are due to the strong pressure for subsidiary silver—dimes, quarters and halves—from all quarters of the country. The revival of trade activity, especially in the West and South, is causing a demand for small silver which can hardly be met without active work upon the accumulation of worn coin and bullion in the treasury. The amount of fractional silver coin reported at the various subtreasuries on the last day of August was $15,377,604, but this was widely scattered, except a large lump which is not in fit condition to issue and which is held in Washington. Director Preston is desirous of avoiding any just cause of complaint in regard to the promptness and sufficiency of the coinage supply during the summer and autumn. He put the whole force of the mints upon subsidiary coinage and gold coinage during August, and turned out more than 3,000,000 pieces of small silver, amounting to $116,000 in dimes, $351,000 in quarters and $234,436 in half-dollars. The work on gold was done principally at the mint in this city and resulted in the coinage of 816,910 pieces, valued at $8,756,250. The problem of coining standard silver dollars under the Sherman law may soon become serious, however, if Secretary Gage adheres to the interpretation of Secretary Carlisle regarding the law. He has not yet shown any disposition to adopt a new interpretation, and has permitted the treasurer to cancel Sherman notes redeemed in silver dollars and to issue silver certificates for dollars presented for that purpose.

The demand for standard silver dollars is considerable during the summer and autumn, especially from New Orleans and other Southern points. A part of the demand can be supplied from free silver in the treasury, under the Bland law, but when this margin rules low, as is the case at present, silver has to be taken from the fund obtained under the Sherman law and used for the redemption of the Sherman notes. This redemption fund stood at $11,034,657 at the beginning of July, but was reduced to $8,411,204 on August 31st. The cancellation of Sherman notes, after their redemption in this manner, has gradually reduced the amount outstanding from $155,000,000, when the purchase law was repealed, to $112,672,280 at the close of August. Of this sum, $29,759,488 was in the treasury and its branches, leaving about $83,000,000 in the hands of the public.

This coinage of standard silver dollars under the Sherman law would not add to the circulation, except for the seigniorage, amounting to about 33 per cent, which is regularly covered into the treasury. This seigniorage, and the bank note circulation and the gold shipments form the only means of expansion of the currency, except such as is due to movements to and from the treasury and the banks. The treasury officials regard the circulation as very nearly in a normal condition, and do not look for large importations of gold during the autumn. They expect the large crop movement to be compensated by merchandise imports and the purchase of securities now held abroad, rather than by the movement of gold.

A Questionable Proposition.

The continued depression in the price of silver has occasioned new financial plans formerly unheard of in connection with silver mining enterprises. One of the latest is a sort of warehouse certificate idea, based on the grain storage custom. Every producer of silver in the west half of America is receiving a circular from a concern in St. Paul, Minnesota, which proposes to "buy, sell and hold in trust gold and silver bullion." The scheme is not without its advantages, but is as one-sided as the handle of a jug.

The plan is for a mining company in this State, Montana, or Colorado, etc., to deposit silver bullion with the local bank or safe deposit company, which local concern will "forward a warehouse receipt" for the amount of such bullion at current market rates to the St. Paul company, which, upon receipt, will issue a corporation certificate of deposit and return it to the local bank, which in turn, will give it to the depositor. This certificate will agree with the depositor to hold the bullion "until it shall reach an elevated price, which shall be named in the certificate, when the bullion shall be sold and the certificate called in and cashed." Producers of silver bullion are invited to enter into a combination contract and agreement with the St. Paul corporation that they will place all of their production into the hands of the corporation and accept the corporation certificate of deposit therefor. That concern says that its certificate of deposit will at all times be worth the price of the daily market for silver, and producers of silver bullion will be allowed to hypothecate their certificates for cash, thus giving producers a chance at any time to realize the going market price of silver, and enjoy the privilege of carrying their certificates "until the price of silver bullion shall have attained the elevated price named in the corporation certificate."

It is believed that the advantages of the plan so far as the producers are concerned will not be so manifest as to cause a general acceptance of the idea. It is probable that a silver producing concern that cannot find any present profit in operating will feel more inclined to let the silver stay where it is "till it shall have attained an elevated price," rather than mine and mill it for deposit in Minnesota or Nebraska.

PARAGRAPH 181 of Section I of the new tariff law, in placing a duty of 1½ cents per pound on the lead in all kinds of lead-bearing ore, especially provides that on all importations of lead-bearing ores the duties shall be estimated at the port of entry, and a bond given in double the amount of such estimated duties for the transportation of the ores by common carriers bonded for the transportation of appraised or unappraised merchandise to properly equipped sampling or smelting establishments, whether designated as bonded warehouses or otherwise. On the arrival of the ores at such establishments they shall be sampled according to commercial methods under the supervision of Government officers, who shall be stationed at such establishments, and who shall submit the samples thus obtained to a Government assayer, designated by the Secretary of the Treasury, who shall make a proper assay of the sample and report the result to the proper customs officers, and the import entries shall be liquidated thereon, except in case of ores that shall be removed to a bonded warehouse to be refined for exportation as provided by law. The Secretary of the Treasury is authorized to make all necessary regulations to enforce the provisions of this paragraph. From several communications received it is evidently a matter of general belief in some quarters that the above creates a large number of new positions, and that Secretary Gage has the appointment of a myriad of "Government assayers." The act does not make any considerable departure from the method in vogue heretofore, and it is believed that applicants for possible vacant positions are wasting effort. The old law which the Dingley act supersedes had practically the same general requirement.

WITH the compliments of a Chicago railroad company comes a map portraying one-half the globe, the central idea being that the Atlantic ocean be abandoned or not reckoned in international transit. It is an old idea in an attractive shape, and developments in these sunset years of the century take it into the realm of possibility. By the map, which seems a sort of half-joke-whole-earnest notion, one goes from New York City by rail to this coast, northward, through British Columbia, over a to-be-constructed railroad to the mouth of the Yukon (with an incidental side trip to the Klondike), thence still northward coastwise to a point opposite the extreme eastern projection of Siberia; a ferry voyage of over 100 miles, the railroad trip renewed down the Siberian shore to Vladivostock, St. Petersburg, Moscow, Berlin, Paris, London—about 11,000 miles. Why not! More difficult things have been achieved. Clarence King says: "The time is not far distant when a man can start out of Denver and travel to Klondike, stopping every night at a mining camp. Already two American stamp mills are pounding away on the borders of the Straits of Magellan, and the day is approaching when a chain of mining camps will extend from Cape Horn to St. Michael. Before the end of the twentieth century the traveler will enter a sleeping car at Chicago, bound via Behring straits for St. Petersburg." One thing is manifest: The coming century, like all other centuries in the world's record, will hold such progress in scientific mining that other arts and industries will follow. Upon mining rests all the stir of life, the wealth of nations, the fortunes of manufacturers and the prosperity of individuals. The little map and the quoted prediction may be reality in the lives of many who read this.

Concentrates.

THE Salt Lake, Utah, Mining Exchange was reopened this week.

MERCUR, UTAH'S, gold output is now figured at $75,000 monthly.

TIN is reported discovered on the Bonaparte river near Ashcroft, B. C.

SEVERAL Sandon, B. C., miners are leaving for the mythical mines of Peru.

TEN DOLLARS is the fee for application for mineral entry or land for a mill site.

THE Mt. Morgan mine, Australia, annually produces about 150,000 ounces of gold.

UNITED STATES mining machinery is admitted free of duty into British Columbia.

THE Salt Lake *Tribune* is the best mining paper between Colorado and California.

CALIFORNIA Chinamen are shipping Mexican dollars to the Orient on private account.

MESA GRANDE, San Diego Co., Cal., reports discovery of an unusually fine asbestos ledge.

TELLURIDE ore of unusual richness is reported discovered at Gaynor creek, Kootenay lake, B. C.

LARGE and rich deposits of mercury are reported discovered on Noggriga creek, New South Wales.

THE Plymouth Rock mine, Milton, Calaveras county, Cal., will not be reopened until next spring.

IT is locally thought that a bank and a cyanide works at Mojave, Cal., would be paying enterprises.

FOR the first time in the history of the nation it takes five ounces of silver to buy a hundred pounds of flour.

THE total cost of the 40-stamp mill put up at the Gwin mine, Calaveras county, Cal., one year ago, was $21,000.

THE Independence gold mine, Victor, Colo., is reported netting its owner, W. S. Stratton, $50,000 per month.

LIQUID AIR is not for sale in this city. So far it is a laboratory production, and is not an article of commerce.

PROPHETS now prophesy that lead will reach $4.50 per 100 pounds by the close of the year. It seems probable.

THE illustrated article by Aug. J. Bowie on "Ditch Construction" was published in the issue of Feb. 27, '97.

RECENT glittering reports of rich gold fields on the Yaqui river in Mexico are declared in Colorado to be baseless.

YESTERDAY'S dividend of the Mercur, Utah, M. Co. brings the total of that Utah company's dividends up to $800,000.

AT Platina, N. S. W., platinum with the gold was saved during 1896 to the amount of 1900 ounces, valued at £3915.

FIRE last week destroyed the hoisting works and part of the shaft of the North Mountain Co., Egan canyon, Nevada.

GRADERS for the Sierra Railway have reached Jamestown, Cal. It is expected that trains will be running into Jamestown in sixty days.

THE mining business in Los Angeles is on the increase. Two more mining papers have recently started in the Southern California metropolis.

A SOUTH AFRICAN miner invented a tool sharpening machine about two years ago, but so far it is believed that it has failed to be a practical success.

E. BEAUDETTE of Murray, Idaho, claims to have discovered a new and sure way of extracting gold from black sand. As usual, he employs "chemicals."

THE National Park Company, South Pass, Wyoming, contemplates putting up a mill, concentrators and a chlorination plant at a probable cost of $40,000.

AT a recent meeting of the Tuolumne, Cal., Miners' Union at Quartz Mountain it was decided to pay benefits in case of sickness or disability at the rate of $7 per week.

A NARROW GAUGE railroad from Guthrie, on the Arizona & New Mexico Railway, to Morenci, Arizona, sixteen miles, is to be built by the Copper Queen Mining Company of Bisbee.

THE notorious Hartsfelt and the International Ore and Reduction Co. are heard from at Marble City, Colorado, this week. They seem able to fool some of the miners all the time.

MANY inquiries received weekly are answered in this column, the question being usually omitted and the answer given in the briefest possible form consistent with accuracy.

No. 1, VOL. I of the *Klondike News*, alleged to be published at Dawson City, N. W. T., bears date July 17, '97. It has not a San Francisco printer's imprint, but looks as though it might.

MERCUR, "Camp Floyd" district, Utah, is a lively mining section. In addition to plants now in operation it is locally figured that ten new mills will be built in that section by June 1, 1898.

ARIZONA'S mining law does not admit of the relocating of claims where such relocation is plainly to avoid assessment work, and is mandatory in compelling locators to do development work.

SINCE July 15 about $800,000 in gold has been received at San Francisco from the Klondike, and when the next Australian steamer arrives about $5,000,000 will have been received from Australia.

THE Klondike transportation and investment companies have about harvested the season's crop of dupes. These cormorants will share with sensational newspapers the odium of consequent suffering.

IN this State mountain quail and grouse can only be killed between September 1st and February 15th. Valley quail cannot be killed before October 1st. Male deer can be killed up to the 15th of October.

THE United States land department has held that a corporation seeking patents to mining lands must comply with the corporation laws of the State where the property sought to be patented is located.

A BOSTON company, "$3,000,000 capital," advertises "control of a dry washer so that the ground may be worked at all seasons whether the water is frozen or not." Fancy a "dry washer" in the Klondike.

A NEW SCHEME for handling dump ores to which high grade talc adheres is in use at Colorado Springs, Colo. It is a washing process that gives the talc as a concentrate product that runs from $100 to $250 a ton.

A SPOKANE, Wash., man has chartered a schooner to take "an armed force of 100 men to Copper river next spring." Any one, armed or otherwise, would do well to postpone adventuring in Alaska till next year, but there are more necessary conditions than going "armed." Better leave the "arms" at home and take plenty grub.

A LETTER signed by J. H. Rothschild, from London, England, positively announces that a syndicate of that name will erect a smelter in Vancouver, B. C., next winter to cost £250,000; capacity, 250 tons a day.

A FOUR-FIFTHS INTEREST in the Freeland mine, Idaho Springs, Colo., has been sold to the Gold Coin M. Co. for $130,000; $50,000 down, $80,000 in sixty days. The company will spend considerable in development work.

A COMPANY can be formed in British Columbia by the signature of a memorandum, or memorandum and articles of association, by five persons, on payment of registration fees and filing of the usual particulars under joint stock company systems.

DIRECTOR WALCOTT of the U. S. Geological Survey is authority for the statement that running west of north through the Yukon valley is a broad, continuous belt of quartz carrying gold, silver, copper and lead. The gold-bearing ore is low grade.

THE number employed in gold mining in New South Wales during 1896 was 12,069 quartz mining, 9428 Europeans and 710 Chinese hydraulic mining—a total of 22,207 men, an increase of 773 on 1895. The aggregate of gold during the year was 296,071 ounces.

A REAL ESTATE SPECULATOR has turned his attention to mining stocks in British Columbia properties and announces in an Astoria paper that "a limited amount of non-accessable stock can be had at 10c a share." Buyers should at least be allowed to get the stock.

OWING to the fall in the price of silver, the Mahala mine at Leadville, Colo., employing fifty men, has announced a reduction in wages from $3 to $2.50. The men accepted the reduction. The Mahala is one of the largest silver producers in the Leadville district.

FOR the hundredth time a Meadow Lake scheme has fallen through, this time a Utah proposition to erect a new style of smelter to work the ore. The result of the last venture is several miles of a well-built road from Cisco to Meadow Lake, and several unpaid workmen.

THIS week's $10 dividend of the Calumet & Hecla Mining Co. makes $20 this current fiscal year and $40 this current calender year. Total payments now foot up $50,850,000 to shareholders. In Nevada, on the Comstock, the California and Con. Virginia have paid $77,608,800 dividends.

THE annual report of the Chief of U. S. Corps of Engineers for 1895, regarding the amount of debris resting in the Sacramento, Cal., drainage system, estimates 308,000,000 cubic yards in Yuba river below DeGuerre Point, and 100,000,000 cubic yards between Smartsville and DeGuerre Point.

THE California Iron and Steel Company have bought the plant at the Iron mine, four miles from Clipper Gap, Placer county, Cal. The machinery will immediately be removed to San Francisco. This is the latest phase in the history of what was expected to be a flourishing industry at that point.

THE Golden Scepter Mining Co. of Phillipsburg, Mont., will have to do nearly $5000 assessment work before January 1, '98, to represent their unpatented claims. A great many companies and individuals have only 111 days from date to do enough work to hold their claims for the ensuing year.

AN unfounded claim is reported that Dawson City is in United States territory. Should, however, international question arise and the matter be as slow of adjudication as the seal controversy in Bering sea, nearly all the placer gold in the disputed region will have been mined by adventurous Americans before the question would be definitely settled.

ANY ONE outside of California wishing a copy of the last report of the State Mineralogist should forward one dollar to the State Mining Bureau, this city. Any one in California can secure a copy by sending seventeen cents to prepay postage. It is understood the present State Mineralogist will not issue a similar report.

IN Montana, Utah, Colorado and elsewhere the increasing value of lead will, it is thought, lead to the reopening of several silver-lead mines, closed on account of the decline in silver, and the novelty will be witnessed of "lead" mines in full operation, producing 25 per cent of lead with 75 per cent of silver as a "by-product."

UNDER the act passed by the recent State Legislature (which so far has not been declared unconstitutional) superintendents of unlisted mining companies in this State are not required to make weekly or monthly statements, nor are mining secretaries of such companies compelled to keep their accounts open to shareholders' inspection.

DURING August, of the 27,122 tons ore output of the Cripple Creek, Colorado, district, nearly half was cyanided, 6500 tons went to the smelters and the remainder was chlorinated. The result is thus locally figured: Sixty-five hundred tons smelting ore, $455,000; 19,522 tons mill ore, 546,616; 1100 tons at stamp mills, $11,000; total, $1,012,616.

SOME of the most attractive of the dozen different "guides to the Klondike" received at this office are almost literal copies of the descriptive matter regarding that region written by experts for this paper, and published in recent issues; and, so far as that part of the prospectus is concerned, are reliable, the compilers showing excellent judgment in selecting an authentic account of the country they profess to exploit.

IN the construction of the 40-stamp mill, Amador county, Cal., five concrete piers are added to the timbers for each twenty stamps, thus admitting replacement of knee frame, knee-beam timbers, knee-beam posts and mortar blocks without shutting down more than five stamps. V. S. Garbarini, builder of these piers, thinks that concrete will eventually be substituted for timber in the construction of mortar blocks.

THE loss to California farmers by the stoppage of hydraulic mining is treble the gross amount of contributory damage occasioned by the debris, and approximates the loss to the miners themselves. It is time this debris question be reopened and the fact recognized that the greatest measure of prosperity to the farmers themselves is in line with a home market and the development of all the industries of the commonwealth.

COLONEL BAKER, British Columbia Minister of Mines, defines the meaning of the phrase "rock in place" at greater length than the California definition. He announces that "rock in place shall be deemed to mean and include minerals not necessarily in a vein or lode, that is when discovered in the same place or position in which it was originally formed or deposited, as distinguished from loose, fragmentary or broken rock or float, which by decomposition is found in wash gravel or sand. Valuable deposits of mineral shall mean and include mineral in place in appreciable quantity, having a present or prospective value sufficient to justify exploration."

THE steamer National City, which left St. Michaels, Alaska, Aug. 27, is to hand and confirms the warnings given in this paper since the beginning of the Klondike craze, namely, that starvation is imminent at Dawson City. Considerable food was sent from this city and northern ports, but it is considered impossible to get sufficient up the Yukon or across overland to prevent scarcity. The steamer Excelsior with eighty passengers from the Yukon is expected here this week.

IN Colorado, says the *Review*, the average contents of the low-grade sulphide silver ores, such as are produced in large quantities in Leadville and in some mines which concentrate their product, is from 10 to 12 ounces per ton. The decline of 12 cents per ounce in silver amounts to from $1.20 to $1.50 per ton, and this wipes out the profit in many cases and forces suspension. On lead-silver ores the advance in lead prices has about offset the fall in silver, so they are affected less.

CAPT. LEE from the Klondike says: "As to the amount of gold taken out of Klondike since the strike in August, '96, the total does not exceed $1,700,000. Of that amount about $1,000,000 has come south. The remainder has gone in wages, expenses and reinvestment in claims. During the same period over $1,000,000 has gone in provisions and supplies. At the present moment the trading companies at Dawson have orders for food and supplies for the coming winter from miners already there to the amount of $1,500,000. On this summer's rush alone about $600,000 has been spent. More has been spent in steamboat passages to Alaska than has been taken out of the Klondike. In other words, the Klondike excitement has cost $10,000,000 up to date and has produced about $2,000,000."

THIS is how those things are viewed in Boston, and is from the *Herald* of the 1st inst.: "The uses of quicksilver have increased so largely in recent years that imports of the metal are considered a possible necessity of the near future. Mining consumes a good deal, but mechanical and chemical arts are fast becoming a great absorbent of the metal. Tinfoil has supplanted quicksilver in the construction of all save the highest grade of mirrors. There is said to be only about 4000 flasks of 76½ pounds net in the country, a reduction of two-thirds in a comparatively brief period. The price has risen quite steadily, and appears not to have been checked. These facts are of important advantage to Boston's quicksilver mining properties, the Napa, Ætna and New Idria. The first named is said to be earning at the rate of $12,000 net per month, and the last named two-thirds as much. The New Idria has lately enlarged its territory by buying the lode and territory between its old workings and its San Carlos mine, giving it a good mile of well nigh virgin ground. Good dividends and an accumulating surplus appear to be in sight for all of these properties. There is no speculation in the shares of either of these companies, and it is doubtful if any reasonable bid would bring the shares from investment boxes. The management of the properties is industrial, not speculative."

THE *Inter-Mountain* says that the safety cages which the last Montana legislature ordered placed in all mines of 300 or more feet in depth are not meeting with much favor in Butte. Several of the mines were equipped with the cages on June 1st, when the law went into effect, but two or three of the big companies were slow about adopting them in all their mines and few of the shafts of the big copper producers are now using them. It is intimated that some of the Butte companies have decided to fight the law compelling enclosed cages to be used. At the time the bill was passed in the legislature it was believed much good would result from their use. Their use in many of the shafts of Butte, however, has been found impracticable, it is said, and the miners themselves are the principal objectors. The miners say they are nothing but a death trap and that they are a great deal more dangerous to life than the open cage. In the copper mines the material rots rapidly under the action of the copper water and unless replaced frequently the doors are liable to become loose and swing into the shaft, a contingency which would be fraught with great danger in a rapidly moving cage with men aboard. Another objection urged against the cages is that the ground around Butte is so soft that it is almost impossible to put in a good shaft and that in consequence some of the shafts "spring" in spots rendering the guides and wall plates uneven. With the open cages these spots are easily detected and the defects remedied before damage results, but in the enclosed cages it is impossible to see the timbers.

DIRECTOR C. D. WALCOTT of the U. S. Geological Survey was in San Francisco this week on practically the same general business that recently called Commissioner of the General Land Office Hermann to this city. Director Walcott says: "I am making this trip for the purpose of learning the real sentiment of the people as to the forest reserves which have been the subject of so much criticism and which I fear are little understood. I believe in the preservation of the forests of the country, and that Government control is the only means of accomplishing such preservation. It has given me much satisfaction to find the people whom I have met, as a rule, in favor of protecting the forests from fires and the young timber from the woodman's ax. I meet with many objections to the plan of forest reserves, but I do not believe that those who make the objection fully understand the plan of the Government or the scope of the order setting aside the forests. The industries of the West are not injured by the reservation order. It is expressly stated that no forest reservation shall be established except to improve and protect the forest or to maintain the waterways. The idea that no timber on the reservations can be used is an error. The locating of mines and mills is not prohibited, and all matured and dead timber may be used as heretofore. The Government seeks only to prevent wanton destruction of timber, and when the people understand that this is the real object, many of the objections that have been urged will not be heard." Director Walcott left San Francisco for Yosemite valley last Wednesday. He proposes to make topographical maps on a two-mile scale of all the forest reserves in California, which includes recent additions—a total of 6,647,000 acres. On these maps the distribution of forests will be platted out, showing the commercial and the non-commercial timber, the agricultural lands included in the forest reserves, the portions burnt over, and all settlements, roads, houses and other improvements upon the national forest domain.

Amending Federal Mining Laws.

TO THE EDITOR:—The amendments proposed by Col. W. S. Keyes to the Federal mining laws will not suit the bona fide miner and prospector. He says in the PRESS of Aug. 21st last that he "would do away with the extra lateral right altogether, but would permit patenting under the present law until Jan. 1st, 1900." That is, he would force the miner or prospector who has uncovered a valuable lode or vein to procure a patent in the time named or relinquish his claim, or part of it, without regard to the miner's financial ability to secure such patent. "Doing away with the lateral right" means also that the mining location would be confined to the surface lines extended vertically downward all round the claim, cutting the vein at the side line on the hanging wall of the lode, and compel the miner to suspend operations on the downward course of the vein at that point, unless he was fortunate enough to have located the extra thousand feet Col. Keyes would allow, else he would have to buy that much, if he could, in the direction the vein dips. This is the law, or was, in the Rand, in South Africa, and would work here as it did there—force the mining companies to buy adjoining ground or see their mining plants rendered valueless, for in most instances the discoverers would not have time to make the additional locations on the side of the first. In addition to this, the discoverer of a vein would get only half the width of his surface ground on his vein, for the outcrop of the vein would be in the middle of the location. In the case of an old mine once operated and closed down, it could not be sold, as there would be a strong doubt as to there being enough ore in the mine to pay for reopening the same. An illustration of this: A mine sold here recently that has been idle for nearly thirty years has an incline 400 feet deep sunk on the vein which has a dip of 28 deg. 30 min., surface ground 600 feet wide, vein croppings in the middle of the claim, and land on both sides covered by other locations; when the shaft is cleaned out the purchasers of this mine would find that they had 58.6 feet of incline shaft and old stopes in ground owned by other parties, if the proposed amendment of Col. Keyes were in force; and if such was the law the mine would probably never be opened, not even though it is known that much of the ore formerly extracted yielded from 5 to 7 cents per pound. The third proposition, as do the others by Col. Keyes, would in effect tie up the prospector's pick, as most prospectors can do and will do the necessary $100 worth of work to hold a claim, if for no other purpose than to uncover something on the lode that will sell his holding, while most of them would find it difficult to make a payment of $50 cash each year. If the present laws governing lode claims are enforced and the cost of obtaining a patent made cheaper, and the laws that govern placer locations altered so as to allow the gravel miner to follow the pay channel in making his location, with a larger amount of ground allowed to drift gravel mining companies, so as to secure to them enough of the pay channel, it will be all that is required, and will increase the mining industry and gold output to a great extent.

Nevada City, Aug. 30, '97. E. H. MOORE.

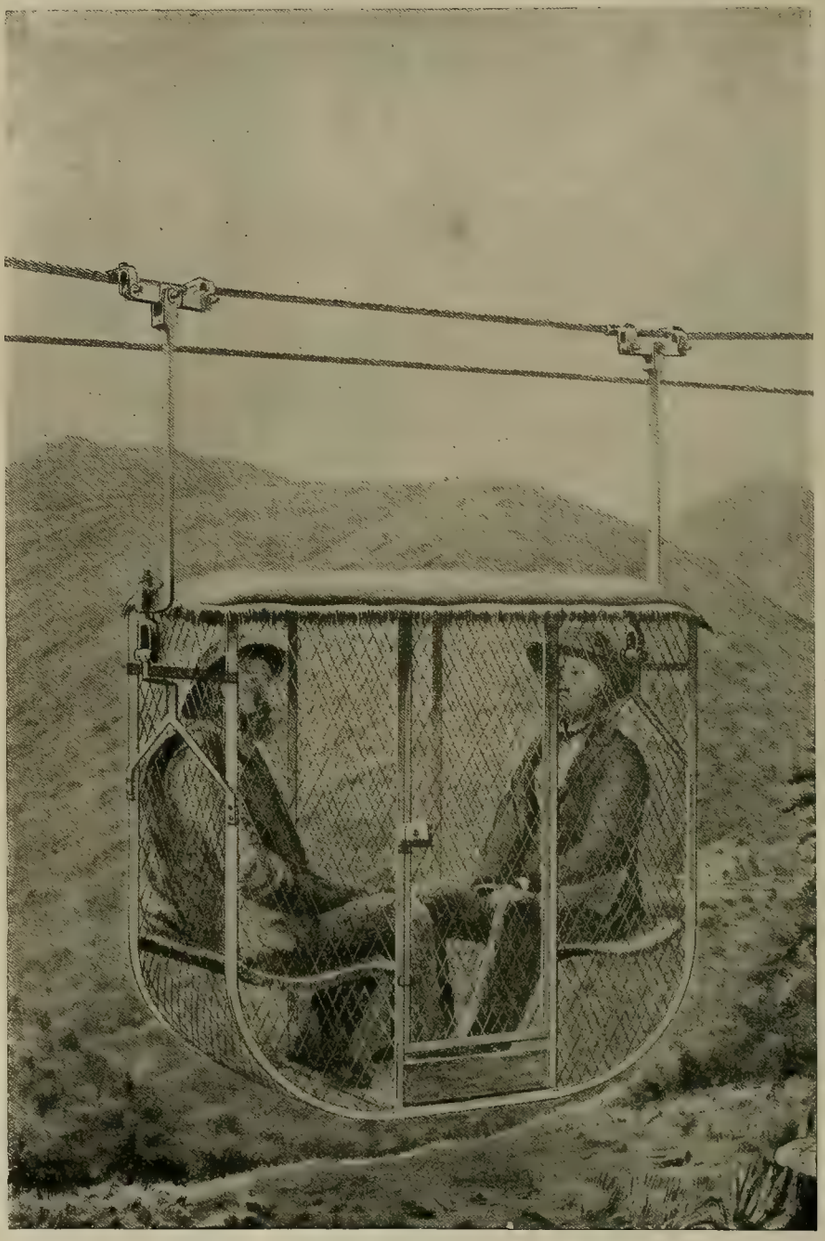
Workmen in Europe and America.

Charles Davis, president of the Davis & Egan Machine Tool Company of Cincinnati, who recently returned from a tour in Europe, says: "The only way to get at the industrial situation in Europe is to dig right down into the locomotive works, gun works and machine shops. Watch the men at their work. You will see them dull and listless. The workman looks through the glass at the end of the shop and sees the proprietor—there only because he is the son of his father. He says: 'It is impossible that I could ever be in there.' And he plods on like a galley slave. Not so with the workman in the United States. He looks through the door at the end of the shop and sees the proprietor there busy with his plans. He says: 'Very well, my friend; it was only a short time back that you were out here in the shop where I am now. Some day I will be where you are.' He puts his lathe on a faster speed and the chips fly. The proprietor, seeing his work, makes him a foreman, then superintendent, and then a partner."

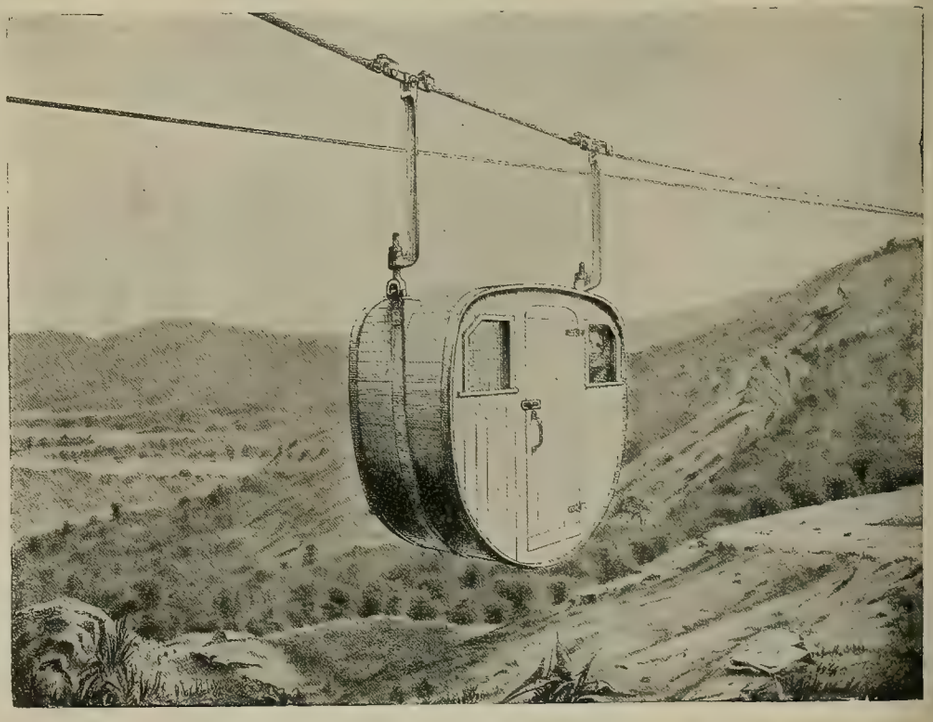
THE census of '96 indicates that Chicago has made the largest increase in population in the interval since the last national census in '90. Its population is given as 1,619,226 in '96, as compared with 1,099,850 in 1890. New York seems to have made the next greatest gain among the large cities, its population being put at 1,995,000, as against 1,515,301 in '90. Brooklyn comes next, having increased its population from 806,343 to 1,100,100. Philadelphia shows an advance from 1,046,964 to 1,188,793. St. Louis shows a gain from 451,770 to 570,000, Boston from 448,477 to 516,305 and Baltimore from 434,439 to 506,378. These represent the cities having a population in excess of 500,000.

Of Probable Value.

The chief difficulty in the overland route to the Klondike seems to be a short stretch of rugged country that deters many from further progress. Thousands of columns in the dailies tell of the horrors of that little stretch of mountain, the impassable mud, the huge boulders, the steep climb, etc. It is out of the



WIRE-WORK CARRIAGE—PASSENGER TRANSPORTATION.



CLOSED CARRIAGE—PASSENGER TRANSPORTATION.

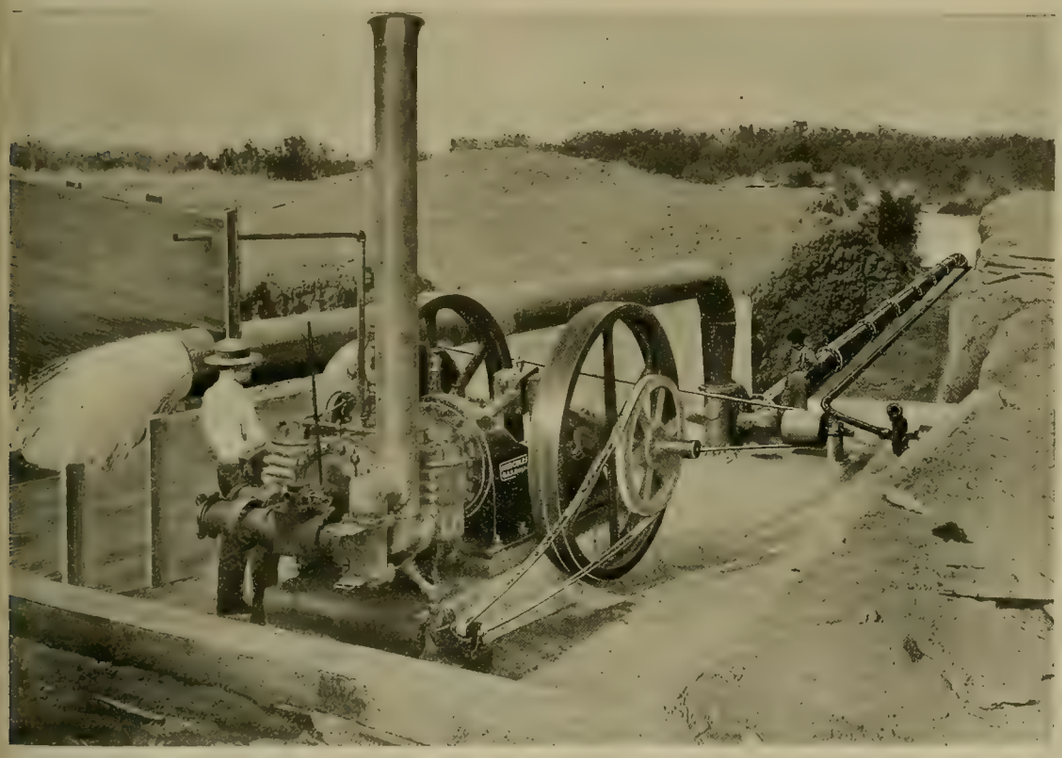
question to suppose that any difficulty of transit, however apparently insuperable, can long detain the American miner, who before now has removed mountains, turned the course of rivers, hung a tramcar in the air, tied a loop in a railway track and successfully solved any and every difficulty presented.

It is believed that the ropeway in such successful use in many mining districts could be utilized in this instance. It is suggested that a railroad will ultimately solve the problem should the mines prove rich enough and the travel continue in sufficient volume to warrant building; but till such time as a road is built something better is needed than the pull-dog-pull-devil style of travel so painfully portrayed in all the accounts from that miserable country.

The details, style of construction, cost, etc., of these wire ropeways have been repeatedly published in this paper, and everyone connected in any way with mining or the transit of materials over a rough country is presumably familiar with the matter. It may, however, not be so generally known that this style of conveyance is capable of carrying passengers, as well as freight, ore and supplies. On this page is portrayed two styles of carriage, closed and open, used for passenger transportation on such aerial tramway. For the two engravings we are indebted to the courtesy of Mr. Parsons, manager of the Hallidie system of ropeway transportation.

A Large Irrigating Plant.

There is an immense amount of land in California contiguous to waterways which can be successfully



A LARGE GASOLINE PUMPING PLANT.

and profitably irrigated. Where ditches can not be run from some higher point on a stream, other methods of supplying the water to the land have to be introduced. Considerable has been done in the last few years in the building of gasoline pumping plants for this particular purpose. There was recently installed on the 7000-acre ranch of George H. Packer, about ten miles above Colusa, the largest gasoline pumping plant in existence. It consists of an 80 H. P. Hercules gasoline engine and a 15-inch Krogh Manufacturing Company's double suction centrifugal pump, taking water from the Sacramento river and delivering it into a ditch 27 feet above the water level.

The plant was guaranteed to deliver 6000 gallons a minute, but it has exceeded the guarantee by about 1200 gallons. The flow is in excess of 7200 gallons, 432,000 gallons an hour, considered sufficient to cover 384 acres to a depth of 1 inch every twenty-four hours.

The engine and pump are set on massive concrete foundations, the centers being 32 feet, to allow for sufficient length of belt. The main suction and discharge pipes are 20 inches in diameter, and the distance from river to point of discharge is about 200 feet. The main driving belt is six ply, 20 inches wide. The plant was constructed by the Hercules Gas Engine Works of San Francisco, who have been building some very large engines for irrigating and mining purposes. These engines are economical, and do not require the services of an experienced engineer. They burn either gasoline, distillate or crude oil, and, the makers say, will do the same amount of work for about one-half what a steam engine will, burning coal. The consumption of fuel in this particular plant is stated to be less than one-eighth of a gallon an hour for each H. P. The success of this plant shows what can be done in irrigating in California land, and will probably lead to the erection of a number of other plants.

Prospecting with the Diamond Drill.

The Wildman mine at Sutter Creek and the Alma at Jackson are using the diamond drill with success. The former is the pioneer in its adoption.

The Machines.—The diamond drill used at the Wildman has a 7-inch cylinder and 5-inch stroke. This machine will drill a hole 600 feet long and take out a core $\frac{15}{16}$ inch in diameter. The drill is similar to others of its class in regard to the automatic hoist to raise the rods and the small auxiliary pump which keeps a current of water circulating down the rods and up the sides of the hole. The drill, hoist and pump are worked by compressed air. The weight of the machine complete is 585 pounds. A man and a boy are required to operate it. The drill at the Alma is similar in principle to that at the Wildman.

Speed.—The speed of the drill varies with, first, the direction or inclination of the hole; second, the kind of ground; third, the depth of hole.

When a hole is drilled vertically downward, which is seldom if ever done underground, the weight of the rods aid in the drilling. A horizontal hole in quartz averages 30 feet a day at the start, the speed decreasing to 20 feet per day toward the finish. In a long run these figures are high and this speed will not be realized. One hole 600 feet long averaged 16 feet per day. The Mariposa slate of the lode drills easy but care must be taken to keep the holes straight as the drills tend to follow the cleavage planes of the slate.

Power.—The power required to run a drill such as described is 5 H. P. This, however, varies with the same factors that govern the speed. The compressed air used is tapped from the pipe which furnishes air to the percussion drills.

Setting the Carbons.—After every 40 feet of quartz or 150 feet of slate drilled the carbons must be reset. The setting is done by a skilled mechanic whose whole time is occupied in setting bits. One setter is employed by both mines using the drills. The carbons are set in the soft steel bit in such a manner as to protect the inside and outside of the bit from wear. They are not set in each other's path but in a ziz-zag row and are so imbedded that the long edge will revolve in the direction of the revolution of the drill. Care must be taken in caulking the diamonds in place as they are extremely brittle and a chance blow will break them. The stone is about the size of a pea and weighs about three carats. It takes the setter a day to set a bit with six stones.

Recovering Lost Diamonds.—As soon as a stone wears loose it should be removed from the hole immediately. This is done in various ways: First, by increasing the flow of water and washing it out. Second, by using an old bit cut with an irregular groove which is filled with tallow, resin or beeswax. This is lowered in the hole and revolved where the lost diamond will adhere to the wax. Third, by driving a piece of soft pine in an old bit and jamming it against the diamond. If all these methods fail the diamond drill should be crushed rather than be allowed to remain in the hole.

The Samples or Cores.—In a room 15x15 ft., arranged with tiers of 2-inch drawers, the samples are very systematically preserved. These drawers are divided into compartments, in which the cores just as they come from the hole are placed. Each drawer is labeled with date, number of hole, number of level, the shaft, and length of hole. Each time the drill is hoisted a label is placed in the drawer, giving the number of this particular hoist and the number of feet drilled since hoisted, the length of core and total depth of hole. All dust is caught from the wash water and placed in its proper place in the drawer. The driller keeps a book in which he records the kind of rock gone through, speed, number of hoists and places where samples for assay are taken. These samples are given to the assayer, who in turn gives his results, together with the drillers, to the manager. Thus can they plot at any time the direction and value of any streak of ore. Before running a drift to what seems a favorable prospect, several holes are drilled from different points to cross the point in question. Then, if the prospect warrants it, a drift is run.

Cost.—The most expensive items in drilling are the carbons and their settings. The carbons cost about $15 a carat (.206 grains) and six stones of three carats are used to a bit. It costs $10 to set a bit, making a total cost of $280 per bit. The cost per foot of wear and tear on diamonds is 50 cents in hard rock and 25–30 cents average in medium rock. The cost per foot of the 2000–3000 feet drilled last year at the Wildman, including everything, except power, was 64 cents. The drill itself, including 600-foot rods and two bits, costs $2000.

N. B. KNOX.

San Francisco, Sept. 1.

Armor Plate for Battleships.

Discoursing of his recent offer to furnish the United States Government with armor plate for battleships at $100 a ton, J. H. Carpenter, former head of the Carpenter Steel Works, says that it was as much the fault of Government as of the maunfacturers that the cost of armor has been so excessive. The enormous expenditure for the equipment of plants to make nickel-steel plates has rendered it necessary for the companies engaged in the business to charge so heavily. "Both the Bethlehem and Carnegie companies," he says, "now see that they built too expensively. Congress perhaps would have interfered only mildly had it not been for the acceptance of a foreign contract by one of the companies at about half the price that this Government was charged. This led to examinations which exposed the cost of plate, and Congress fixed the price at $300 per ton, which is considered ample to meet all contingencies. I should not have been willing to state my views in detail, only I have made proposals to make plate at such a marked difference in price that it would seem that I believed that the companies are charging exorbitant prices, whereas my views are quite to the contrary. My plan is a revolution from present methods of making steel. The process is pneumatic—that is the use of air is a part of it. Air is used in a new and scientific manner, with results that show a quieting of the usual after reactions in steel, enabling it to be hardened much more readily, uniformly, and with less wastage from blow-holes, spongy centers, and piping, common to the ingots now used in making plates. In my processes the wastage is less than 25 percent, while under the old process it is 60 per cent. By making the plates in sectional thicknesses of hard and soft metal in its molten condition, the results are positive, and the resistance of the plates to projectiles is very materially increased. The conditions of the metal are equal to the best made by the old processes, and this has been already proved in works in Europe."

THE Secretary of the Navy has ordered Lieut. Sargent to make investigation of the various grades of petroleum, with a view to its use as fuel for marine engines. When done he will report to the authorities at the Newport torpedo station, and plans will be drawn for an oil engine, to be placed in one of the new torpedo boats now being built by the Herreshoffs. This will be the first attempt to use petroleum as fuel for the torpedo fleet. Some of the advantages expected from the new fuel are economy of machine space, and, consequently, greater fuel-carrying capacity; economy in the cost of fuel and the ability to develop extremely high steam pressure under forced draught.

Notes on Prospecting.

Written for the MINING AND SCIENTIFIC PRESS by JNO. W. GRAY, E. M.

Alluvial gold-bearing gravels and drifts are, for the most part, formed by the redistribution of auriferous glacial matter, or the disintegration and concentration of landslips from, or the gradual wearing away of, mountainous country containing auriferous veins. It is held by some, however, that all alluvial gold does not come from quartz claims, and that nuggets, properly so-called, and the great pure masses of alluvial gold, have been formed from gold salts in solution, by gradual accretion upon some metallic base. Nuggets, having the characteristics of water-worn gold, can be formed by artificial means, thus giving some foundation to the claim. If this theory be accepted, it is well to reflect that, following up an alluvial lead, no matter how rich, will not inevitably develop a payable lode. Glaciers often carry a small amount of gold intimately distributed throughout their mass. The reassortment and concentration of this material by water collects the gold in the form of placer ground. In some parts of the world rich alluvial deposits have been formed in this way, and no payable veins have yet been found above or around them. The wearing away of a great mass of country containing auriferous veins may result in the formation of rich placers, and yet not one of the veins supplying the gold prove, when found, to be rich enough to work.

If fine gold is found in the sands of rivers or streams, heavier gold will probably be found above, and farther up yet coarse gold and nuggets may occur, and these may suggest the locality of the source. Water washing away gold-bearing matter drops first the heavier particles, carrying the lighter down. The richer deposits are likely to be found where the streams change direction or fall. Mining in some of the ancient river channels of California has disclosed the gold above holes and depressions. The grade of the channel being heavy, pay has been found in the wide portions, on the sides, and the inner rim of curves. When the fall is light, pay is most likely to be found in the reaches of somewhat strong flow.

When gold is found in streams or gulches, terraces or accumulations of gravel may occur on the sides of the slopes, sometime high up. These should be examined, since they are often gold-bearing, containing rich layers and runs of gold. When the gravel is loose and broken, the gold is apt to be found near the bottom, mixed with clay and earthy matter.

Shallow deposits on hillsides and in valleys often are rich in gold, and the mixture of sand, soil, clay, earth and gravel constituting these should not be overlooked, but carefully prospected. Do not let an accumulation of moss, leaves, brush, etc., deter from making a pan trial. Gold is often found at the grass roots and when least expected. Remember the saying, "Gold is where it is." Unfortunately, this is too often where the prospector is not.

It must be borne in mind that the existing course of gold-bearing streams is not always an indication that the original gold gravels or drifts follow the same course. Ancient channels and glacial drifts often appear to have been at an angle to the present streams. Channels rich below, are frequently almost barren above the points where they cut away, intersect, or cross, the principal formation supplying the gold. An illustration of the above is given in this State by the "Blue Lead," which has been cut through and disclosed to view at various places by the streams heading in the Sierras and flowing westerly to the sea. The fact above mentioned has often proven a source of trouble to miners. Leads were supposed to follow the course of the stream whereas the true leads, in many instances, went right across their course, and were found again by accident and by inexperienced diggers.

Prospecting for alluvial gold, at shallow depths, is simple, since the gold is usually found at or near the surface, and then traced to deeper leads if any exist. To find and follow deep leads or ancient channels covered by volcanic or diluvial action is an undertaking of magnitude. Often a careful study of the geological environment and the conditions governing the present shape of the country, is necessary, requiring to be followed by much underground exploration work. The bedrock of alluvial deposits especially if seamy and of a soft character, is often rich in gold for a considerable depth. Clay supposed to contain gold should be closely examined and washed with unusual care.

No special directions are necessary for preliminary alluvial pospecting. The appliances needed are pick, shovel and pan. The inexperienced soon become skillful in panning dirt, and with a little exercise of common sense soon learn to estimate approximate gold values. A grain of pure gold is worth a little less than four and a third cents. The average value of gold from many placers in the United States is about three and three-quarter cents per grain. In Alaska and the Northwest Territory some of the gold is said to be of much less value. It can generally be determined, once for all by assay for a given lead. About one and one-half yards of gravel when dug is equal to one yard before being dug. Several average pans of dirt can be measured and the number to the yard thus determined. It is easy then to approximate the value of the gravel per yard in place. For exact data, the volume of a yard of gravel in place, after being dug, should be determined for the deposit being prospected. The smaller sized pans are often most convenient, since the load is lighter and they can be more easily handled.

The prospector should carefully observe the materials of the deposit he may be testing, and study its peculiarities. The knowledge thus gained is often of immense service in tracing the run of leads, and recognizing them when found again. In sinking shafts for testing purposes energy should not be wasted in making them too large. Two and one-half by four feet is large enough for considerable depths.

When alluvial gold is found in a region, it is probable that gold-bearing lodes exist somewhere about, and the surrounding country should be carefully prospected for auriferous veins. The search for mineral veins is conducted in much the same way in all similar regions, but the prospector is wise who gives some little thought to the best manner of setting about this work.

The better localities for the occurrence of mineral deposits are at or near the junction of the older sedimentary formations, slates, shales, schists, quartzites, sandstones, limestones, etc., with the igneous rocks. Igneous rocks are those thrown up from the melted interior of the earth. Sedimentary rocks are those formed by the washing down and deposition of the older rocks. When altered by heat or pressure, these latter rocks are called metamorphic rocks. All the prospector has to do, however, is to bear in mind the difference between the two kinds of rocks, igneous and sedimentary.

Good veins are often found on the line between two different rocks. These are contact veins. Recent formations and modern volcanic rocks are not considered worth prospecting, and in great formations of igneous rock the chance of good veins occurring is small, unless the formation is cut or intersected by dikes of porphyry or similar rocks. Look out for dikes of porphyry, diorite, etc., in and among the formations above mentioned. They are always good signs, and the region of their occurrence should be carefully examined.

The search for lodes, if the country is exposed, is not difficult. The prospecting may be done upon the hills and ridges, since there the outcrops are usually better seen, and the veins can be traced to lower ground by their strikes. Sometimes, in a grass-covered country, a vein may be located and traced by a track where the grass appears more withered than elsewhere. The quartz lode is close to the surface, and there is no soil to make the grass grow well. The outcrop, once found, can be followed along the strike of the lode and sampled at frequent intervals to determine the best portion of the vein as exposed. It must be remembered that, in a rough country, where the lode strikes across hills and valleys, the line of outcrop will appear crooked or curved. The true direction of strike must be determined upon a flat, level stretch.

The appliances for prospecting gold lodes are also the pick, shovel and pan, but, in addition, a mortar and pestle will be needed, and a magnifying glass and a fine screen are good to have. An iron quicksilver flask cut in half will make a mortar, and a piece of drill steel with smooth and hardened end will answer for the pestle. It is often better to burn the stone before crushing it for the pan. This makes it more likely that the gold will be revealed in the panning operation.

The crushed sample should be passed through the screen and then panned, as for alluvial gold, except that more care must be used, as the gold is usually finer. For close tests the sample should be dried, then weighed or measured before crushing and panning, so as to be able to approximate the value of the ore per ton. Quartz can be estimated at 13 cubic feet to the ton in place, or 20 cubic feet to the ton when broken to ordinary fineness. When without the appliances for weighing, one can only guess the amount of metal obtained. Some miners become rather skillful at this, but it is better to have a small balance, with grain weights. By weighing the gold obtained from a given amount of ore panned out, somewhat reliable information may be obtained as to the value of the find. Prospectors often deceive themselves by panning out selected stone, instead of average samples. They often think they pan out much less material than they really do, and novices always imagine the amount of gold obtained to be much greater than it actually is. These mistakes should be avoided.

If the country be not exposed, notice the cuttings (if there be any), landslips, cliffs, water courses, dry channels and gorges. If float stone or gold occur, follow it up until no more is found, then look to the hillside for the vein formation. At the base of the slope float occurs, or gold is found by panning earth and gravel dug from the slope. This is done each way along the slope, until no more float or gold is found. From the middle of the line thus determined work up the hill, searching for float and panning as you go, until no more is found. Dig or drive into the hill here for the ledge. Remember that, if the hill is rounded outwards, the float and wash gold are spread out as it works down, while if the hill is rounded inwards, float and gold are confined to a narrow portion of the slope. If it be a gulch, the float and gold will be found mostly at the bottom, the latter principally where holes are naturally formed. If float is found at the foot of a hill, the source will generally be found somewhere on that hill.

Where the country is covered with a dense brush, with a depth of soil, and a surface of moss, leaves and decayed underbrush, it becomes much more laborious to trace loose lode stuff to its source. Often trenches, drives and shallow shafts are necessary. Or the process called "loaming" may be employed. The prospector, at likely looking places, digs down to the rock and takes a sample, marking the spot and correspondingly marking the sample. He collects many samples in this way from different places, takes them to the water and pans them off. If gold is found, he is on the right track. He returns to the spot where he took his samples, and in like manner traces the gold up the hill, until the loam gives no prospect, and there sinking is commenced and the hidden vein disclosed. The vein, when found, is followed and sampled as above described. Gold that is flat, lenticular and worn has probably traveled; if porous and with gangue attached, it is vein gold. As the vein is approached the gold float stone will become more angular and less worn. The float stone should be "kindly rock," such as is known to compose the matrix of veins. The usual matrices are quartz, calc spar, fluor spar, and heavy spar, but the almost universal matrix of veins, particularly of gold lodes, is quartz. This is, therefore, the rock that should be chiefly sought for. Frequently pieces of quartz, broken away from a vein, are honeycombed and colored yellow, red or brown by iron oxide. This is called "gossan," and is a most promising indication. Never pass an ironstone blowout without careful examination and testing. Gold is distinguished from iron and copper pyrites and yellow mica by being soft and malleable. A steel point will prick gold, but will glance off iron, or only scratch the other minerals. Pyrites of iron and copper are often rich in gold, and ore containing them should be carefully tested by assay for the precious metal.

Other metals besides gold may well command the attention of the prospector, such as silver, copper, lead, mercury, tin, etc. These metals are all very valuable in themselves, and many of the ores of the first three are often rich in gold.

Ores of silver occur in various rocks, porphyry, trap, sandstone, limestone and shales, and are found along with those of lead, copper, antimony and zinc. The gangue is usually quartz, calc spar and fluor spar and heavy spar. Prospectors, by observation, soon learn to recognize the more common and valuable ores of silver. They are heavy, and pure specimens of some of the richest ores are soft and can be easily cut with a knife. A rough test is to heat a piece of ore and plunge it into water. The metal comes to the surface in drops. Other metals may possibly appear and be taken for silver, but in any event the test indicates the presence of metals that deserve the notice of the prospector. Silver is a white metal. It can be hammered out and cut with a knife, and occurs native in irregular shapes and in masses.

Ores of copper occur in rocks of many kinds and in both lodes and deposits. As a rule, they are easy to distinguish, on account of their bright colors—brown, yellow, red, blue, green. The ores are heavy and can usually be cut with a knife, unless iron is present in considerable quantity. Copper occurs native in irregular, fanciful shapes and masses. It is a red metal and can be hammered out. A rough test for copper in ores is to roast the piece and drop it hot into some grease. Expose it to a flame, and a green color will appear if copper is present. Gossan on the outcrop is good for copper.

Ores of lead occur in granite, limestone, sandstone, argillaceous rocks, etc. The principal ores are galena and carbonate, and they are often rich in silver. Galena, once seen, is easily recognized again; but the carbonate, when broken up and fine, appears like clay or earth and is distinguished only by weight and actual test. Fluor spar in the gangue is favorable for lead. The ores of lead are soft and easily melted. Lead is rarely found native.

The chief ore of mercury (quicksilver) is cinnabar. It is a red to brown ore, with scarlet red powder or streak. It is easily recognized when often seen. It occurs in connection with slates, shales, serpentine, sandstone, etc., but seems to have a preference for sandstone. If crushed ore be placed with lime in an iron pan and heated, a drop of quicksilver will be found at the bottom. Mercury is easily vaporized by heat; and a gold coin, placed in the fumes, will soon have a coat of quicksilver. Quicksilver is a heavy liquid metal, with a tin white color. It occurs native in cracks and holes in rocks and also alloyed with silver.

Tinstone is the great ore of tin, and occurs as lode and alluvial or stream tin. It occurs of various shapes and of different colors, and is not always easy

to identify. Lodes of tinstone are found in or near granite with white mica. This ore is at times washed down and left in beds of gravel debris. The courses of such deposits are called "streams," and the rolled fragments of tinstone therein are called stream tin. It is blackish in color, and occurs as fine sand, coarse grains and pebbles. It is often associated with alluvial gold. By scratching the tinstone, or crushing to powder, the "streak" is obtained. It is whitey-gray, and, once seen, is not easily mistaken.

The alert prospector will also be quick to observe indications of coal. Everyone will recognize coal in its common forms. It occurs in extensive layers and beds along with different rock strata. The rocks are usually shales and sandstones, and the sandstones are often coarse grit rock or conglomerates. There are sometimes beds of limestone with the other deposits. Coal is a very valuable material and good beds, well located are better than gold mines.

A certain amount of technical information, a knowledge of rocks, the locality of occurrence of the more valuable minerals, their appearance, and simple modes of testing them, are of service to the would-be prospector, but the necessity of this learning is by no means great. A bright prospector soon learns to trace out and discover mineral deposits. As explained above, he can easily learn to make approximate estimates of gold values. By a little patience and observation, he can learn to recognize the common rocks, and the useful ores of the more valuable minerals. If he is wise, he will carefully take average samples of the ores he finds, and have them tested by a competent and reliable assayer. It is well to have some selected samples tested. Many ores are payable when sorted, when otherwise they would not be so. Probably the most important thing for a prospector to learn is how to properly sample a find for a correct determination of its value. As a matter of fact, this is about the last thing he learns to do and his want of care in this respect often results in expense and disappointment. Many of the best finds have been made more or less by accident, and by persons with little knowledge of mining. This would seem to prove that technical knowledge is not essential to success. Health, strength, courage, ability to stand fatigue and hardship when necessary, a cheerful, even temper, and a patient hopeful disposition are more important essentials and more conducive to the success of the prospector.

Artificial Production of Diamonds.

Prof. Wm. Crookes gave the following interesting references to the probable origin of the diamond, and the efforts hitherto made to produce it artificially, in a recent lecture at the Royal Institution in London.

The lecturer stated that speculations as to the probable origin of the diamond have been greatly forwarded of late years by improved means of obtaining high temparatures; and through the successful experiments of Moissan, microscopic diamonds have been made in the laboratory. He had provided a most powerful dynamo, especially made for the purpose, weighing 4½ tons, and when driven by a 50 to 75 horse-power engine generating a current in the electrical furnace of 700 to 800 amperes at 70 volts, yielding a heat of from 3,500 to 5,000° C. In the process of making diamonds, the first necessity was to select pure iron and to pack it in a crucible with pure charcoal from sugar. Half a pound of this iron was then put into the body of the electric furnace and the arc formed close above it to utilize the electrical current passing through it. The iron rapidly melts and saturates itself with the carbon. After a few minutes it is heated above 4,000°—a temperature at which the lime of the furnace melts and volatilizes. The current is then stopped, and the crucible is plunged beneath the surface of cold water, where it is held until it diminishes to a dull-red heat. The sudden cooling process solidifies the outer layer of iron, and holds the inner molten mass in a tight grip. The expansion of the inner liquid in solidifying produces an enormous pressure, and the dissolved carbon separates out in a transparent dense crystalline form—in fact, as diamond. Then commences the more tedious part of the process, the attacking the metallic mass with solvents to liberate the diamonds, the crystals of graphitic oxide, carbonado and bort—the cleansing operations being repeated until all the well-washed grains are collected and examined under the microscope. The laboratory diamonds burn in the air before the blow-pipe into carbonic acid, and in luster, crystalline form, optical properties, density and hardness are identical with the natural stones. Many circumstances, he pointed out, led to the conclusion that the diamond of the chemist and the diamond of the mine are akin as to origin, and that the diamond genesis must have taken place at great depths, under enormous pressure. Molten iron could have held the carbon in solution, and all the varieties of carbon crystals, and even the different tints of diamonds from various mines and geographical areas, could be accounted for on this theory. It is certain, from observations made at Kimberley, corroborated by the experience gained in the laboratory, that iron at a high temperature and under great pressure will act as the long-sought solvent for carbon, and will allow it to crystallize out in the form of diamond—conditions existent at great depths below the surface of the earth. But it is also certain, from the evidence afforded by the Arizona and other meteorites, that similar conditions have likewise existed among bodies in space.

Development of Lake Superior Iron Ores.*

By D. H. Bacon.

During the late fifties the ore product of Lake Superior was handled over a mule tramroad to Marquette. Now the Duluth, South Shore & Atlantic; the Chicago & Northwestern; the Wisconsin Central; the Duluth; Superior & Western; the Duluth, Mesabi & Northern; the Duluth & Iron Range; and the Lake Superior & Ishpeming railroads serve the shippers. Up to nearly 1870 a 700-ton ship was an enormous craft, the loading of which required two days, the unloading being seldom accomplished in that time. Now the cargoes reach 5000 tons, the loading requiring less than three hours, and the unloading ten hours. In 1871 the largest ore barge carried 1050 tons and made twelve trips per season. Now the mines cover more land than was familiar to even the timber cruiser when the Jackson mine was opened. The annual shipments have grown from a few thousands to 10,000,000 tons, and the ability of the mines to produce is not taxed. Lake freights are one-eighth of early prices and rail freights one-quarter.

The deeper waterways, commodious locks and large ships of to-day are in a greater measure due to the movement of ore than to any other cause. Great savings have been made in each detail of each department. The only cost that has not been lessened, I am glad to say, is the cost for money paid to men, for wages, measured by what they will buy, are as high now as at any time past, except it were one of feverish activity.

As illustrating the cheapening that has been effected, ore is to-day sold at Lake Erie ports for $1 per ton less than in early times it actually cost to mine, and this is done without loss. And further economies may be expected. Young men remember sales of ore in Pittsburg at $18 per ton, or about the present price of rails.

The first mines were opened in Marquette county, and were of what is commonly known as "hard ore." Previous to 1873 soft ore, or "hematite," was not popular, but the buyer was often obliged to take some in order to secure the needed quantity of hard ore. In those good old days the ore buyers came to the sellers as penitents approach the shrine, but I am told that custom in this respect has changed somewhat of late.

Beginning with a few grades, the Lake Superior mines now offer ores from the purest and best to those that will not bear transportation, and within these limits can be found the varieties needed for general or special products, and in quantity equal to any demand. The men who were early in charge of the mines had some knowledge of mining and quarrying. Many of their methods are now out of date; but experience, daily observation and study, technical schools and the mechanical ability so common with Americans have enabled those in charge to meet all difficulties and to carry the industry to a point that is complimented by visitors from abroad. In the discovery of new fields the miner of iron ore, like the miner of more precious metals, has led the way, the explanation of the geology being left to the student. As viewed from this distance, the early methods were very crude. Horses furnished the power, and they were worked in all possible and some almost impossible places. The little machinery then in use was poor and often but ill adapted to the work. The first hoisting plant of large size, economical design and equal to future demands was set up at the Lake Superior mine in 1880. Not single, compound, triple and condensing engines of large power are found throughout the iron ranges for hoisting, pumping and compressing. The hammer has been supplanted by the power drill, and electric motors and rope haulage are common above and below ground. Underhand, back and breast sloping, square sets, caving sets, saddle backs and milling and filling are common. Steam shovels and locomotives have taken the place of shovels and carts. Every known system has been or is in use. Many mines have presented difficulties that in the early days would have been considered insurmountable, but each has been overcome.

To one closely identified with this industry for nearly thirty years, no single change has seemed important, and only by looking backward can one measure the advance. The early operators had little knowledge of ore deposits, their position in relation to associate rocks, their dip, pitch, strike, depth and many other facts, an understanding of which is necessary to continued success. This knowledge has been acquired, and with it have come right, courage, true economy instead of parsimony, the general development of ore supplies far beyond immediate needs and a thoughtful preparation for the future.

Nitro-glycerine and power drills have done more to reduce cost than any other two changes. In 1871 a drift was driven at the Cleveland mine at a cost of $100 per foot. Now the cost would not exceed $16. In one case men were harnessed to a derrick sweep. Heavy rains were nearly always followed by a few days of idleness, and the pumps were expected to freeze every cold night.

In speaking of mining methods, the "caving system" was mentioned, which several claim to have invented or introduced. The first ore taken out by this method was mined at the Cleveland Hematite in 1883. The ore was very soft, with treacherous walls, and G. W. Wallace, the superintendent, tried what some of his men said was successful under like conditions in England. It proved satisfactory and is now known as the "caving system." John Pengilly was sent to the Cleveland Hematite to learn the method so that he might use it at the Brotherton mine.

*From a paper read before the American Institute of Mining Engineers, Lake Superior meeting, Tower, Minn., July, 1897.

A DEFINITE IDEA of the present standing of alchemy in America is given by Dr. H. C. Bolton in the London *Chemical News*. Two claims to success in creating gold are deemed worthy of mention on account of the boldness, persistence and apparent scientific basis with which they have been urged. The claim of Dr. G. H. Emmons was first advanced in August, 1896, and in July of this year it was stated that nearly $1000 worth of an alloy of gold and silver, which had been produced from Mexican dollars, had been sold to the United States assay office, the profit on such manufacture being at least $3 per ounce. It was predicted that the production would reach 50,000 ounces within a year. Dr. Emmons affirms that his work had its origin in an investigation of nickel steel in 1892, when evidence of a new substance appeared, and, acting on a suggestion from Mr. Carey Lea's work on the allopathic forms of silver, he made a more minute subdivision of silver than Mr. Lea obtained, and compressed this in a new apparatus of great power. The result is a substance—called Argentaurum—with greater density than silver and the appearance and properties of ordinary gold. The chief source of expense, in the words of Dr. Emmons, "is the time required for bringing about the desired molecular changes." The second process for transmutation is claimed by Mr. Edward C. Brice of Chicago, whose operations seem to have been begun in New York about three years ago, and to have continued with numerous victims—although his Chicago plant is still declared a financial success. A patent was applied for last May, and twice refused. The application being pressed, an elaborate test of the process was made by the patent office, with no results except partially to recover the small percentage of gold contained in commercial antimony.

Kelvin on Fuel and Air Supply.

Lord Kelvin, in his recent address before the British Association at Toronto, gave some estimates on the available fuel supply of the world and made some suggestions which attract attention. He thinks that the utilization of water powers to the greatest extent will diminish only insignificantly the tax on the world's supply of fuel, and believes that the cultivation of vegetation which adds to the store of oxygen is of more importance than anything else man can do to prolong human life on the earth. He estimates that there exists 510,000,000 million tons of oxygen that will burn 340,000,000 million tons of fuel, but the diminution of the oxygen will destroy human life long before its supply gives out, so that the fuel that may be left after the race dies is of no avail. There are 200,000 tons of fuel for each person living to-day, which, he says, will limit the life of the race to a comparatively short span. But the growth of vegetation will be necessary to sustain life to this limit. Lord Kelvin calculates that the power now developed from the turbines at Niagara is only equivalent to the requirements of about ten ocean liners, and if the entire force of the mighty stream should be utilized it would only be equal to the power of 100 of these ships.

Amending Federal Mining Laws.

TO THE EDITOR:—An article in the PRESS of the 21st ult., entitled "American Federal Mining Laws," has attracted my attention. The three propositions by Mr. Keyes are, with slight modifications, identical with some contained in the Mexican mining code of 1892. It is high time that the extra lateral right incubus should be forever banished from our Federal mining laws. It has cost treasures of money and caused no end of bad blood and often the loss of life. Here in Mexico we never have any trouble or law suits upon that score. Not having the time to enter as fully into this question as its importance demands, I would advise the members of the International Gold Mining Convention to procure a copy of the Mexican mining laws of '92 and study them closely. They will get points from them that may be of great benefit both to themselves and others.

AUG. SAHLBERG, Superintendent.

Esperanza mine, El Oro, Mexico, Sept. 1.

How They "Boom" in London.

It has often been said that the Americans of the west are past masters in the art of booming, and that no one can approach them in this line; but I am inclined to think that the Westralian folks in London have beaten the record; for never have I heard of the chief executive of a state being called upon to make a public speech to boom a mining section. But this is just what occured this afternoon in the Great hall, in the Cannon street hotel, London.

A big meeting was held, it having been publicly advertised, under the auspices of the West Australian Chamber of Mines, and presided over by Lord Castletown of Upper Ossory, supported by other lords, and other mining men. The hall was packed to the doors, and not a little interest was manifested in the proceedings.

The lion of the event was, as suggested above, the Rt. Hon. Sir John Forrest, premier of the West Australia, who (as the advertisements said) had "consented to address" the meeting. He said that his subject would be West Australia as a gold producing country. There are other products of the colony, but he dealt only with the gold industry. The extent of the auriferous district, he said, is over 1,000 miles, from the southern to the northern gold fields. The gold output for the past years has been somewhat as follows: 1886 £1,147; 1890, £8,664; 1893, £421,385; 1896, £1,068,808, and for the first six months of 1897, £1,008.253. He prophesied that the year 1897 would show an output of £2,000,000, while the total output since the opening up of the country has been £4,685,000.

The premier mentioned several of the mines that have done well, and among others spoke of one that has paid 6 shillings per annum dividends, the shares being now quoted at only £1. He mentioned, of course, quite casually, that he has some shares in that company! This should be a good pointer! The government has abolished all duties that in any way would tend to harm the gold industry.

He spoke about the money to be made by "staking" prospectors and said that he himself had done well in this line; for in one case he staked a prospector to the tune of £100, and his returns amounted to the neat sum of £8,000. As to the land laws he told his hearers that an immigrant can get 160 acres of land free, and more than that the government will lend him some money to help him clear the land, if he needs it. The population of the colony is 160,000, and the revenue last year amounted to £2,864,750. There are 1,500 miles of railroad in the colony, much of it belonging to the government.

The meeting was quite enthusiastic; there being quite a large contingent of Westralian mining men and brokers, who led off in the applause and hear, heared all the boom points.

Surely this is a smooth way of booming a gold field, and we shall next expect the premier of British Columbia to take the stand, and give a boost for the War Eagle and the Le Roi, and then perhaps we can get Governor Adams and Mr. Smith to come across and give a few brief utterances on the glories of Cripple Creek and Telluride, and the greatness of Butte and the Mayflower group. I hope that if they do so, they will omit to name the companies in which they "have a few shares," as though that is quite pardonable in a British premier of title, it would be an unpardonable sin in an American, and would at once be put down as an example of Yankee brag! London Corr. Colorado Critic.

THE ascent by Prince Luigi of Mt. St. Elias has demonstrated two facts of prime importance to the scientific world. It fixed the altitude of the mountain at 18,120 feet, and proved St. Elias was never a great volcano. A new glacier was discovered by the explorers, between the Augusta mountains and Great Logan. It takes its course apparently to the sea, and was named by the prince, Colombo.

Scientific Progress.

Hydraulic Blasting.

A meeting of the Manchester Geological Society is reported in *Industries and Iron*, at which a new hydraulic apparatus for breaking down coal in mines was discussed. Mr. James Tonge, who described the apparatus, called attention to the great danger attending the ordinary method of blasting in coal mines, and said that the numerous serious accidents from this cause had led the inventors to look for a safer process of loosening the coal. The new apparatus consists of a hydraulic cartridge, 18 inches in length and 3 inches in diameter and weighing thirty pounds and a small but powerful hand pump fitted with a pressure gauge weighing about twenty pounds. The mode of using it is as follows: The coal is holed underneath the usual depth, and a hole drilled near the roof to about the same depth as the holing, in the same way as for blasting. After this the cartridge is placed in the hole and pushed to the back. No "stemming" is required. The pump is coupled to the cartridge, the suction pipe is placed in a small bottle of water, and work commences. Very soon the gauge begins to show the rising pressure—half a ton, a ton, a ton and a half, two tons to the square inch. During this time a cracking sound is heard, indicating the shearing off of the coal at the back. The gradual way in which the work is done, without shock or jar of any kind, prevents even the least damage to coal or roof, in striking contrast to the action of explosives. The time occupied is an important matter. It has so far been about twelve minutes. This time includes placing the cartridge in the hole, connecting to the pump, getting down the coal, withdrawing the cartridge from the hole, and getting to the next place. The advantages claimed for this process over the ordinary blasting are (1) larger and stronger coal, which means a better average price; (2) non-interference with the working of the pit; the coal being got down whenever required; (3) no damage to roof; (4) no dust; (5) and absolute safety from the dangers attending shot firing. In previous machines of this sort trouble has been had with the joints, but it is stated that this one is free from that fault.

Economy of the Gas Engine.

At a recent meeting of the North British Association of Gas Managers, one of the papers presented gave the following in reference to the use of gas engines in Dunferline:

In the year 1896-7 there were twenty-two engines in the town, the average size being 3.27 nominal horse power, and the average consumption being 78,632 cubic feet per engine.

The best result in Dunferline was in the case of an 8 nominal H. P. engine, which, with a steadily increasing load, repeatedly consumed 3900 cubic feet in twenty-four hours' work, equal to 20.31 cubic feet of gas per nominal horse power hour, and as the brake horse power employed probably averaged not less than 12 H. P. during the whole period, the consumption of gas-brake horse power equaled about 13.54 cubic feet. This result will be sufficient to explain the reason why it is so difficult to introduce town's gas in Dunferline for power purposes. It is a poor steam engine which consumes eight pounds of coal per brake horse power hour, and yet with this large waste of fuel 3.89 brake horse power per hour are obtained for the cost of one penny for coal, as compared with 2.11 brake horse power per hour as obtained for one pennyworth of gas. Still, allowing for the lesser attendance which is necessary with gas engines as compared with steam engines, in small works, where the load is constantly varying, it is considered that, with gas at 3s per 1000 cubic feet, a gas engine of the most efficient type is the more economical motor.

THE use of compressed air is now so established and so extensive that an organization entitled the Compressed Air Makers of America has now come into existence. The members at present consist of men employed or to be employed in the caissons of the new East river bridge to connect New York and Brooklyn. A schedule of wages has been established, varying with the depth or pressure, as follows: From 55 to 70 feet depth, $2.75 for six hours' work; from 70 to 80 feet depth, $3 and four hours' work; 80 to 90 feet depth, $3.25 and two hours' work; from 90 to 100 feet depth, $3.50 and one hour and twenty minutes' work.

IT is of scientific interest and practical importance to determine the conditions resulting in the maximum attractive power of the electro-magnet. Wilde has exceeded his own estimated limit of 400 pounds per square inch for magnetic tractions by means of annealed charcoal iron wire 0.57 inch in diameter. The electro-magnet was excited by a current of 40 amperes. With a piece of wire 1.2 inches long the unprecedented tractive force of 422 pounds per square inch was obtained. That the magnetization limit was virtually arrived at was shown from the fact that, when the current transmitted round the electro-magnet was reduced from 40 to 26 amperes, the amount of the tractive force remained constant. The determinations were made with a single pole electro-magnet.

THE survey of the boundary line between Nevada and California begun in 1893 on an appropriation of $300,000 secured by Representative Caminetti of California, is nearly completed. About $2000 of the fund remains, which is being devoted to the correction of a few mistakes in triangulation work. Surveyors Sinclair and Boyce are now on Freehill's peak, near Bijou, Lake Tahoe, and Surveyor Baldwin is in the Como mountains. The first-named will be on Mount Davidson this week. The new line varies little from the Von Schmidt line of 1873, Nevada losing a little near Lake Tahoe and gaining slightly at other points.

THE appointment of a committee to investigate the condition of the Coast and Geodetic Survey has resulted in the presentation of a report which will not be made public. It is understood, however, that it has been practically decided that a successor to the present director of the Survey will be appointed, and that the selection will be made without reference to political consideration and on the grounds of scientific standing. In this case the name of Professor Geo. Davidson of this city of course suggests itself before that of any other.

EXPERIMENTS made by M. d'Arsonval with an instrument which he calls the myophone proves, contrary to the older opinion, that nervous excitability may exist for many hours after death. The old test of the muscle shortening is, no doubt, not applicable long after death has departed; but, as the sound given out by the myophone proves, the death of a nerve is much less rapid than has been hitherto supposed, and a nerve may act on a muscle, in a state of electric excitability, without producing more than simple molecular vibration.

FOR the removal of oxygen, sulphur, etc., from molten metals, as cast iron, steel, copper, bronze, nickel and aluminum, J. L. Gauharou of Paris recommends the addition of carbide of soda, which, combining with the impurities, forms oxide, sulphide, or sulphate of soda, which can be separated easily and perfectly from the refined metal.

AN iron ship weighs 27 per cent less than a wooden one, and will carry 115 tons of cargo for every 100 tons carried by a wooden ship of the same dimensions, both loaded to the same draught of water.

A NEW machine, invented by Prof. Dwight of Vassar College, is said to slice rock to the thickness of one-fiftieth of an inch. This is accomplished by means of a series of tin disks with edges charged with diamond dust.

Mechanical Progress.

Breaking Up Old Boilers.

Frequently two or three old boilers are seen lying around a manufactory awaiting some market for their disposal. A complete boiler is an object little desired by the junk men; were it broken up into sheets and tubes he would readily make a bid for the whole. The breaking up of a large boiler is a job to be dreaded by a man who does not understand the business, but he who "has been there" knows that a couple of laborers armed with slight hammers and cold chisels, together with the requisite "know how," can reduce that huge boiler shell into a pile of scrap iron in a few days' time. It is not hard to remove the rivet from an old boiler; all that is necessary is a sledge hammer with a good square corner and a few blows driven with precision upon one side of the rivet head will break it off as cleanly as though cut by a chisel. Probably fifteen or twenty blows will be necessary to each rivet, and they must be delivered exactly, no unfair striking being allowed in this matter, or the rivet will not break. The work can be furthered by the application of a cold chisel, shaped a good deal like a caulking tool—that is, ground straight on one side, with all the bevel on the other side. This tool is fitted to a handle so as to be held by one man and operated upon by the other man with a sledge hammer. Two days' work by two stout men, armed and equipped as above, will go far towards demolishing a large boiler.

In Boston there are two men who make a business of breaking up old boilers, doing it by the job. In looking over the "graveyard" of a second-hand dealer in boilers, as some engineers call the storehouse of these dealers, the writer observed quite a number of the old boilers and inquired whether they were to be sold. The dealer replied that they would be broken up as soon as Blank brothers could get around to it. "We never break up the boilers ourselves; no one does; our men could not earn half a day's pay at the work. Those two men make a business of it and will go through a boiler in one-fifth the time two of my best boiler makers could do it, and make good pay at it and always have plenty to do. When I want boilers broken up I always wait until they can get around to do it."

A PROMOTER is said to be doing a good business in some small towns at the expense of the mill owners. His scheme is to induce the town council to grant him a charter to furnish electric lights for the streets, dwellings and stores. He then induces a number to agree to take lights, and he installs the plant in the local mill or elevator. As soon as it is running nicely he sells out to the local miller or elevator man, and according to his own story he is "making all kinds of money," at the expense, of course, of the man he sells to. In the first place, there is no necessity for a miller to give a good profit to a promoter for what he can easily do himself, and, worst of all, it is extreme folly to pay a schemer five prices for a poor plant, when he can get a good and well equipped plant of reliable manufacturers, who will make defects good, for one price. If there is an opening for an electric light plant in his own town, the miller should prepare to supply it. He has the power plant and generally plenty of room to spare, so he can establish an electric light station at a comparatively small cost. The operation of it is not likely to discommode him or interfere with the milling business in the least. If the miller is disposed to go into the electric light business, he should do the promoting himself.

RAIN cannot force itself under the bottom of a door or window frame just patented which has a flange in the bottom of the frame with the front of the

step lower than the back, the door being beveled to fit it tightly.

Loading by Electricity.

A few years ago the idea of loading a ship with 2500 tons of flour in twenty-four hours by means of two small motors would have been looked upon as absurd. This was done recently in Tacoma, Wash. Two thousand tons of cargo have frequently been loaded or unloaded in a day by steam power, but the important factor in the record breaking achievement at Tacoma was that the conveyor was worked by electricity. With the apparatus which has been designed for the purpose, flour and grain can be loaded at any stage of the tide and independently of the weather. If it should rain, a canvas is quickly spread from the door of the warehouse to the ship's hatch. With the system of loading ordinarily used eighteen men are required to do the work of one electric conveyor, with which the bags are delivered into the ship's hold at the rate of 2500 to 2700 pounds a minute, or 75 tons an hour. When extra speed is desired two conveyors are employed. This was done when the record of 2500 tons in twenty-four hours was made. The electric conveyor is 40 feet long. It is moved at will on two wheels in the center. A 2 H. P. motor supplies the power, the current being taken from the nearest electric wires. The sacks are placed on a revolving belt of rubber, which passes over twelve rollers. The belt is propelled by a driving wheel attached to the side of the apparatus. The rolls are placed close together and the belt revolves at sufficient speed to carry all the weight in flour or grain that can be placed upon it. The conveyor works as well when placed at an angle of 45° as when on a level.

Electrical Progress.

Utilizing Water Power.

Those who are developing the natural resources of this coast, Central and South America readily see the uses to which water power can be put in the generation of electricity. Coal is expensive in these latitudes and makes the cost of supplying power by means of steam greater than that of utilizing water. Of the output of one electric company, 40 per cent of that which goes to the countries south of us is for use in connection with water power. In most instances the power generated is used on the spot, long transmission being rare. Among the cities which use electricity derived from water fall are Escuintla, Guatemala; San Salvador; San Miguel and Chihuahua, Mexico; San Gil, Colombia, and San Christobal, Venezuela.

The Electric Power Transmission Company at Pachuca, Mexico, develops 3300 H. P. and transmits it nineteen miles for power, mining and light. The San Rafael paper mills at Ameca, Mexico, get 750 H. P., and for Puebla, Mexico, the Puebla Lighting Company generates 965 H. P. and sends it nine miles to the city.

One electric company is constructing for the Jalapa Electric Light Company a plant which develops 800 H. P. and carries it eight miles to Jalapa. The same company has installed a 400 H. P. plant for the Mazipal Copper Company of Conception del Oro, Mexico. The line is seven miles long. The Compania de Alumbrado Electrico of San Salvador gets 320 H. P. from a point seven miles distant. Percy Burbank generates 150 H. P. five miles from Lima, Peru, and sends it into that city for light and power. In the Argentine Republic the Cordova Light and Power Company develops 5000 H. P. and sends it sixteen miles into the city of Cordova.

European countries do not seem to have taken hold of the generation of electricity by water power with the energy the New World has shown. Up to 1894 the largest amount of power produced electrically from water flow was 3000 H. P., generated at the falls of Tivoli, Italy, and transmitted seventeen miles to light Rome.

Work at Rhinefelden, on the upper Rhine, is going on; 15,000 H. P. will be developed by means of twenty turbines. Ten thousand H. P. will be used in electric chemical industries and the rest in lighting.

The Bakersfield, Cal., Transmission.

The electrical transmission plant of the Power Development Company at Bakersfield, Cal., which recently received extended illustrated notice herein, is the subject of an excellent article in the current issue of the *Journal of Electricity*, in which, speaking of the apparatus, is said:

Dr. Cary T. Hutchinson, of the firm of Sprague, Duncan & Hutchinson of New York, who was selected as the consulting electrical engineer of the Power Development Company, made an exhaustive test of the apparatus used before its shipment from Schenectady, and this being the first report by a competent and disinterested engineer on the efficiency and characteristics of this type of transmission apparatus available, is here published in its essential features for the first time. The measurement of the general efficiency included the mechanical power delivered to the exciter, the efficiency of which was found to be 80 per cent. The commercial efficiencies of the generator were found to be as follows:

Full load	94.1 per cent.
Three-quarters load	93 "
One half load	91.4 "

The generators were tested under full load for ten hours, and the rise in temperature was calculated from the increase in ohmic resistance and direct from thermometer readings. The insulation was measured by the volt meter method and by applying a potential of 3000 volts to the fields and 5000 volts to the armature. The apparent anomaly in the field temperature as determined by the resistance method (15 deg.), and by the thermometer reading (24 deg.), is probably due to the thermometer being affected by the heat of the armature. The fields run very cool.

The report shows the heating of the armature to be 47 deg. Centigrade and of the fields 15 deg. C., as calculated by the increase of resistance method, while the following readings show the rise in temperature above that of the air as recorded by the thermometer direct.

Bearing	17 deg. C.
Collector ring	30 deg. C.
Field coil	24 deg. C.
Leading pole tip	21 deg. C.
Trailing pole tip	23 deg. C.
Binding wires	51 deg. C.
Armature surface	43 deg. C.
Top of iron frame	10 deg. C.
Armature spider	32 deg. C.

The step-up transformer equipment consists of two sets of the General Electric type of air blast transformers, there being in each set three 160 kilowatt transformers taking the generator sixty cycle three-phase current at a potential of 500 volts, and delivering to line a potential of 11,500 volts. The primary and secondary windings of both of these transformers are in delta, and a seventh transformer is at hand to use in emergency.

The transformers were submitted to a like exhaustive test which lasted under load for 4½ hours, the temperature being measured by the increase of resistance method.

	160 KW.	75 KW.
Primary	33 deg. C. av.	35 deg. C. av.
Secondary	32 deg. C. av.	32 deg. C. av.
Iron	22 deg. C. th.	21 deg. C. th.
Efficiency, full load	97.4 per ct.	96.7 per ct.
" ¾ load	97.1 per ct.	96.1 per ct.
" ½ load	96.05 per ct.	94.8 per ct.
" ¼ load	92.7 per ct.	93.2 per ct.
" 1 1-10 load	84 0 per ct.	83.0 per ct.
Core loss, full volts	3200 watts av.	2050 watts av.
Magnetizing current,	.52 amperes.	.375 amperes.
Power factor no load,	.53	.54
Insulation test	20,000 volts.	20,000 volts.

TO-DAY electric heating, using that term in its generic sense to cover a variety of uses and purposes, stands just where electric power did ten years ago.

THE next meeting of the Pacific Coast Electrical Transmission Association will be held in Sacramento, Cal., on October 20, '97.

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Mining Summary.

CALIFORNIA.

Amador.

The Monte Cristo mill is not running steadily. Work continues on the upraise.

The Iron Mass force has stopped sinking and will drift at a depth of 300 feet.

The Madrone people are sinking a winze on a 2-foot vein of decomposed quartz and ochre that prospects high.

The *Dispatch* reports W. J. McGee in San Francisco last week to place the Bay State mine so that creditors could realize on their claims. It says the Bay State Company is insolvent and owes about $20,000. Mr. McGee says the people of Plymouth, who have carried the mine for several years, cannot afford to lose this much money. It is said that the creditors will bond the mine for the amount of their claims if the promoter will agree to operate the property and pay for what he does. The mine embraces eighty acres of patented ground, and has a 10-stamp mill in good order, hoist, pipe line, etc. The shaft is down 750 feet on a ledge of $4 ore, which, it is claimed, will pay expenses if worked economically.

At the Potazuba mine, Sutter creek, the shaft is down 475 feet, and at a depth of 550 feet drifts will be run north and south.

Butte.

The superintendent of the Spring Valley mine at Cherokee is having one of the old tunnels reopened and retimbered that drifting may be carried on.

The *Mercury* chronicles the sale of the American gravel mine, at Magalia, to A. W. Morganstein of San Francisco for $6,000.

The Nimshew Gold Mining and Power Company of Chicago, Ill., A. F. Jones general manager, have purchased the Carter quartz mine and will also work one mile of the bed of Butte creek. The company have purchased the Moss ditch and will repair it and put it in shape for use. There are twenty-one men employed. T. O. Carter is superintendent and the company have a big plan which he is carrying out. This is to generate the equivalent of 3000-horse power in electricity for use in the mill and mine. The intention of the company is to extend the line of wires from the mine direct over the hills to Chico, so as to supply both light and power in that city. The distance in a straight line is only twelve miles, while it is something over twenty by the traveled road.

Meline Bros., owners of the Golden Nugget mine on Philbrook creek, have eight men at work on a channel that yields pay dirt.

At the Ethyl mine, formerly known as the Wylie mine, eleven men are under the supervision of W. D. Edwards.

In the Emma mine, owned by the Nimshew G. M. Co. of San Francisco, the tunnel has reached a depth of 1700 feet and a rich channel has been struck. G. C. Higgins is superintendent. An air shaft 315 feet deep is being sunk to strike the face of the tunnel. They are down 91 feet through solid lava with their shaft.

Register: On the west branch of Butte creek the John Dix mine is giving employment to thirty men working gravel. The Peter Woods mine, under the supervision of A. J. Walsh, is employing nine men. Work on the Bader mine near Magalia is steadily being pushed ahead.

Calaveras.

The Drake and Tryon mine group near Angels is being developed. At the Tryon, the shaft has reached a depth of over 300 feet. The shaft on the Ghost is about 400 feet deep. Heavy machinery will soon be put in place and work resumed.

The Drake and Tryon mine three compartment shaft has reached a depth of 50 feet. Preparations are making to build hoisting works.

The mill on the Union gold mine near San Andreas is being moved to the Great Western, near Angels. Crushing of ore from that mine will ensue.

A change in the management of the Thorpe mine has taken place, L. Allgewahr, the superintendent, tendering his resignation. Jas. Cullen is acting as temporary superintendent.

Prospect: F. Brunner, owner of the Bald Hill mine, two miles from Angels, has two wagons engaged in hauling ore from his mine to the new Tulloch mill for crushing. There is an 8-foot ledge in the mine and the rock will assay from $6 to $179 to the ton.

The South Paloma mine is down over 700 feet and has encountered a second stringer of quartz double the width of the first one, found six or eight weeks ago, and rich in sulphurets. These stringers are between the hanging and foot walls with heavy gouge and native gold, both in float quartz. The company proposes to sink 1000 feet before making any preparations for building the 40-stamp mill now in contemplation.

El Dorado.

In the McDonald mine, at Grizzly Flat, the gravel goes as high as $30 to the pan.

Nugget: J. J. Gearhart is putting up a new 10-stamp mill on his mine in Mud Springs township, two miles below the Church mine. They have been running a tunnel and are in over 400 feet where they struck the ledge, which justified the erection of the mill.

Grading is being done to the millsite at the Pocahontas mine, and it is understood that a 10-stamp mill will be erected at once. The mill is eventually to be of twenty stamps, although the ten will be put in position this fall.

Humboldt.

Arcata *Union*: The gold beach mining now being carried on about one mile below the mouth of Little river is proving a successful operation.

Kern.

The Rand mining district announces progress, outside capital coming in looking for investment, mining properties changing hands, claims being developed, etc. M. R. Richie, Los Angeles, expects to begin the erection of a mill next month. A pocket is reported struck in the King Solomon mine, the ore running from $1200 to $2000 per ton. A cyanide plant is to be erected upon the mine owned by the Gold Bug M. Co. The Val Verde has 200 tons of ore on the dump awaiting milling. The mill at Cuddyback is kept busy with custom work. The G. B. mine of Randsburg has been bonded to F. Cole, who has begun work.

Randsburg *Miner*: A run of seventy tons of Wedge ore has just been finished at the mill at Cuddeback lake. The ore ran $150 per ton.

The Mojave Gold Mining and Milling Company is operating the Wonder, Wedge and Grachyte claims, on the southeast slope of Soledad mountain.

The White Peak Group Mining Company owns 260 acres of mining locations on the south and west slopes of Soledad peak, six miles from Mojave. It embraces fourteen claims.

Mariposa.

Gazette: At the Sellick mine near Hayward, a new mill has been completed; twenty-seven men are employed. The main shaft in the mine is down 170 feet, and will be sunk another 100 feet.

A Modesto company has been formed to operate the Woodside mine.

On the Merced river, at Brown's Flat, Olsen Bros. are down 70 feet and have a vein which carries free gold and sulphurets.

Mono.

Supt. J. J. Kermeen of the Dunderberg mine is urging his principals to attack the mine from the Green creek side, where a tunnel about 3300 feet long would strike under the present workings more than 1000 feet, and run along the course of the vein all the way, thus developing as well as draining the ground.

Nevada.

The La Suerte Gold Mining Company has levied an assessment of 5 cents per share, delinquent September 28th.

The Last Chance mining property is bonded to Rodehaver, Porterfield and Barnes. C. W. Porterfield is superintendent. The company will build a new 20-stamp mill.

The Phœnix M. Co. (formerly the Sneath & Clay) of Nevada City will build 480 feet of flume to bring to the hoisting works the water of Hitchcock ravine.

The *Transcript* says ore from the Rocky Bar and Massachusetts Hill mine, near Boston Ravine, is being hauled to the North Star mill. In appearance the ore resembles that taken from the mine by the Watt brothers many years ago when 7000 tons averaged $80.

(Special Correspondence).—A transaction of much significance to our mining district was completed last week. The property owned by C. D. West and S. Fowler, comprising seven claims, was transferred to Rhodehaver, Porterfield and Barnes. There is a 5-stamp mill on the property, the capacity of which will at once be increased. The ledge averages 4 feet and the ore value is from $10 upward. Now that this property will be extensively operated, and the permanent opening of the ledge at the Gaston Ridge mine, as also the prospective work and mill on the seven claims owned by Geo. Mainhart, the Washington district will attract merited attention from mining capitalists.

Work is progressing steadily at the Ormonde with satisfactory results. The tunnel on the McCarthy ledge—a large ore body that runs from $4 to $9—is being continued with success. J. F. L.

Washington, Sept. 6th.

(Special Correspondence).—The Stanford mine, formerly known as the Oro Fino (the bonding of which by Judge Caldwell to Messrs. Neff & Coleman some weeks ago was chronicled at the time in the MINING AND SCIENTIFIC PRESS), is the scene of considerable activity. The water will be pumped and the shaft driven 200 feet deeper and several drifts will be run. The property will be thoroughly prospected.

Parties are negotiating with Frank Cook of Sierra City for his properties at Meadow Lake in this county.

It is authentically reported that Salt Lake people have acquired new holdings in the Meadow Lake district and that work is to be resumed on properties that had been operated on, but abandoned later on.

Mr. Schockley of Cincinnati has begun active work at the Old Sneath & Clay, adjoining town. The property is now known as the Phœnix. The new company is composed of Ohio people and Dr. Tickell of this city.

At the old Howe Diggings near town, two young men—Fiske & Hall—made a good strike last week in washing gravel. Current rumor places their amount at $4000.

Prospecting at La Suerte mine progresses favorably.

Work on the Searls continues with good results.

Nevada county, though it has a number of dividend-paying mines, has a vast amount of territory awaiting the prospector and capitalist, though local capital is by no means idle in opening new prospects. In this respect Nevada county is as active as probably any other mining county in the State.

Nevada City, Sept. 6th.

Placer.

The Gold Run gravel mine was recently sold to London men. The bottom strata has been opened by a tunnel. At the mouth there is a 10-stamp mill crushing. A hydraulic tunnel runs in under the channel from Canyon creek. The debris will be stored in Canyon creek canyon, 500 feet wide, available for storage purposes 1⅓ miles. The company has a half-million feet of lumber and forty men are repairing the flumes, canals, etc. J. E. Doolittle is general manager.

The Marguerite Gold Mining and Milling Company has elected W. Schmitz, president; G. Gall, 1st vice-president; F. M. Freund, 2nd vice-president; H. Guembel, treasurer; F. Mettman, secretary; Chas. Peach, superintendent.

Chubb, Knox and Bell have a chimney on the Remington Bell place, from which they are taking out gold in decomposed granite, the pans averaging $10.

The Eclipse clean-up last week gave as result 155 ounces of gold valued at $13.60 per ounce, after a run of twenty-two days with ten stamps. B. Hawkins is superintendent.

The Curtin Mine and Milling Company has incorporated at Newcastle: J. Curtin, E. H. Baxter, A. McDonald, M. Murphy, G. W. Fletcher.

At the Mayflower gravel mine, 1⅓ miles north of Forest Hill, at an elevation of 2700 feet, Wm. Rule superintendent, a 20-stamp water-power mill capable of crushing nearly 200 tons of rock daily, is running. Seventy men are at present employed, and eighty cars of a ton each are crushed per day. They are breasting in the tunnel 8000 feet in. Four rubbers, one in front of each table, carry the gold to the undercurrent. The tailings are dumped into the company's canyon. Six hundred feet of flume convey the water.

The Breece and Wheeler or Paragon mine at Bath has been leased by Grenell & Akers. Thirty men are employed breasting an old channel about one-half mile in. A 10-stamp steam-power mill is kept busy twelve hours a day; the amount crushed per day is about forty tons.

The gravel mine at Red Point, a mile and a half from Damascus, owned by the River Mining Company of Paris, France, is superintended by J. A. Ferguson. Sixty-five men are employed in the Red Point Channel tunnel, 2⅔ miles long. The channel averages 150 feet in width. About 3000 cars, of a ton's capacity each are taken out per month. The cars are run by horses, three for each shift.

A director of the Pioneer says that the mine is yielding monthly net earnings at the rate of 10% per annum on the par value beside paying all the development and contruction expenses, that the August yield will be at least $14,000, and that the ore is averaging $20 a ton.

Plumas.

At Granite Basin the Morning Star mine, which gives employment to twenty men, is to have a new hoist engine, drills, air compressor, etc., and a few weeks will see it running again.

R. Hodge took out a $1000 pocket last week at the Shaw mine.

The Starlight mine is reported to have realized $40,000 in August from the ore that was shipped to San Francisco. The mill employs twenty-seven men under the superintendency of Mr. Blanc. H. L. Robinson is credited with intention to start a new shaft on the Greenstone mine, near here.

The Thistle Shaft is closed. The pumps have been taken out. A long tunnel through rock a mile and a half could be run or work could begin 40 feet up in the shaft and run a tunnel until the top of the present work on the channel is reached, which is 40 feet above the bottom of the shaft. In sinking the shaft the contractors, after going down several hundred feet, struck a bed of quicksand and pumped out thousands of tons. Finding they were making no headway, they gave up the contract. Some local miners declared they could sink it and were placed in charge. They built a thick, heavy wooden bottom to the shaft with a small trap opening upward. This bottom was laid upon quicksand and just enough sand was permitted to come up through the opening so that the bottom would sink down about 8 inches. Then a set of timbers were framed and placed in position. Then the trap door was opened and the sand slowly forced its way up through the opening until the bottom sank the required depth, when the trap was closed, the sand lifted from the shaft and another set of timbers placed in position. This was continued until the bed of quicksand, 50 feet in depth, was passed.

San Diego.

The defendant in the case of the Free Gold Mining Company vs. James Spiers et al. has appealed to the Supreme Court from the order appointing C. N. Pauly receiver of the Golden Cross mines at Hedges.

A tunnel is being run on the Seventy-Six mine to tap the vein at a depth of 400 feet. A number of stringers have already been cut. Forty feet more and the main ledge will be encountered.

The Poor Man's Mining Company is being incorporated, based upon the purchase and development of the Mountain View and Poorman mining claims, two free milling properties between the Stonewall and Ranchita mines, near Banner. It provides for 1000 shares $10 each, payable in monthly installments.

A New York house has ordered from the Laguna Mining Company of this city, a sample car load of antimonial ore from their Laguna Mountain property for shipment to England, with a view to developing an extensive business. A 6-foot vein of antimonial ore has been found in the Alpine mine in the Laguna mountains while assessment work was being prosecuted in Mesquite district. A great many claims have been recently located—about ten miles square is taken up. Placers have been worked for years. As in the case of most desert districts, there is a lack of water for the working of ore. Water for camp purposes is hauled from the railroad station at Galmis, six miles away. The water problem will probably be solved by piping it from the Colorado river, twenty miles away.

Three thousand dollars per month is being taken from the Ranchita mine in the Julian district. The 5-stamp mill is kept busy on $30 ore from development work only.

Shasta.

Free Press: The Hidden Treasure mine was shut down last Saturday night and over thirty men laid off. This property belongs to the Montain Copper Company and has been worked for flux ore. The cost of getting out ore was about $2.25 a ton, and the company can buy ore for fluxing for about $2 a ton on contracts. After the lay-off six miners, among them Wm. Gilbert and a man named Williams, entered into a contract to take out the ore for the company for about 50 cents a ton less than they had been paying. The discharged men will probably go to work for the company on other mining property.

Sierra.

The Gold Valley mine resumed work about three weeks ago. The company is employing about twenty men at the mine and in the mill. The mill and all other machinery is run by electricity.

The Willoughby mine will soon be started up under the management of Mr. Woodworth.

Messenger: The workmen who were employed at the Garnett mines near Hepsidam have put an attachment on the property to secure unpaid labor, amounting to about $5000.

Siskiyou.

A strike is reported in the Schroeder mine seven miles from Yreka, on the 1200-foot level, the vein is 4 feet in width, averaging $130 to the ton. Since the 10-stamp mill and five concentrators were destroyed by fire two years ago the owner, J. H. C. Schroeder, has been running tunnels, endeavoring to strike the vein which faulted on the 1000-foot level.

The Distelhorst-Barton Klamath river dredger has resumed operations near Oak Bar.

Yreka *Journal*: The Klamath river dredger on the Klamath river produces good pay gravel. A few places on the river were very light, but other places paid so well that that made up for the poor gravel beds. The big scoops handle about a ton of gravel each time. If each scoop would pay 25 cents the owner would make plenty of money.

Mining around Oro Fino is quiet. The hydraulic mines in Oro Fino are rich, but can be operated only a few months in the year, by reason of a shortage of water.

The Katie May mine on Greenhorn, near Yreka, will be worked this fall and winter, and the owners expect to take out a large quantity of quartz.

The big mines down the Klamath are waiting for the commencement of the fall rains before they will be enabled to resume operations. Several of the properties were doing so well when they had to close down, that the owners are very anxious to get to work again. The streams in every part of the county have not been so low for years, as they are at present. The wheels on the Klamath have to be set as low as possible in order to keep them in motion.

The old Steamboat mine on McAdams' creek, owned by A. C. Brokaw and W. Bennett, was sold a few days ago to a company of Chinamen, who will try their luck at working it. The Steamboat is one of the oldest mines in that section, being situated on McAdams' creek, four miles northeast of Fort Jones, embracing several old claims, in all about 2½ miles along the course of the creek. The top ground was thoroughly worked in early days, but bedrock has never been reached on account of the great difficulty in handling the large amount of water encountered. Brokaw and Bennett, who have just sold the mine, have been working on a shaft 100 feet deep of 6x14, with three compartments. They equipped the mine with a double drum hoist and three Dow pumps, which were operated by a seventy-five horse power engine. They had planned a drain tunnel 1⅓ miles along the creek, where it was expected to reach bedrock. Thousands of dollars have been spent in this mine and there is little doubt that it would be a paying property if the bedrock could be drained without entailing such a great expense and such a large amount of labor. The Chinamen form a company and work these mines to much better advantage than white men, as they do all of their own work, so it may be that this Chinese company will make a success where white men have not.

The hydraulic mines on the Salmon river have had a prosperous season, but water is short now.

Trinity.

The *Journal* thinks there is undoubted evidence of an ancient river channel in the county, which has been one of the main sources of gold in the leads diverging from it. Years ago, during the glacial period, California was covered with immense glaciers and ice-capped. During the subsequent change of temperature these immense ice fields melted and the glaciers receded northward. Consequent to the melting ice immense rivers were formed, ran their course, deposited an immense amount of gravel, and in the course of time became dry, leaving only geological traces of their pre-historic formation. All northern California shows traces of these prehistoric rivers.

In Trinity the course of one of these ancient river channels is clearly marked. It is shown most plainly in Trinity Center. At the Bloss & McClary mines and the old Coyle claim the deposit is plainly discernible. It is the only place in the county where the evidence is so plainly seen. There the channel is not exceedingly deep and is about 500 feet in width, lying between the rim rock which rises high on each side. The trend of the channel is southwest, and it shows plain indications in a southwesterly direction to Minersville. At the above-named places it is worked by the hydraulic process and yields large returns. The channel is crosscut with numerous streams and runs under the mountain dividing Swift creek from the East Fork of Stuart's Fork. All that country is filled with a volcanic mud flow. The channel shows plainly at the old Kapusta mine at Minersville.

The ancient river apparently ran down the Coffee creek country from the Siskiyou mountain, through Trinity Center and Miners-

ville, continuing on through Weaverville, passing through the Oregon Gulch mountain and breaking up in the Junction City basin. From Five-cent gulch in Weaverville basin, past the hill on which the electric plant is located to the La Grange ditch, is a large deposit of the volcanic mud flow. The well-known Hupp & McMurry placer is a lead from this channel; the La Grange mine is an integral part of the same. Competent authorities assert that beneath the false bedrock of Weaverville basin will be found this ancient gravel deposit, which can be worked to advantage by deep drift diggings. Along the ridge of Buckeye mountain near Minersville evidences of this ancient channel are plainly discernible.

This old channel offers a favorable field for enterprise. Wherever struck it has yielded large returns. Along its course it offers splendid inducements for capital. In the lower counties deep drift diggings are worked successfully, and there is no reason why they should not be here.

During the upheavals of ancient times, the grinding of the ice cap upon the auriferous soil and the consequent disintegration filled the turbulent river with an immense amount of gold-bearing gravel. The ancient channels comprise a large amount of auriferous gravel. Where crosscut by more modern streams leads have been formed of excessive richness. However, a large part of the old channel still remains and only requires capital and intelligent effort to yield large returns.

Tuolumne.

The Rawhide Mining Company is installing an electric plant, 1,000 H. P., on the north fork of the Tuolumne river. The water is diverted by canal and flumes three miles long giving a fall to the pipe line of 500 feet. The transmission line will be 12½ miles from generator to distributing point at the mine. The power will be used for general mining purposes, lighting, etc. The system is duplicated throughout to guard against accidents.

The Hibbing mine is being operated by Osborne & Sell of San Francisco, W. D. Hibbing superintendent. A shaft has been driven down 165 feet, at which point a station was cut out and drifting commenced. The ledge showed 18 inches of good rock that would mill $22 per ton; recently the *Democrat* reports better ore estimated to be worth from $50 to $100 per ton.

A. C. Maier is operating the Felix gravel mine on the main Tuolumne, near the Buchanan with 10 feet of pay gravel.

The *Banner* reports that it is proposed to sink 1200 feet at the Dutch. An 18-foot vein has been uncovered at the Junction. The stamps at the Arbona mill at Tuttletown are falling upon rich ore. There is plenty of rock of the best grade. Drifting and crosscutting is going on at the 600-foot level of the Rappahannock. Sinking will proceed to the depth of 1000 feet.

From Stent is reported a strike in the Mascot mine, the property of the Santa Ysabel M. Co. It is thought that the pocket will yield about $50,000.

A strike was also made recently at the Green mine, situated on the east belt, on the 300 level.

Colby & Beckwith, who recently struck a pocket in the Tansy quartz claim near Sonora which produced $40,000, came to San Francisco this week and report that there are no Tuolumne miners who have the Klondike fever. Land adjoining that from which this big pocket was taken out has been leased and will be thoroughly prospected. The Tansy claim is on the eastern slope and is a spur of the Bald Mountain.

NEVADA.

J. W. Brim of Williams, Cal., bought from Denio, Deegan & Cowden of Winnemucca, their gold mine in the northern part of Humboldt county for $16,000.

At the Buckeye placer claims, thirty-five miles from Carson, the Raycraft brothers, owners, worked nine weeks washing out nearly $4000, which brought at the Carson Mint $19 per ounce. C. D. Lane recently bonded the Buckeye mine for $250,000, after expending over $20,000 in exploration and surveying, he decided the cost of procuring and bringing in the requisite supply of water for sluice and hydraulic purposes would be $1,000,000 and gave up the bond. Herman Zadig and other San Franciscans have still more recently bonded the same property for $300,000.

The Gold Creek *News* reports a strike in the mine owned by the Walker Bros. at Mountain City, Elko county. This property was worked years ago and produced ore that was worth $4 a pound. At a depth of 40 feet the vein was lost, and it was thought the vein did not go down. After some prospecting it was discovered that the mountain had faulted 200 feet and the ledge was again found in place, 8 feet wide, going down between granite walls; 35 feet in from the 125-foot level the ore chute was again encountered. From 10 to 22 per cent of the values of the mine have been gold, and gold shows all through the ledge matter in the present strike of 8 feet.

The beneficial working of the new mining law is seen in the development of Island mountain. It is now covered with 10-foot holes dug this summer showing up good ore, while older sections have been held for years without a stroke of work.

OREGON.

Jacksonville *Times*: A. B. Hopkins has sold the DeLamatter mine in Kerbyville district to Portland parties for $4000.

The Oak Flat Placer Mining Co. of Josephine county is constructing a ditch three miles long from Soldier creek to their mines, which will carry 4000 miners' inches of water. They sent to the Willamette valley for laborers last week, as they could not be obtained here for the wages offered, $1 a day and board.

Baker City *Democrat*: The California mine, Cable Cove district, recently purchased by W. J. Connors of Butte, Montana, will employ forty men. The machinery for a 5-stamp mill is on the ground.

At Granite the Ross gulch claims are being worked by Clark Bros., who have built a mile of ditch, put in 2000 feet of 20-inch pipe and syphoned the water across the gulch.

The Don Juan mine, recently sold for $30,000, has put in a sawmill and is getting out lumber for a 10-stamp mill. The Pyx mine, owned by one of the Geisers, who sold the Bonanza property, and the Phœnix, owned by Shultz & Berry, have both put in new machinery. All work had been suspended on the Phœnix property for two years until this summer. At the Red Boy and Clear Creek mines, owned by Godfrey & Tabor, a sawmill has been put in and lumber is now being sawed for a 10-stamp mill. The Quebec ledge is bonded for $25,000. The La Bellevue, recently purchased by Keith & Bamberger of Salt Lake, is now being operated, and great things are expected of this property, which has over 8000 feet of development on it.

WASHINGTON.

The Mashel Copper Mining & Developing Company, $1,500,000, has four claims thirty-four miles southeast of Tacoma, the vein averaging 2¼ per cent copper. The company claims it can be mined and reduced for 75 cents per ton.

E. B. Burdick, superintendent and manager of the Acme mine at Marcus, shipped his first car of ore last week. Indications are that the mine will continue shipping all winter. B. Setzer is superintendent of the Sunday Morning mine.

BRITISH COLUMBIA.

The Rossland *Miner* is authorized to announce the sale of the Velvet mineral claim, Sophie mountain, to the New Gold Fields of British Columbia for $62,500; $12,500 cash.

The management of the Noble Five mine submitted a proposition to their men to pay $2.50 and $3 per day. The reduction was not accepted and the miners are at work at the old scale pending the decision of the managers in the matter.

The mines above the head of Kootenay lake are still clamoring for the completion of the government trail from Cody creek connecting via Hamill creek with Argenta, says the Kaslo *News*. Rich ore awaits shipment, but the government is lamentably slow.

At the Trail smelter there are now $300,000 worth of ore in the roast heaps. The roasting takes out the sulphur and arsenic, the loss in weight and bulk is from 15 to 25 per cent. The roasting ore is laid in heaps 50 feet long, 20 feet wide, 10 feet high, in the form of an oblong pyramid. The base is made by dry wood; when fired the lower part of the heap becomes a red hot mass with vent holes in the outer shell through which escapes a stifling smoke. The wood simply starts the fire, the ore supplying its own fuel. It requires about six weeks to burn out the entire mass. About 225 tons of ore a day are now being smelted, which if it averages $30 per ton, would yield $6,750.

The Cariboo Hydraulic Mining Company, operating in Cariboo, reports that the result of the cleanup completed on August 16 amounts to 5,685 ounces of amalgam of the estimate value of $60,000, the proceeds of forty-seven days' washing with two giants. The dryness of the season has considerably lessened the supply of water, and the cleanup was not as big as expected. Next season the company will have completed works which are expected to add greatly to the output.

At Grand Forks, W. C. McDougall has sold his gold-saving plant in operation on the Eighteen Karat group. A ditch 800 feet long and 6 feet wide carries the water from a wing dam across the river. The machine that is to do the fine work with the gravel after it has gone through the grizzlies is a light-built apparatus, resembling in appearance a banker's high desk. It contains a cylinder 18 inches in diameter, covered with copper plates, which revolves in a trough, in which is a supply of quicksilver. The revolutions of the cylinder carry the pay dirt through the quicksilver, which catches the gold. Mr. McDougall expects the ground to yield $1.25 per cublic yard.

Manager E. J. Field of the Wonderful mine at Slocan figures a profit though silver goes lower and with the lead tariff 100 per cent greater than last year. He takes the average value of a ton of Slocan ore and says:

100 ozs. silver at 50c.	$50.00
60 per cent lead—1200 lbs at $2.10	25.20
Total	$75.20
Freight and treatment	20.00
Net for mining and putting on cars	$55.20

This is estimated at a lower price than the present quotation for silver; lead is figured less the $1.50 duty.

ALASKA AND N. W. T.

Healey Dall, paleontologist to the U. S. Geological Survey, says:

"One serious danger menaces the large population now pouring into the district. The upper Yukon is a country where subsistence has always been difficult. The first party which ever reached it, that under Robt. Campbell of the Hudson Bay Company, who named the Pelly river, though composed of seasoned voyageurs, was, if tradition was reliable, forced to support life by cannibalism before it could reach help. In 1866, not more than three hundred Indians were able to find subsistence between Fort Yukon and Fort Selkirk. The abundant fish and game of the lower Yukon are absent. The river steamers available for transportation cannot, during the remainder of the present season, carry up to Dawson City much more food than will supply its present population. It seems improbable that any large proportion of the people now hurrying over the Chilkoot portage can transport—if indeed they possess—food enough to carry them over the winter and up to the arrival of summer supplies from the lower Yukon. Very serious hardships, and even possible starvation, therefore, confront the rash and foolhardy, who push forward without proper supplies into a region whose limitations they do not realize. Fortunately, it is likely that many of those least prepared for the undertaking will not get over the divide, and will be obliged to remain in southeastern Alaska, where the rush to Klondike will have left open many opportunities for employment. Were it otherwise, the coming winter and spring would probably furnish material for tragedy. Even as it is, the circumstances offer ground for very grave apprehensions."

The Juneau *Miner* says work will proceed at once on the Alaska G. M. Co.'s properties. Work will be continued on the present shaft and a tram a mile long installed without delay. The present mill of ten stamps will have auxillary steam power, so that there need be no stoppage should the water run short.

A letter from Supt. Trowbridge of the Bald Eagle M. Co., Sumdum, says that the tunnel is in good ore, and that samples sent up here assay $48 and $53 per ton respectively. The mill is running full time.

S. P. Earle & Co. are erecting a five-stamp mill on their property seven miles from Berners bay, near Yankee basin.

The War Horse group of mines at Funter bay is sold to Schaney & Engleman for $20,000. The group consists of seven claims each 1500 by 300 feet.

UTAH.

Last week at Coalville all the property of the Crescent Mining Company was sold to McMillan & McLaughlin for $75,000.

The Bingham *Bulletin* says there are many old mines in that locality formerly noted as large producers and comparatively or wholly idle to-day, which no doubt could be made to repeat or exceed their former records. Some have been gutted of everything in sight and will require a considerable outlay for development work, but improving market conditions are so encouraging no doubt some of the old properties are shortly to resume active operations.

Arrangements are being made for a convention of those interested in silver production all over the State, including mine owners and miners, smelter and railway men, to devise some plan to continue the operation of the mines. It is claimed that, if concessions are made on all sides, the cost of producing silver can be kept within the present low price, and the large number of men employed can continue to find work at at least living wages for the coming winter. The mine owners complain that the railroads and smelters are exacting exhorbitant charges for handling ores, and concessions will be asked. Reasonable concessions will be asked for from the miners themselves in an adjustment of the scale of wages. The mine owners generally seem to want to meet other interests involved half way and make just allowances. It is believed that, if economy is practiced and a scaling down made on all sides, many of the mines that would otherwise have to close can be kept in operation by mining on a small margin.

At Mercur, the millsite for the Golden Gate mill is employing nearly 200 men, and the work is going rapidly forward.

IDAHO.

All the property of the Yellow Jacket Gold Mining Company at Yellow Jacket has been sold to J. S. McChestney of New York for $170,000.

The Lucky Boy Gold Mining Company at Custer have posted notices that wages will be reduced this week, or else work will cease, on account of the low price of silver. The proposed reduction is: Miners, from $3 to $2.75 per day; outside men, from $3 to $2.50, and mechanics, from $3.50 to $3.

At Princeton the Gold Bug has taken a contract to drift on the Early Bird ledge 40 feet. The drift will be on the 100-foot level.

The *Statesman* says the sale of the Black Hornet mine, near Boise, to a Colorado company, is practically closed. A gold nugget worth $69.65 was recently taken from this mine.

Sweetser & Burroughs of Pocatello have a slug thirty-eight ounces worth about $760—the result of three days' run of their gold dredge on the Snake river, near Minadoka. Their boat works the sand from the bottom of the river and handles about 2000 yards of dirt in twenty hours. They say that the sands of the Snake in that vicinity average from 5 to 8 cents per yard.

MONTANA.

The Butte men who bonded the Gold Hill near Gaylord last spring, have relinqished the property after an expenditure of nearly $10,000 in development.

One of the very few silver producing mines now in operation in North Walkerville is the Big Bonanza, owned by King and Wilson. Within the past week ore averaging over 1500 ounces in silver has been mined, and the general average of the 6-inch pay-streak is between 200 and 300 ounces.

Jno. Lee, president Golden Jack Mining Company, says at present the company is working only copper. The tunnel is 180 feet. A St. Louis company will next spring build a mill at the mines.

At Gilt Edge several men are working and the people have greater confidence than ever before in that camp.

Fifteen years ago the Diamond mine near Helena, was listed for sale by a Radersburg mine dealer. Richard Lockey saw the bulletin list, on which the mine was posted, and as a speculation bought it, paying 90 cents. The Diamond was discovered and located thirty years ago by E. Folsom, of White Sulphur Springs. Shortly after locating it Mr. Folsom sold it to a Pittsburg man, who set up a small stamp mill, but did not make a success of it. The capitalists left and the mine was neglected and abandoned, taxes became delinquent, the assessor's valuation on the property was small, and the delinquent tax due was only 90 cents. Mr. Lockey owned the mine for several years, and then sold it. The property has since passed through the hands of several owners, growing in value all the time, until it was sold recently to a Scotch syndicate for $1.300,000. There is now on the property one of the largest and most improved gold mills in Montana.

At Pony, in the Clipper group, Elling & Morris have three miles of tunnels, the lowest cutting the Clipper at a depth of 1400 feet. The ore is a fine-grained, grayish-white quartz, carrying gold free in sulphurets. At the 20-stamp mill the ore is milled wet, the pulp being run over plates, then over vanners and canvas tables; the resulting tailings are then treated by cyanide. The concentrates from the vanners and the slums from the canvass tables are treated at the East Helena smelter. About fifty tons of ore are milled every twenty-four hours, forty men are employed in the mine and mill.

At the Old Joe a homemade concentrating plant is making money for the owners. The material used in the homemade plant was a cracked mortar, five worn out stamps, a wooden water wheel, an old discarded, three-compartment jig and a roughly constructed vanner.

The Bailey mill is now being erected by the Mastodon Gold Company on Monitor hill near the new postoffice of Mammoth. The mill is to be of forty tons capacity. The Bailey process may be called a continuous cyanide process, although it really aims to combine amalgamation with cyaniding and a depostion of the gold from solution by electricity instead of the usual zinc shaving.

At Virginia City C. L. Hathaway has a new mill on the Bertha, which was started up last week. The ore is pulverized in a cylinder, divided horizontally into two sections. Inside the cylinder are five rings, so grooved that they receive one-third the diameter of 15-inch balls, which roll in the grooves by gravity as the cylinder revolves. The pulverizing cylinder is fed by an automatic feeder. The cylinder is driven by a 5-foot cog wheel, driven by a 11½-inch pinion, operated by a pulley 30 inches in diameter with an 8-inch face. The ore is carried into a pulverizing cylinder by a hopper, into which it is delivered by a feeder and a screen conveyor. No screens are used to regulate the size of the product, that being regulated entirely by the rapidity with which the ore and water are fed into the pulverizer, the faster the feed the more rapid the passage and the coarser the product; the slower the process the slower the ore passes through the pulverizer and finer the degree of pulverization. From pulverizer the pulp passes by gravity into the amalgamator, which is a cast cylinder 6 feet in diameter. Inside the hollow cylinder is a solid cylinder 24 inches in diameter and 1 inch shorter than the inside length of the amalgamating cylinder. The space between the ends of the solid cylinder and the inside face of the head of the amalgamating cylinder is filled with rubber packing. After the amalgamating cylinder has been running a few moments from 150 to 250 pounds of quicksilver is introduced behind the solid cylinder or roller. As the pulp comes from the pulverizing cylinder, reduced to a fineness of from 80 to 100 mesh, it is delivered into the amalgamating cylinder, the roller, which by gravity keeps in the bottom of the revolving amalgamating cylinder, passes over it, reduces it to a palpable degree of fineness—probably 150 mesh—the pulp raises up through the quick, which takes up any particles of gold fed in the crushing process. After the pulp leaves the amalgamating cylinder it passes over a "Hathaway gleaner," a contrivance in which amalgamating plates are arranged in a peculiar shape.

Edward W. Parker, who has charge of the United States Geological Survey, has completed that portion relating to Montana. In it he says that the total coal product of the State is 1,543,445 short tons, of a spot value of $2,279,672. The annual coal produce of the State has shown an uninterrupted increase each year since 1877.

WYOMING.

Edward N. Breitung of Marquette, Mich., an extensive mining operator, has bought the Albany placer mines on Douglas creek. The price is understood to be $50,000. The property consists of 1100 acres. The remainder of '97 will be devoted to surveys and exploring preparing for a good year's work in '98.

COLORADO.

The Mecca Mining Company sent down 1,000 pounds of ore from the World's Fair lode, eight miles southwest of Georgetown last week which yielded $160 to the ton, the largest proportion of the values being gold. The company is now driving a tunnel through a phorphyry dyke that traverses the claim to cut the vein lower down. The company has secured two other claims in the vicinity, on one of which a four-foot vein has been opened which runs well in gold. The discovery of gold in Georgetown district has been a revelation to miners of that section and many of them refused to believe that gold has been found until the fact was demonstrated by the mill run.

A Denver dispatch says unless the Colorado Midland and Denver and Rio Grande railroads agree to reduce the freight rates on silver ore from Aspen to that city it is probable that all of the big silver-producing properties of that district will be closed down. The mine owners and operators of that district have made a vigorous protest against the existing rates.

An Idaho Springs letter says: In the letting out of men on the silver working lodes the gold interests have taken another step forward. At one of the mines employment was given to all of the men let out at a silver property. This means an addition in the working of gold-bearing properties. Another mine manager says that he intended increasing his force by forty men, and this will take up some of the surplus. What miners are let

out at the silver producers will be given preference in putting on of men at the gold producers. Perhaps 1,000 of the miners working around Idaho Springs were formerly working in the silver mines. It is a wonderful change and because of its gold advantages Idaho Springs has been made to prosper.

From Alamosa is reported the sale for $18,000 of the old Hamilton mine on the east side of Mount Blanca to Pittsburg men. They claim to have a vein of tellurium and sylvanite worth $200 a ton. The new owners are expected to begin shipping soon. Fort Garland is the nearest railroad point to the south. The mine is under the crest of Sierra Blanca, above timber line, and is reached by eight miles of good wagon road and a seven-mile burro trail from Fort Garland.

Manager Hersey of the El Dorado mine at Kokomo says that that property, which has been employing from twenty-five to thirty men, is closed down pending a settlement of the wage question. Owing to the low price of silver Manager Hersey stated to the men that it would be necessary to cut the wages of the men from $3 to $2.50 per day until silver got to such a price that he could put it back. This idea at first seemed satisfactory, but at a meeting of the Miners' Union there Mr. Hersey states the reduction was objected to, and the men so notified him. It was therefore decided to quit work until the matter can be satisfactorily settled.

A placer mining company near Granite makes a cleanup once a month and sends the gold to Granite, two miles, on horseback. Two men heavily armed started with $5000 worth of gold last week and were held up and robbed of the gold and their guns.

The scheme to consolidate the best mines of Empire into one group, which was examined and reported upon by Haggin and Tevis two years ago, is about to be revived. Since that time the treatment of the low-grade ores near the mines has been very much advanced, and the railroad company has agreed to extend their rails from the junction to the camp proper, a distance of two miles. A new mill with a capacity of 200 tons of ore per day is one of the items in the consolidation. The new mill is to be located on the Pearce placer, near the junction, where plenty of water power is available. The mines which are included in the proposed scheme are the Benton, Crown Prince, Pioneer, Conqueror, Corncracker and the Dumont properties. New York and California are expected to furnish the required capital.

Aspen *Tribune*: The Millinee Mining Company have reduced their force from forty-five to sixteen men. The low price of silver is the prime cause of this move, and it is generally believed that should silver advance to the 60 point, or a $3 freight rate be secured on low-grade ore, the force will be increased probably in excess of the old number.

NEW MEXICO.

The Red River *Mining News* believes that inside of twelve months at least $5,000,000 will be invested in the development of mines and in machinery for the reduction of ores in the Red River district.

From Cochiti is reported a free gold strike in the Puzzle mine 12 inches wide.

Oasis: The mill of the Colorado Mining Co., at Las Planchas, Sonora, has started up after a complete and thorough overhauling. Everything is in first-class condition and working finely. During the suspension of the mill development has been vigorously prosecuted, a great area of virgin ground is opened up and ready for stoping, and there are over a thousand tons of high-grade silver ore on the dump, with many thousands of tons in sight in the mine. A great deal of it will run 150 ounces to the ton, and no less than fifty ounces. Superintendent Allen says the Colorado Co. is utterly indifferent to the price of silver—at twenty cents per ounce they can make money. It is the production of such mines that is bearing down the price of silver.

ARIZONA.

The Prescott *Journal-Miner* says a cyanide plant for the Little Jessie mine has been decided on.

At Congress Junction the Golden Wave Mining Company, J. H. Costello superintendent, reports a strike of good ore.

During the past year the United Verde Copper Company have added eight boilers to their Jerome plant, the capacity of each being 250 H. P. The company is now said to have 800 men on their payroll, and disburses over $75,000 on each monthly pay day.

G. Sutherland at Cook canyon, is superintending work on the Cook group of mines.

The King of Arizona is milling and sacking ore for shipment. All the ordinary rock extracted is run through the company's mill at Mohawk, the richest is shipped to a smelter to insure the extraction of all the gold. Boring for water at the mine goes steadily on. A depth of 150 feet has been attained. It is expected that water will be struck within 400 feet.

The Bisbee *Lyre* reports returns received by the superintendent of the Copper King of Arizona of sixty sacks of ore which assayed 4 per cent in copper, 164 ozs. in silver and 28-100 oz. in gold.

Republican: R. R. Richardson has just leased fifty acres of patented placer ground in the Greaterville mining district to a Chicago company. This company will put in a large new dry-process machine which it is claimed will wash fully 100 tons per day.

MEXICO.

A recent article in *El Mundo*, the Government organ, shows that with the silver dollar at 40 cents of our money, Mexico would probably have to export only about 4,000,000 dollars extra in silver to meet all her foreign obligations, which sum would not even touch her metallic reserves of $43,000,000, on which there is a paper money issue of 75 per cent of that amount.

In the State of Jalisco Pennsylvania men have bought the San Vicente mine, and promise to have ready for operation a stamp mill and smelter by November. Gold in paying quantities is said to have been found near Ameca, some distance west of Guadalajara, for the exploitation of which J. R. Williams is trying to form a company with $100,000 capital.

The French house of Rothschild purchased some time since mining properties in the States of Michoacan and Guerrero, and has sent a corps of engineers over the proposed route of a railroad to bring the new territory into connection with the National railroad at Patzcuaro.

Chihuahua *Enterprise*: The dispatch sent to the City of Mexico last week to the effect that Boss Shepherd had shut down his mines at Batopilas, owing to the fall in price of silver is without any foundation whatever. Advices received from Batopilas state that Governor Shepherd has no intention of shutting down his mines, but on the contrary is making numerous improvements and carrying on work on a larger scale than ever and will continue to operate his mines even if silver should go much lower than any point yet reached.

NEW SOUTH WALES.

The diamond-mining industry is steadily progressing in New South Wales. During the past year prospecting work has been carried out on all the leases on the Bingara diamond field. The Monte Cristo mine, through want of water, only treated twenty tons of wash. The Australian Diamond Mines Proprietary Company kept sixteen men at prospecting work and have sunk 1500 feet, and driven 1200 feet in the aggregate, during the past twelve months. The Eagle Hawk Company treated 500 tons of drift, which returned gold and diamonds to the value of £325. The Murchison Diamond and Gold Mining Syndicate is busily engaged in prospecting and constructing dams to conserve water. It is estimated that the output from the field was 3000 carats, the lowest value obtained being 6s per carat. The Boggy Camp diamond mines, situate about fifteen miles west of Tingha, employ about sixty men. In some of the best mines on the field the wash is found 4 feet thick, yielding about ten carats to the load. The stones are of good quality and pure white.

Commercial Paragraphs.

FORMAL ANNOUNCEMENT is made of the consolidation of the Siemens & Halske Manufacturing Company of Chicago and the Pennsylvania Iron Works of Philadelphia. All but 300 shares of the Chicago corporation have been exchanged for those of the Pennsylvania company. The Pennsylvania's capital will probably be increased to $5,000,000.

THE Vulcan Iron Works have just turned out a 5,000-pound wheel that can be taken apart in pieces which do not weigh over 175 pounds each. They were packed in sections by horses last week from Silverton to the Forty-five mine in Snohomish county, Wash. The wheels are to carry a cable 7,400 feet in length running from the mine. Forty buckets will be transmitted on the cable and the full capacity of the system will be 100 tons a day. There are fifty-six grips on each wheel, so arranged that the heavier the load on the cable the tighter will be the grip.

IN regard to a Milwaukee dispatch concerning purchase by Westinghouse Electric and Baldwin Locomotive Works of the Gibbs Electric Company of Milwaukee, the following is authoritive: "The Baldwin-Westinghouse people engaged Geo. Gibbs of the Gibbs Electric Company as chief engineer, and to avoid complications of patents the Westinghouse has purchased outright the entire stock of the Gibbs Company. This is not of any plan such as suggested in the dispatch of absorbing all independent manufacturers of dynamos and motors."

Recent California Mining Incorporations.

Surprise M. Co., San Francisco; E. L. Geist, J. Band, J. A. Fisher; capital stock, $1,000,000; subscribed $60,000.

Revenue G. M. Co., San Francisco; E. C. Harlow, A. A. Dudley, G. Stone, G. H. Pippy, M. F. Loewenstein; capital stock, $100,000; subscribed $500.

California Reduction Works, San Francisco; F. M. Graham, F. E. Kingsbury, C. E. Hailstone, F. E. Titus, F. S. Oliver; capital stock, $2,000,000; subscribed $1,000,000.

Glenn Con. M. Co., Forest Hill; F. G. Hoffman, G. R. Cowan, D. A. McDonald, J. A. Shields, P. G. Halligan; capital stock, $75,000; subscribed $35.

Recently Declared Mining Dividends.

Le Roi, B. C., $50,000; September 7th.

Calumet and Hecla, Michigan, $10 per share; payable October 1st.

The Dominion Developing and Mining Company, Vancouver, B. C., $1.75 per share; September 1st.

Cariboo Mining, Milling and Smelting Company, B. C.; 2 cents per share, $16,000; September 6—the sixteenth dividend—a total of $173,000.

Coast Industrial Notes.

—The first train over the S. J. & S. F. road reached Visalia, Cal., last Thursday.

—The Southern Pacific announces an increase of 20 per cent in freight rates on wheat, barley and canned goods shipped from California over the lines to New Orleans and New York.

—The shingle output of Washington for '97 will be 15,000 carloads at an average price of $3,000,000. Mills are all busy, and from sixty to seventy-five carloads of shingles are shipped East daily.

—The Yuba Electric Light, Power and Irrigation Company has incorporated in Sacramento, Cal.; capital stock $160,000, all subscribed; J. Markley, Geyserville, W. Longbottom, H. W. Johnson, F. D. Ryan, W. W. Bassett of Sacramento.

—The British steamship Glenlochy is at Portland, Oregon, to load lumber for the Manchurian Railway, Vladivostock, Siberia. She is the largest steamer that ever came to this coast for lumber, having a gross tonnage of 4656 tons and is expected to carry 3,250,000 feet.

—John Martin of the Stanley Electric Company says that work on an electric plant in the foothills twenty miles from Marysville, to supply light and power for Yuba and surrounding counties, would begin immediately, and that the plant would be in operation by April, '98.

—Men are scarce and wages are advancing at Cosmopolis, Wash., says a Tacoma *Ledger* correspondent. Two dollars a day is being paid for swampers. Cedar and spruce logs are strong at $5, with occasional reports of better prices being paid. Fir is still slow at $3.50, and a $4 deal is not looked for for some months yet.

—The controversy for supremacy in San Francisco between the Electric Light & Power Company and the Mutual Electric Company has reached the Supreme Court. The Mutual Company petitioned for a writ of injunction to restrain the Superintendent of Streets from interfering with it in erecting poles on Market street, in this city, and the lower Court denied the petition. The Supreme Court upholds the order of the lower Court, but says: "The contradicted affidavits show plainly that it is a deliberate attempt to drive one corporation out of the field in the interest of another by the oppressive and unlawful use of official power."

—Under separate agreements entered into with the two railway systems of Mexico, the Mexican National Railway Company and the Mexican Central Railway Company, the telegraph lines of these companies have passed under the control of the Postal Telegraph Company. Heretofore telegraphing to the Mexican capital has either been by cable via Galveston and Vera Cruz, or by the American land lines to the Mexican border, and thence by the lines of the railway companies from Laredo or El Paso to the City of Mexico. The contracts now entered into give the Postal Company a continuous system from the United States to all the principal cities in the neighboring republic. To make this possible the Postal Company extended its lines south from Denver through Albuquerque to El Paso, to connect with the Mexican Central system, and it is now building from Little Rock to Laredo to connect with the Mexican National system. This extension will be completed on January 1, 1898.

HO! FOR ALASKA'S GOLD FIELDS!

Greatest gold fields on earth. We have just published a complete guide to Alaska fully describing all her rich gold fields, telling how to get there, cost of trip, routes, etc., also mining laws. Fully illustrated; only reliable book. Facts and views secured by special correspondents right on the ground. Post yourself by securing "inside" information ahead of the crowd. For the present we will send a book free to anyone sending us 25c postage for a 3 month's trial to our big illustrated weekly family paper. Clubs of 5 and 6 books, $1. Agents send 25c for sample. Mention THE PRESS. *Weekly Sentinel*, Denver, Colo.

Personal.

I. B. STORCH, M. E. has removed to 1605 Willow St. Alameda, Cal.,

HERBERT LANG'S present address is Catalina Hotel, Los Angeles, Cal.

O. A. PALMER is examining the Dexter properties at Tuscarora, Nev.

G. E. BAILEY, M. E., has returned from an examination of property in Trinity Co., Cal.

J. R. SHARP has been appointed superintendent of the Diamond Coal Co's. mines, Hahn's Fork, Wyoming.

J. F. MCDONELL has been elected secretary of the Virginia, Nev., Miners' Union at a salary of $4 per day.

PROF. N. S. SHALER, of Harvard University, is in Caribou, N. S., examining the low grade gold ore of that section.

E. F. CASSELL, auditor of the Nowell Gold Mining Company, of Alaska, is in San Francisco on a business trip.

F. S. NICHOLLS has been appointed superintendent of the Hall mines smelter at Nelson, B. C., to succeed Paul Johnson.

JNO. O. NORBOM has removed to Vancouver, B. C., where he will represent the British Columbia Iron Works Co.

FRED W. BRADLEY, general manager Bunker Hill mine, Wardner, Idaho, is in Washington district, Nevada county, Cal.

WILLIAM WRIXON of San Francisco is the new superintendent of the Queen of Sheba mine, near Rawhide, Tuolumne Co., Cal.

W. L. WATTS of the State Mining Bureau is at San Pedro, investigating the oil formation there. Some time ago a well was bored for oil, which is now about 850 feet deep.

BENJ. HALL of Grass Valley, Cal., one of the proprietors of the Pioneer Reduction Works, has received a patent for a reverberatory smelting and refining furnace, of which he is inventor.

M. R. MORRIS of San Francisco has arrived at Sylvanite, Montana, to build the new Gold Flint mill and install the machinery. The Gold Flint will have seventy-five men employed next week.

PROF. J. A. HOLMES, an expert geologist sent out by the United States Geological Survey to investigate the mica deposits of the country, is at Spokane, Wash., and will examine Idaho and Washington mica beds.

F. G. WENTE, an engineer in the service of the Amsterdam firm of Werf, Conrad & Co., is here en route to Holland after two years on the Amoor river, where he has been dredging the Amoor for gold at a salary paid by the Russian Government. He says it is a very rich river. There is no recording of claims there; no individual miner can come and set up his stakes and then begin to dig. If he did he would soon find himself on the convict island of Saghalien. All miners who wash the auriferous gravel are there for the Czar of all the Russias, and what gold they discover goes to his mints to be stamped with his inscription. The mines, no matter if worked by a large company or an individual miner, are all under Government control, and all who have obtained permission to dig—it being necessary to do so before starting—must forward all their findings to the authorities, from whom they receive a percentage. Mr. Wente left Xabaroffsky in June and journeyed to the coast in sleds, wagons, and on snowshoes. He left Vladivostock July 10th for Yokohama.

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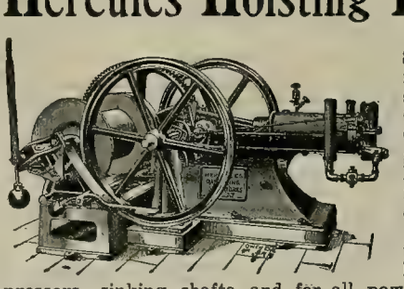

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We build engines from 2 to 200 h. p. for pumping, hoisting, running air compressors, sinking shafts and for all power purposes. Used in mines throughout the coast.

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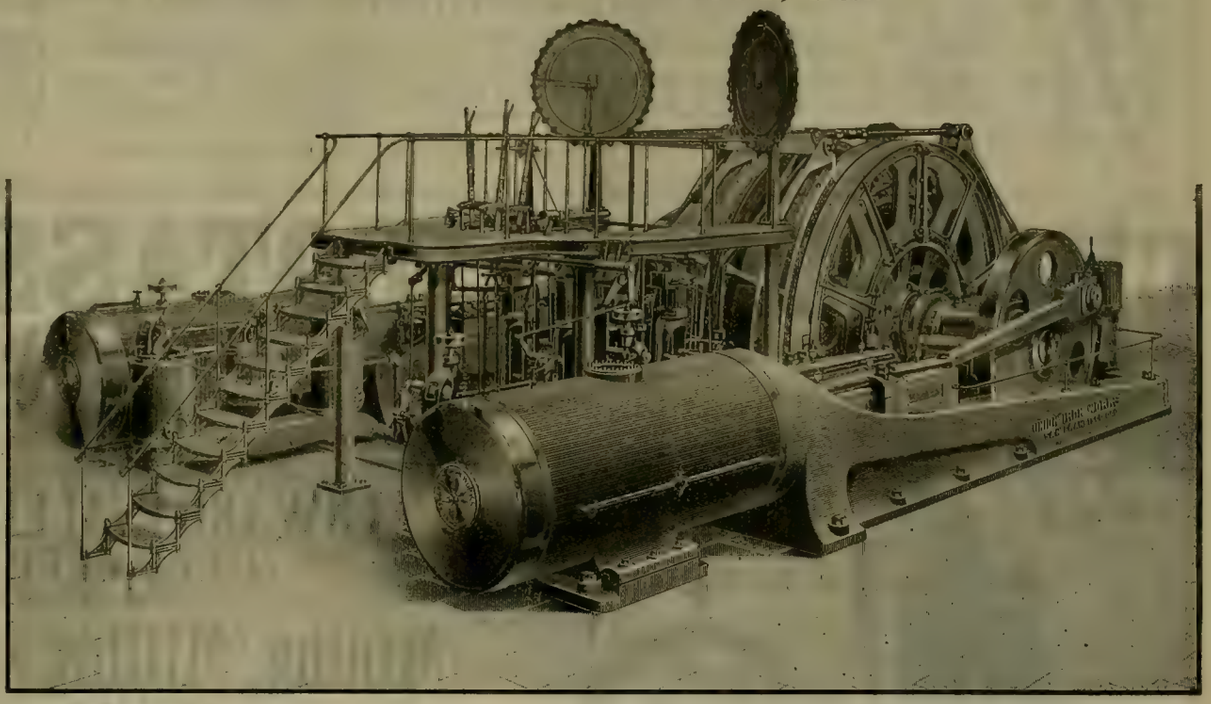

The brakes, clutches and reversing gear are arranged to be operated by compressed air or steam, by means of auxiliary cylinders which are under full control of the engineer, stationed upon the elevated platform shown, insuring the most rapid work with absolute safety. Shaft hollow forged steel of ample strength and stiffness to withstand any strains; reciprocating parts of steel and are as light as consistent with the duty required; cylinders of the "overhung" type, weight being taken by a guide saddle, which admits of free longitudinal movement, due to expansion, causing no strain on bed plate or foundations; cylinders steam-jacketed, fitted with valves provided with Corliss releasing gear and hand cut-off, enabling the engines to be run economically with reference to the work to be performed; bed plates modification of the Porter Allen type, heavy and substantial, with large foundation base and anchor bolts. A duplicate of this engine has also been furnished the Homestake Mining Company of Dakota.

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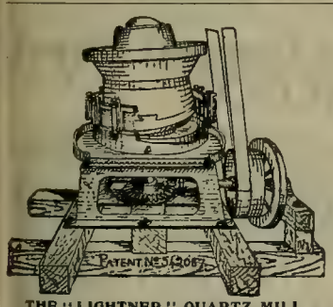

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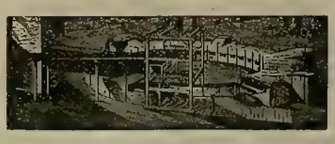

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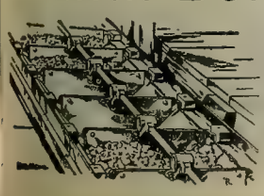

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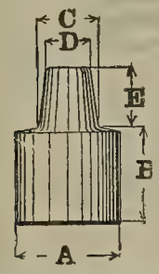

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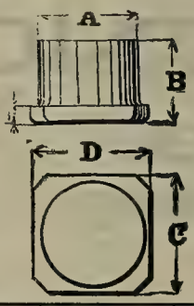

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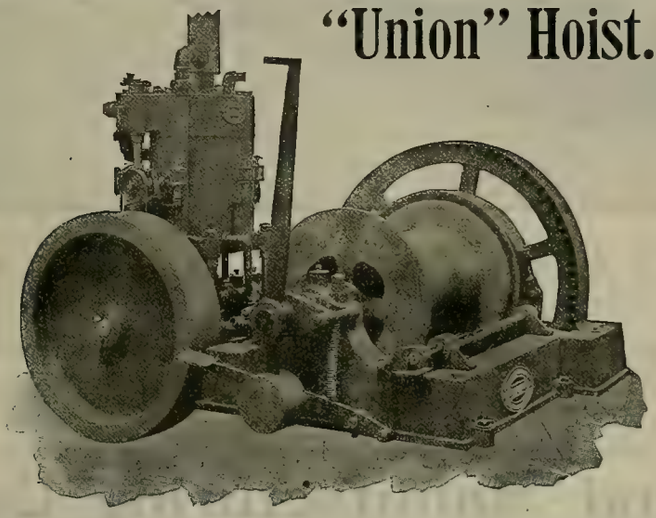

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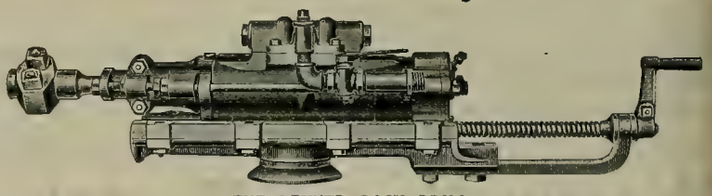

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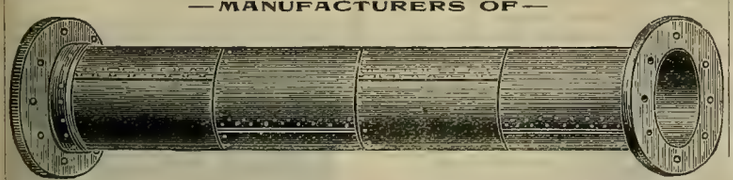

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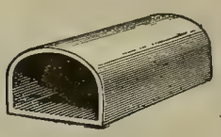

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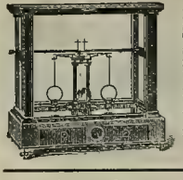
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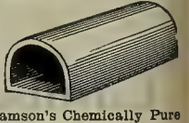
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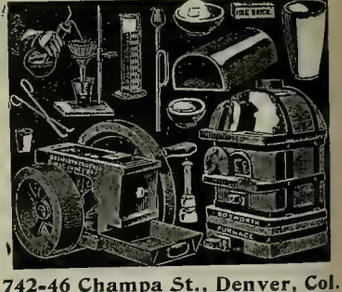
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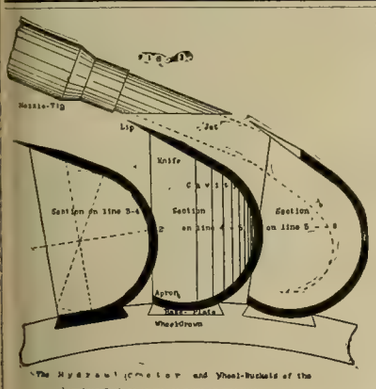

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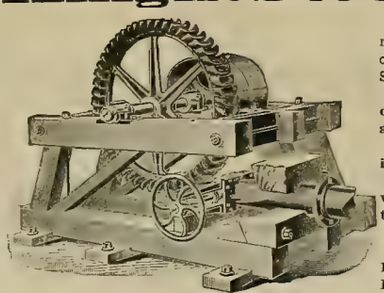

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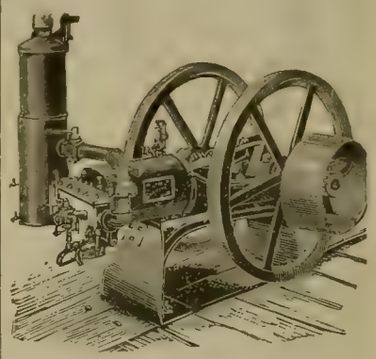

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING AUGUST 31, 1897.

588,946.—STEERING GEAR—C. E. Bergman, Everett, Wash.
589,372.—DUPLICATING PAD—H. P. Brown, S. F.
588,051.—RAILWAY SWITCH—R. Cady, Los Angeles, Cal.
589,080.—SAFETY RAZOR—W. Greenfield, S. F.
589,210.—SMELTING FURNACE—B. Hall, Nevada City, Cal.
589,258.—TOBACCO PIPE—W. S. Hannaford, Pasadena, Cal.
589,350.—WATER WHEEL—L. J. Holzhauser, Etna Mills, Cal.
589,391.—CUP AND CAN—C. P. Kertell, San Mateo, Cal.
589,181.—HORSE CHECK—F. X. Lussier, San Jose, Cal.
589,133.—BALLAST LOG—S. Menzies, S. F.
589,186.—OPERATING STORAGE BATTERIES, ETC.—Meredith & Hunt, S. F.
589,091.—EVAPORATOR—H. A. Merriam, S. F
589,019.—SHIELD FOR TIRES—M. O'Brien, Fresno, Cal.
589,023.—CLOTHES LINE SUPPORT—T. T. Parker, Wheatland, Or.
589,027.—CAR COUPLING—W. B. Rice, Modesto, Cal.
589,224.—ROPE GRIP—J. Samuelson, S. F.
589,226.—CAN CASING MACHINE—J. P. Simmons, S. F.
589,316.—BEDSTEAD—A. E. Strang, Salem, Or.
589,319.—WASHING MACHINE—I. N. Turnbaugh, Panaca, Nev
589,378.—GOVERNOR—S. J. Tutthill, Oakland, Cal.
27,593.—DESIGN FOR DISH—C. J. King, S. F.
27,609.—DESIGN FOR LOCK CASING—W. D. Roberts, Centralia, Wash.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong&Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CAN CASING MACHINE.—John P. Simmons, San Francisco, Cal., assignor to L. C. Parke of same place. No. 589,226. Dated August 31, 1897. This invention relates to an apparatus which is essentially designed for casing cans after the latter have been filled and labeled ready for the market. It consists essentially of a series of tables, a chute arranged with relation thereto, mechanism by which the table and chute are brought into line so as to allow the cans to pass by gravitation from the chute to the tables until the latter are successively filled, and a means for delivering the contents of the tables simultaneously into the case.

DUPLICATE PAD OR SHEET.—Horace P. Brown, San Francisco, Cal. No. 589,372. Dated August 31, 1897. This invention relates to an improvement in a duplication or manifolding of marks or entries upon separate sheets, such as shipping receipts, cash memoranda, pads and sheets generally where any repetition of the mark or entry is required. It consists essentially of the application by printing or other means to one surface of a sheet of a non-drying transparent ink or other suitable material, which serves to duplicate upon a following sheet any entry or mark made upon the face of the first-named sheet or sheets anterior thereto. In conjunction with this is shown an impenetrable flap or surface loosely hinged to the front end of the book adaped to be folded between the series of sheets to prevent a transfer beyond the particular series required.

GOVERNOR.—S. J. Tutthill, Oakland, Cal., assignor to the Tutthill Water Wheel Co. of San Francisco. No. 589,378. Dated August 31, 1897. This invention relates to a governor which is especially applicable for the controlling of momentum of high speed water wheels. It consists in a means for increasing or decreasing the amount of water discharged upon the wheel, a cylinder with a reciprocating piston and intermediate mechanism through which the movement of the piston actuates the water supply device, a divided pipe, one branch of which connects with the bottom of the cylinder, and the other branch forms communication between the bottom and the top, a water-containing tank with a pump by which circulation therethrough is maintained, and valve mechanism in a branch of said circulating pipe to increase or decrease the area of the discharge passage whereby the reduction of said passage forces a portion of the water into the cylinder to actuate the wheel-containing mechanism, and a governor driven from the wheel shaft and connecting with the valve in the circulating pipe to increase or decrease the flow therein in unison with the varying movements of the wheel.

ROPE GRIP AND TAKE UP.—John Samuelson, San Francisco, Cal., assignor of one-half to Cornelius Kramer of same place. No. 589,224. Dated August 31, 1897. This invention relates to a device which I call a rope grip and take up. The object is to provide a means which can be readily attached to a rope whereby any slack of the rope may be instantly taken up and the rope firmly gripped in the device and held in position. It is especially applicable for setting up rigging on ships or for the handling of running rigging and ropes where they are to be drawn in or shortened and for otherwise operating the grip and hauling the rope in any desired direction. It consists of a base plate having converging guides and slots, also converging gripping jaws slidable between the guides having channels made in their meeting faces with corrugations adapted to grip and hold the rope pins passing through the jaws an through the angular slots, links connecting with said pins at one end and with another pin at the opposite end, said pin being movable in the central longitudinal slot and a locking nut by which the parts are secured at any desired point.

REVERBERATORY SMELTING AND REFINING APPARATUS.—Benjamin Hall, Nevada City, Cal. No. 589,210. Dated August 31, 1897. This invention relates to improvements in reverberatory smelting and refining furnaces which are especially useful in the treatment of pyritic ores. It consists in the combination with a horizontal reverberatory furnace of a mechanism for regularly feeding the ore to one end, a discharge pipe at the opposite end, a blast pipe or pipes delivering air into the feed end of the furnace along the line of travel of the ore, a supplemental furnace chamber in line beyond the discharge adapted to receive the overflow of slag and matte whereby the level of the matte is approximately maintained, a chimney or stack at the outer end of the second chamber through which the products of combustion escape after acting upon the matte and the slag, and a final discharge passage for the slag at the end of the chamber.

CARTRIDGE.—Martin P. Boas, San Francisco, Cal. No. 588,764. Dated August 24, 1897. This invention relates to the construc- of cartridges for firearms. It consists essentially of a plurality of unitedly seated independent projectiles, a shell having an explosive charge common to all of these projectiles, a means at the rear end of the shell for exploding the charge and a grooved seat plate in the forward end of the shell in which the projectiles are independently and unitedly seated, said seat plate having peripheral grooves in which the material of the shell is crimped. The explosion of the powder charge acts to propel all of the bullets simultaneously from the ground.

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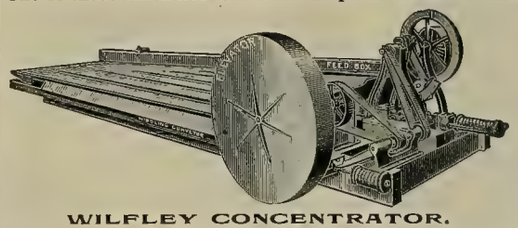

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White & Rogers, San Francisco, Cal.—GENTLEMEN: Answering yours of the 27th ult., *in re* Wilfley Concentrating Table in use at the above mine, I beg to state that we have run the pulp from fifteen of our 1000-lb. stamps, making ninety-eight 5-in. drops per minute and crushing to pass through a No 1 perforated tin screen, over one Wilfley Table for the thirty-one days ended August 31st. While the machine has been handicapped by a load far in excess of its rated capacity, said load amounting to about fifty-one tons daily, we are pleased to note that it has given us a sulphuret worth .344 per cent more than the joint product of five other machines of different types, operating under practically the same conditions. The concentrates from the Wilfley are entirely free from silica, while those from the other concentrators have carried an average of .082 per cent. We feel that further comment as to the merits of the Wilfley Table is quite unnecessary. Yours very truly,

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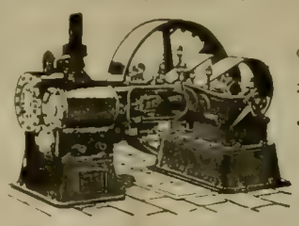

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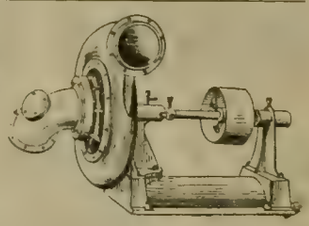

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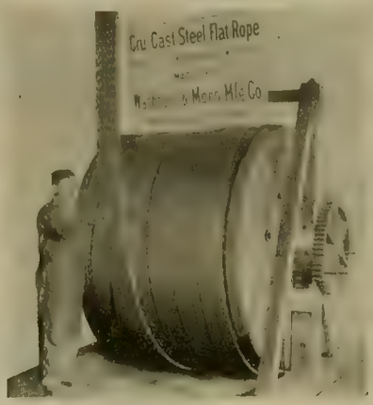

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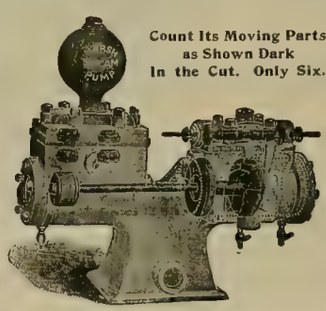

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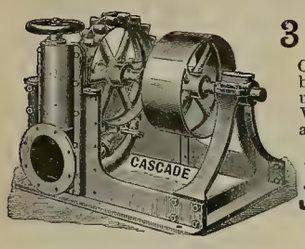

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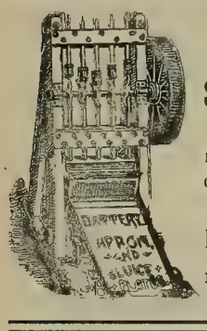

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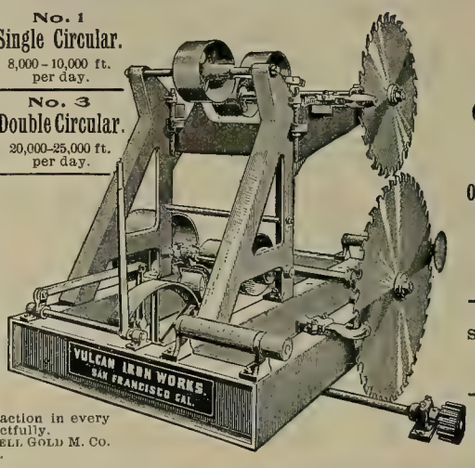

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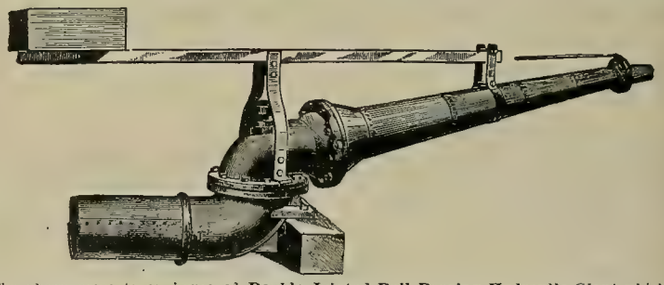

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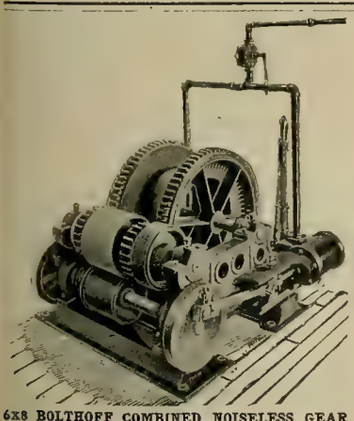

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Market Reports.

The Markets.

SAN FRANCISCO, Sept. 8, 1897.

General business continues to steadily enlarge, with a disposition manifested to carry more in stock. The strength of all lines of goods with a continued firming up is doing no little in creating a feeling of greater confidence. This feeling is made stronger by the high prices all kinds of farm and orchard products command, with a large demand ruling. The increased prices it is estimated will put into circulation several million dollars in excess of last year. Not only is the farming community reaping great benefits from higher prices for their produce, but gold mining is still forging ahead, with more money offering for investment. Well-known mining experts are kept busy reporting on claims. Manufacturers of mining machinery report that figuring on new work is larger, if anything, than at the corresponding time last year. It is stated that the outlook is quite promising for an increase in orders for farm implements the coming season, and also for structural material.

The local money market shows continued activity with a free call for funds for crop moving purposes. The higher cost of grain calls for larger sums when compared with former seasons, but this is freely met without creating friction. So far as we can learn there is no disposition to strengthen the rates of interest but rather to put out all the money possible on approved security. This disposition, no doubt, is actuated by a belief that there will be a large supply of idle funds this winter which may cause a further shading in the rates of interest, particularly if Eastern money markets do not appreciate, and it looks now as if they will rule low after crop moving. Our Eastern exchanges report a heavy movement in grain and other farm products which is causing a car famine.

New York Silver Prices.

NEW YORK, Sept. 9. — Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	24	52
Saturday	24⅛	53⅜
Monday	—	—
Tuesday	25	54¼
Wednesday	25	54
Thursday	—	—

	Copper.	Lead.	Iron.	Tin.
Fri.	11 10 @11 25	4 25	9 50@12 25	13 65
Sat.	11 10 @11 25	4 27½	9 50@12 25	13 60
Mon.	—— @——	——	——@——	——
Tue.	11 10 @11 25	4 30	9 50@12 25	13 60
Wed.	11 10 @11 25	4 30	9 50@12 25	13 60
Thur.	—— @——	——	——@——	——

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	2½@5c Prem
New York Telegraphic Transfer	5@7½c Prem
London Bankers' 60 days	$4.84
London Merchants	$4.83
London Sight Bankers	$4.86
Refined Silver, per oz., 1000 fine	54¼
Mexican Dollars, nominal at	42

SILVER.—Has advanced the past week. On Wednesday, Sept. 1st, it was 51¼ cents per ounce fine in New York, and yesterday (Tuesday) it was 54¼ cents. This is quite a recovery, yet better informed operators hold to the opinion that it will go to 50 cents or less before bottom figures have been touched and a recovery based on a substantial footing can be expected. The production has been greatly reduced, yet it is in excess of present requirements; yet, if there should be a speculative movement, higher prices could be easily brought about.

Pixley & Abell report shipments of silver from London to India, China and the Straits for the year to August 12th as follows, compared with the corresponding period of last year. In view of the recent extraordinary developments in silver, we take from the same circular the shipments for each of the last ten years. It will be noticed that China has greatly diminished its takings of silver this year, as also have the Straits settlements. The table is as follows:

Year.	India.	China.	Straits.	Total.
1887	£4,068,289	£293,266	£568,570	£4,930,125
1888	4,348,529	319,121	661,527	5,329,177
1889	5,834,334	355,874	1,681,114	7,871,332
1890	7,330,356	263,947	912,606	8,506,309
1891	4,462,754	241,985	2,209,966	6,914,705
1892	7,229,199	147,882	3,826,739	11,203,820
1893	7,052,271	2,390,969	1,612,513	11,055,753
1894	5,012,093	2,728,771	1,233,446	8,974,310
1895	3,624,496	1,652,523	753,883	6,030,902
1896	4,905,978	749,285	827,136	6,473,399
1897 to date—	3,468,420	146,492	179,855	3,794,767
Corresponding period last year—	2,400,278	574,413	546,686	3,520,377

MEXICAN DOLLARS.— The market is nominal, correct quotations being out of the question. There is a fair demand.

QUICKSILVER. — The market is unchanged.

Our market is quoted at $88 for domestic consumption.

COPPER.—Eastern advices state that the export demand has been quite heavy. The home demand is steadily improving. The market is firm to steady.

Our market is quoted as follows:

Ingot casting, jobbing	13@—
Ingot " wholesale	12½@—
Sheet copper	—@16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½

TIN.—The market is weak, with a light demand for both pig and plate.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

LEAD.—The market continues to hold to steady prices, in sympathy with the East, where strong and higher prices rule.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	5 00 @ 5 25
Sheet	6 25 @ 6 50
Pipe	5 50 @ 6 00

SHOT.—The market is firm.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 40
Drop, B and larger sizes, " "	1 65
Buck, Balls and Chilled, do, " "	1 65

POWDER.—The market is firm.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9c to 11c, according to strength and quantity.

COAL.—The market is practically without any change to note. The supply of both foreign and domestic is is ample for all nearby requirements.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$8 00@— —
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 50@ 6 00
Coos Bay	—@ 4 75
Cannel	8 00@— —
Egg, hard	12 00@13 00
Wallsend	6 50@— —

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	— —
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— — — —
English, to load	9 50 @ — —
" spot, in bulk	10 00 @ — —
" in sacks	11 00 @ 12 00
Cumberland	— — @ — —

IRON.—The market is steady to firm with continued large consumption. Australia has bought 2,000 tons at the East—the first purchase made in this country. The *Iron Age*, just to hand, says: The stimulus of growing confidence and an increased volume of business is spreading, and the iron industry is rapidly getting into better shape. Even foundry pig iron, which has been lagging behind conspicuously, is making a start in activity. Making due allowance for a number of influences eager to secure an upward movement, it is a fact that the market has hardened. It is true also, however, that a number of producers in the Eastern and Southern territory still claim to be unable to obtain higher prices. From Chicago comes the report that an agreement has been reached between the local and the Southern makers to advance prices and keep the market in good shape. A leading Southern company has announced its price for No. 2 foundry as $7, Birmingham. There are indications, too, that speculators in Wall street are taking some interest in pig iron, believing that there is money in this lagging metal.

AMERICAN.

	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

ANTIMONY.—The market is firm.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 7¾c for Cookson's, 7¼c for Hallett's and 7c for Japanese.

NAILS.—The market is firm.

Wire, carloads, basis per keg	....
" jobbing, " "	$2 35
Cut, carloads, " "	....
" jobbing, " "	2 25

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4½

PLATINUM.—The market is steady.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is firmer.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

Chemicals.

SULPHURIC ACID.—The demand is improving.

We quote in a jobbing way at 1¼c per lb for 66%.

ACETIC ACID.—The market is firm at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported steady from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is steady.

We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is firm.

Our market is quoted in a jobbing way at $1.40 a pound.

BONEASH.—The demand is fair.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is firm.

We quote in a jobbing way at 70 to 75 cents per pound.

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Alta S M Co, Nev	57	10c	Sept 3.	Oct 6. Oct 27	J E Jacobus, 309 Montgomery
Altoona Q M Co, Cal	1	75c	Aug 3	Sept 6. Oct 11	C Allenberg, 206 Sansome
Andes, S M Co, Nev	44	10c	Sept 1.	Oct 4. Oct 25	J W Twiggs, 309 Montgomery
Chollar M Co, Nev	44	25c	Sept 1.	Oct 7. Oct 28	C E Elliott, 309 Montgomery
Con Cal & Va M Co, Nev	9	25c	Aug 3.	Sept 8. Sept 29	A W Havens, 309 Montgomery
Crown Point G & S Co, Nev	71	10c	July 27.	Aug 31. Sept 21	Jas Newlands, Mills Building
Gold Ridge Con M & M Co, Cal.	5	4c	Aug 3.	Sept 18. Oct 9	H Sylvester, 43 Sixth
Hale & Norcross S M Co, Nev.	113	10c	Aug 18.	Sept 22. Oct 13	R U Collins, 331 Pine
Horseshoe M Co, Cal	3	40c	July 12	Aug 23. Sept 20	C E Green, 532 Market
Inyo Marble Co, Cal	30	10c	July 27.	Aug 28. Sept 20	M A Cahn, 323 Phelan Bldg, S F
Marguerite G M & M Co, Cal.	7	10c	July 28.	Sept 10. Oct 11	F Mettman, 237 Twelfth
Mexican G & S M Co, Nev	57	20c	July 28.	Sept 1. Sept 23	C E Elliot, 309 Montgomery
North San Juan G M Co, Cal.	3	7c	July 16.	Sept 8. Oct 4	H W Morris, 141 First St
Occidental Con M Co, Nev	28	10c	Aug 3.	Sept 7. Sept 30	A K Durbrow, 309 Montgomery
Osborn Hill G M & M Co, Cal.	6	35c	Aug 4.	Sept 6. Sept 27	R R Grayson, 331 Pine
Potosi M Co, Nev	48	25c	Sept 8.	Oct 12. Nov 4	C E Elliott, 309 Montgomery
Red Cap M Co, Cal	1	$9	Aug 25.	Oct 1. Oct 23	F deK Townsend, 125 Beale
Savage M Co, Nev	93	20c	Sept 2.	Oct 5. Oct 25	E B Holmes, 309 Montgomery
Sierra Nevada S M Co, Nev.	113	20c	Aug 18.	Sept 22. Oct 12	E L Parker, 309 Montgomery
Silver Hill M Co, Nev	35	5c	Sept 7.	Oct 12. Nov 5	D C Bates, 309 Montgomery

SODA ASH, 58% (LeBlanc process).—The market is firm at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is steady at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—There is a fair demand at 2½c a pound from stores.

NITRATE OF SODA.—The market is steady.

Mining Share Market.

SAN FRANCISCO, Sept. 8, 1897.

Occidental advanced the past week to $2.75 a share, causing a sympathetic movement in Savage and Gould & Curry based on an improvement in the latter on the Brunswick lode. Savage moved from about 25 cents to 76 cents. The strengthening in Gould & Curry and Savage caused a better tone with the others which resulted in quite a sharp advance on Friday and Saturday, with honors outside of Con. Virginia being about evenly devided. Monday being a holiday there was no board, but Tuesday the market was fairly steady at the morning session until Occidental was called and when it sold at $2 against $2.70 on Saturday there was a weaker feeling which became more pronounced at the afternoon session. If the statement is correct that the ore vein on the 650-foot level has been crosscutted and found to be over 30 feet wide giving an average assay value of $20 a ton in gold, then Occidental shares as a gamble lose their attractiveness. This will be particularly the case if another report is true that the Occidental mill is to be put in order for crushing ore. When they began taking out ore on Chollar the shares went down, and this has been the case with the shares of every mine from which ore was extracted and milled. It is the uncertainty and not the certainty that makes the gamble. What the strength in Yellow Jacket and several other shares on the Comstock lode is based on is hard to say, unless it is in sympathy with the others, for it is safe to affirm that no work will be pushed ahead now that is calculated to strike a body of ore of any importance. It is stated that in Justice a donkey engine is to be used to facilitate work, and if the expected showing justifies the company will start work in the old Woodville shaft, owned by it, to make thorough and systematic exploration of the mine.

From the Comstock mines the news is of about the same tenor as has been reported for several weeks past. The work in several is of an important character provided it is not stopped or its course turned, as has been done on more than one occasion before. Some of the work indicates blocking out but for what purpose it is hard to say unless for more economical and expeditious working later on —probably at sometime within the next two or three years. It is a well known fact that in two of the mines considerable ground was blocked out several years ago which will act an important part when the time comes, if ever it does in the lifetime of the reported controllers, John W. Mackay, D. O. Mills, J. L. Flood, Colonel Hayward and others. No official information has come to hand regarding the crossdrift started in Utah. In Sierra Nevada they are exploiting on both the Layton tunnel level and the 900-foot level. On the former the prospects are quite favorable but it would be more so if the work was towards the west. There is no change in the work in Union, it is still south on the 900-foot level. On the 1000-foot level of Mexican there has been no change the past week worthy of attention. The south drift on the central tunnel of Ophir is being pushed slowly ahead. Work is continued west on the 1000-foot level. At last advices the crossdrift was in over 400 feet with no material change to note. In Con. Virginia they have commenced operations on the 1750-foot level. At present they are working to connect with the 1650-foot level. It would be singular if enough ore should be struck on this level, which when followed down, would justify pumping out the water on the lower levels. The work on the 1650-foot and 1550-foot level is about the same as heretofore reported by us. There have been sent to the Selby Smelting & Lead Works 332½ tons of concentrates for reduction. If work is continued by Best & Belcher and Gould & Curry in their joint east crossdrift they will get to the Brunswick lode. They are now in about 610 feet. In Savage the work is on the same level heretofore reported. No work is being doing in either Hale & Norcross or Chollar. Hale & Norcross is controlled down here by the Fox combination and at Virginia City by the Grayson-Hayward combine, making it a cat and dog fight which shareholders will eventually have to pay for. In Potosi the work as outlined is quite important provided it is done for the interest of outside shareholders. The work indicates that the 450-foot and 1100-foot levels are to be exploited. It is singular that no news is published from Bullion. It looks as if there is something more than they want the public to know. The promised stoping of ore in Alpha is forgotten but instead the public is treated to old stereotyped reports.

Reports are current that important work is to be started in Andes, but official letters do not indicate it. The news from Con. Imperial, Challenge and Confidence is about the same as published last week. From Yellow Jacket nothing has come to hand to indicate what they want assessment money for. There is nothing new from Kentuck, Crown Point, Belcher, Seg. Belcher or Overman.

On the Brunswick lode there are three points of interest, viz., the work in Occidental, Savage and Best & Belcher. That in Occidental is given in the introduction. In Savage the formation is more favorable for a body of good ore than has yet been found on that lode. As it is towards Gould & Curry it makes the latter strong. The joint work of Con. Virginia, Best & Belcher and Gould & Curry is confined to the 300-foot and 600-foot levels. They are working on the 400-foot, 500-foot and 600-foot levels in Chollar. On the latter level they will be soon out far enough to start a crossdrift. Only 84 tons of ore were

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extracted the past week. It assays about the same as that given in last week's review.

The market was weak this morning until Sierra Nevada was called, which advanced, causing a better feeling. After call it advanced to $1.15, but closed at noon at $1.05. It is stated that there is an improvement in the mine. The entire list strengthened up and it looks as if they may do slightly better.

The following illustrates the changes of the week:

MINES.	Sept. 2.	Sept. 8.
Alpha	$ 20	$ 25
Alta Consolidated	11	17
Andes	18	25
Belcher	38	50
Best & Belcher	80	93
Bodie		
Bullion	10	15
Challenge	44	50
Chollar	72	84
Confidence		1 25
Consolidated California and Virginia	1 35	1 85
Consolidated New York		
Crown Point	32	43
Exchequer	06	07
Gould & Curry	54	82
Hale & Norcross	1 05	
Justice	11	
Mexican	52	73
Ophir	73	1 30
Overman	13	18
Potosi	38	53
Savage	39	73
Sierra Nevada	67	1 35
Union	41	70
Utah	25	33
Yellow Jacket	34	54

San Francisco Stock Board Sales.

SAN FRANCISCO, Sept 8, 1897.

9:30 A. M. SESSION.

300	Alpha	25	50	Occidental	2 10
80	Alta	17	50	Ophir	1 10
950	Belcher	45	500	Overman	16
850	Best & Belcher	87	300	Potosi	45
400	Caledonia	38	850	Savage	64
250	Con Cal & Va	1 75	300	Seg Belcher	13
100	Confidence	1 25	1650	Sierra Nevada	82
100	Crown Point	38	300	Silver Hill	04
300	Exchequer	07	400	Union	55
700	Gould & Curry	69	350	Utah	25
1300	Julia	05	800	Yellow Jacket	47
300	Mexican	60			

SECOND SESSION—2:30 P. M.

1100	Ophir	1 30	1400	Utah	33
1300	Mexican	73	600	Bullion	15
1000	Gould & Curry	82	300	Exchequer	07
400	Best & Belcher	93	100	Overman	18
200	Con Cal & Va	1 85	400	Union	70
600	Savage	73	500	Alta	15
900	Chollar	84	400	Julia	05
800	Potosi	53	100	Caledonia	40
100	Crown Point	43	700	Silver Hill	04
800	Yellow Jacket	54	150	Challenge	50
500	Kentuck	08	175	Occidental	2 05
200	Alpha	26	1050	Andes	25
200	Belcher	50	500	Scorpion	08
600	Sierra Nevada	1 35	300	N G & C	22

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from N. B. Willits, et als., in the Willow Placer Extension, near Howard's Station, Sierra Co., to deposit tailings in Little Deer creek; from G. A. Rosenthal, et als., in the California Mine, near Sierra City, Sierra Co., to deposit tailings in east fork of North Fork of Yuba river; from Jacob Yager, in the Schneider Diggings, near Spanish Ranch, Plumas Co., to deposit tailings in Spanish creek; and from Henry A. Halsted, in the Halsted placer mine, near Spanish Ranch, Plumas Co., to deposit tailings in a ravine, gives notice that a meeting will be held at room 59, Flood building, San Francisco, Cal., on September 27, 1897, at 1:30 P. M.

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Table of Contents:—Perface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of cupellation; Weighing of Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests of Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 126 12-mo pages, with illustrations, well bound in cloth; 1896. Price **$1.00** postpaid. Sold by the **Mining and Scientific Press**, 330 Market St., San Francisco.

Assessment Notices.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 3rd day of August, 1897, an assessment (No. 5) of 4 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of September, 1897, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 9th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 25th day of August, 1897, an assessment (No. 1) of Nine Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, No. 125 Beale street, City and County of San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of October, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 23d day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

E. deK. TOWNSEND, Secretary.

Office—125 Beale street, City and County of San Francisco, California.

SAVAGE MINING COMPANY.—LOCATION OF principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Trustees, held on the 2nd day of September, 1897, an assessment (No. 93), of 20 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, No. 309 Montgomery street, Room 50, Nevada Block, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 5th day of October, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

E. B. HOLMES, Secretary.

Office—No. 309 Montgomery street, Room 50, Nevada Block, San Francisco, California.

ANDES SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia City, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of September, 1897, an assessment (No. 44) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, rooms 20-22 Nevada block, 309 Montgomery street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 4th day of October, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of October, 1897, at 1 o'clock P. M., to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

JOHN W. TWIGGS, Secretary.

Office—Rooms 20-22, Nevada block, 309 Montgomery street, San Francisco, California.

ALTA SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Gold Hill, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 3d day of September, 1897, an assessment (No. 57) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to Secretary, at the office of the company, room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of October, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 27th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. E. JACOBUS, Secretary.

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DELINQUENT SALE NOTICE.

OSBORN HILL GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Grass Valley, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 6) levied on the 4th day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name	No. Cert	No. Shares.	Amt.
Albert Allan	71	150	52 50
John deWitt Allen	245	500	175 00
Bessie Baird Archibald	252	100	35 00
William Bowers	219	10	3 50
C. H. Crocker, Trustee	243	1,000	350 00
C. H. Crocker, Trustee	244	700	245 00
C. H. Crocker, Trustee	254	1,300	455 00
C. H. Crocker, Trustee	255	1,000	350 00
Thomas Cole	226	50	17 50
V. C. Driffield	47	500	175 00
W. B. Fegley	168	200	70 00
Sam'l Goldstone	4	100	35 00
Sam'l Goldstone	250	50	17 50
Sam'l Granger	24	250	87 50
William George	33	100	35 00
J. J. Garvin	176	25	8 75
R. R. Grayson, Trustee	60	5,000	1,750 00
R. R. Grayson, Trustee	69	500	175 00
R. R. Grayson, Trustee	77	1,000	350 00
R. R. Grayson, Trustee	90	100	35 00
R. R. Grayson, Trustee	102	50	17 50
R. R. Grayson, Trustee	107	10,000	3,500 00
R. R. Grayson, Trustee	108	10,000	3,500 00
R. R. Grayson, Trustee	109	5 000	1,750 00
R. R. Grayson, Trustee	112	1,000	350 00
R. R. Grayson, Trustee	127	100	35 00
R. R. Grayson, Trustee	128	100	35 00
R. R. Grayson, Trustee	129	100	35 00
R. R. Grayson, Trustee	130	100	35 00
R. R. Grayson, Trustee	131	50	17 50
R. R. Grayson, Trustee	132	50	17 50
R. R. Grayson, Trustee	139	200	70 00
R. R. Grayson, Trustee	140	300	105 00
R. R. Grayson, Trustee	145	500	175 00
R. R. Grayson, Trustee	146	500	175 00
R. R. Grayson, Trustee	147	500	175 00
R. R. Grayson, Trustee	148	500	175 00
R. R. Grayson, Trustee	149	500	175 00
R. R. Grayson, Trustee	217	5,000	1,750 00
R. R. Grayson, Trustee	247	50	17 50
R. R. Grayson, Trustee	248	50	17 50
R. R. Grayson, Trustee	258	2,500	875 00
R. R. Grayson, Trustee	260	500	175 00
I. Haas	23	200	70 00
John Hosking	35	100	35 00
James Hosking	38	100	35 00
K. P. Society	180	20	7 00
A. Lucas	50	33	11 55
Mitchell & Bro	34	100	35 00
Mitchell & Bro	216	100	35 00
D. B. Marwick	46	50	17 50
D. B. Marwick	141	50	17 50
D. M. Murphy	263	2,000	700 00
Wm. McAdams	170	100	35 00
J. C. Morris	178	45	15 75
Richard Noell	31	100	35 00
Wm. S. Pugh	173	100	35 00
M. P. Quinn	169	200	70 00
W. C. Ralston	205	7	2 45
W. C. Ralston	261	500	175 00
W. B. Sharp	259	500	175 00
W. B. Sharp, Trustee	196	500	175 00
H. Silvester	42	100	35 00
S. Solomon	48	500	175 00
J. M. Thomas	36	200	70 00
F. J. Thomas	30	100	35 00
F. J. Thomas	232	100	35 00
Robert J. Tyson	204	100	35 00
Col. Wm. Thompson	167	250	87 50
Mrs. L. C. Thompson	253	25	8 75
Jos. Weisbein	25	250	87 50
Thomas H. Wilhelm	28	100	35 00
T. M. Womelsdorf	172	100	35 00
J. Haydon Womelsdorf	175	50	17 50
H. P. Womelsdorf	174	135	47 25
Lee Womeldorf	177	50	17 50

And in accordance with law, and an order from the Board of Directors, made on the 4th day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Room 11, No. 331 Pine St., San Francisco, California, on MONDAY, the 27th day of September, 1897, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

R. R. GRAYSON, Secretary.

Office—Room 11, No. 331 Pine street, San Francisco, California.

DELINQUENT SALE NOTICE.

INYO MARBLE COMPANY OF CALIFORNIA.—Location of principal place of business, San Francisco, California; location of works, Inyo County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 30) levied on the 27th day of July, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
Percy Beamish, Trustee	546	500	50 00
Percy Beamish, Trustee	547	225	22 50
Voss, Conrad & Co	545	301	30 10

And in accordance with law, and an order from the Board of Directors, made on the 27th day of July, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at their office, Room 323, Phelan building, San Francisco, California, on MONDAY, the 20th day of September, 1897, at the hour of 3 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

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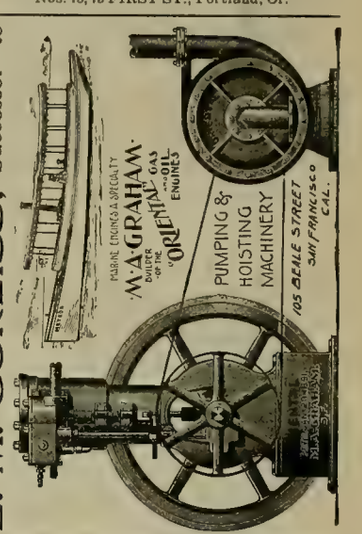

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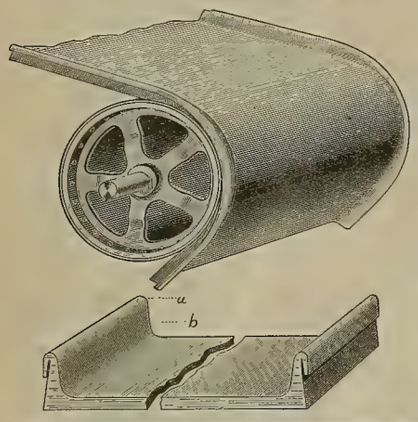

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SUTTER CREEK, AMADOR CO., CAL., Feb 22, 1897.

MR. JAS. S. BROWNELL, 132 Market St., San Francisco, Cal.—DEAR SIR: Replying to your favor of the 18th inst., will say that in the two mills operated by this company we have nineteen of your Patent Lip flange concentrator belts in use; some of them have been in constant use for the past two years and have given entire satisfaction. I know of no better flange for a side shake machine.

Yours truly, JOHN ROSS JR., Superintendent.

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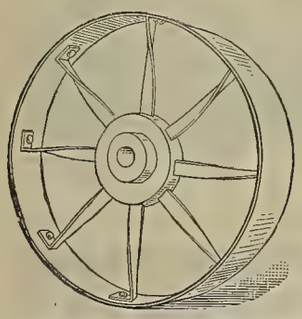

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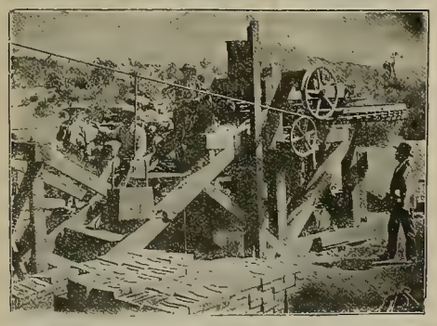

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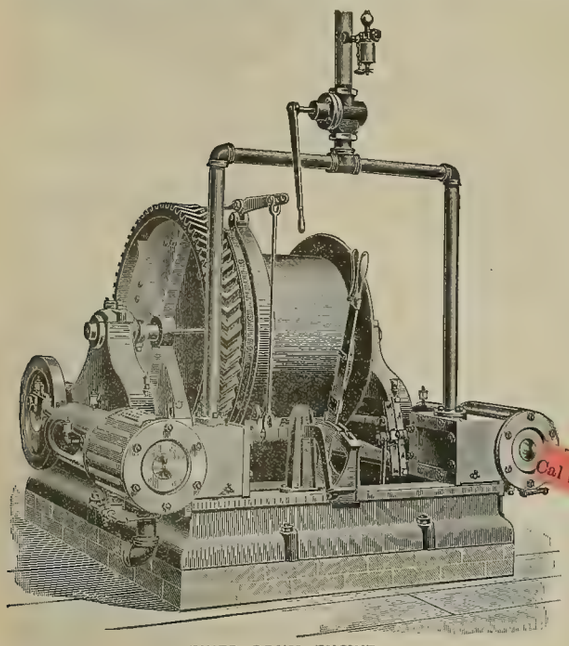

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MINING AND SCIENTIFIC PRESS.
AND PACIFIC ELECTRICAL REVIEW.

No. 1941.— VOLUME LXXV. Number 12. SAN FRANCISCO, SATURDAY, SEPTEMBER 18, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

THE HIGH ORE AND GREEN MOUNTAIN HOISTS.

THE BLUEBIRD 150-TON MILL, SHUT DOWN SINCE SILVER DECLINED.

THE MOUNTAIN CON. HOIST.

OLD ALICE HOIST AND MILL.

NEW ALICE MILL.

Some Montana Silver Mines.

On this page are portrayed some Montana mining properties that are having a hard struggle for existence in these dark days of silver. The Bluebird mill has been shut down, awaiting an advance. It was bought for $100,000, and developed into a property for which $2,000,000 was refused. The Alice mine at Walkerville has sufficient "by-product" in the shape of gold to enable it to continue, though it passed its August dividend. It employs 150 men and the output of the mine and mill is paying expenses. With advance in silver quotations the payment of dividends will be resumed. A great many improvements have been made. At the Valdemere the shaft has been timbered 120 feet, preparatory to sinking 300 feet deeper, but, with silver at present quotations, mine work is limited to what is barely necessary to keep it in good condition. The Alice was the mine which first proved the permanence of Butte's mines when water level was reached in 1879. Marcus Daly was its first superintendent. It has been worked for over twenty years, has about twenty miles of shafts, drifts, levels, winzes, etc., and has paid nearly $1,000,000 in dividends. The Moulton, illustrated on page 265, is a silver property, owned by W. A. Clark. It adjoins the Alice and has been a large dividend payer in the past. But 1893 hushed its stamps and silenced its drills, so that but little active mining has been done since. The High Ore and Green Mountain mines are part of the Chambers Syndicate group. They now belong to the Anaconda Company. The High Ore will be remembered by old Montanans as the Bell. The Mountain Con., one of the group of copper properties forming the Chambers Syndicate, is now also the property of the Anaconda Company. The cuts herewith are furnished through the courtesy of Mr. Guy X. Piatt of Butte.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

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J. F. HALLORAN.....General Manager

TO THE PUBLIC.

No one is authorized to solicit business for this paper unless in possession of proper credentials and regularly numbered and stamped blank subscription receipts.

San Francisco, September 18, 1897.

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A Just Decision.

The most important mining matter that has transpired during the week, so far as California is concerned, is the decision of Secretary of the Interior Bliss, who has ruled regarding mineral lands and railroad grants. The ready compliance of Mr. Lamoreaux, of unhappy memory, who seemed to anticipate the desires of the corporations in subservience to their wishes, is in unsavory contrast to the rigid justice of the present Commissioner of the General Land Office and his superior, the Secretary of the Interior. These men are evidently determined to do right unawed or unbribed.

The case on which the decision of the Secretary was made was that of a marble company against the Northern Pacific Railroad Company and the State of Washington, involving the title to mineral lands in the State of Washington; the question being whether marble was a mineral, and also the more important one, what the terms of grants were to the railroad company and the State. The Secretary decided that marble is a mineral within the meaning of mining laws and therefore not subject to the selection of patent by a railroad company, which was almost obvious. The important part of this decision was that this rule applies to all substances known as mineral by recognized authorities.

The far-reaching effect of this decision is of course manifest. It will confine the future patenting of lands to railroad companies to lands more valuable for agricultural than mineral purposes. It is a pity that before the recent wholesale absorption of California mineral lands by corporations, some uninfluenced and honest officials like Commissioner Herman and Secretary Bliss were not in a position to officially prevent such absorption.

Secretary Bliss' decision this week is a tremendous rebuke to the unfaithful men who took advantage, under a previous Administration, of their official position. In the two years from June 30th, 1894, to June 30th, 1896, Mr. Lamoreaux permitted railroad corporations in this State to patent 3,226,269 acres of the public domain, of which probably one-fourth was more valuable for mineral than for agricultural purposes.

This ruling is of considerable importance to all parts of California, and followed up will enable those interested in the southern part of the State to secure the return to the public domain of several large tracts of oil and asphalt lands. It will also tend to prevent in the northern part of the State the further corporate absorption of mineral lands.

Is Not Retroactive.

During the week Secretary of the Interior Bliss has made final decision in the case of W. H. Goudy vs. The Kismet Mining Company, Cripple Creek, Colorado, which is of considerable importance. The case involved the publication of applications for patent. A great number of such applications had been published in a Cripple Creek paper. Secretary of the Interior Smith decided about a year ago that certain governmental requirements had not been complied with and that all the applications in question would have to be readvertised, which of course would occasion great expense, delay and the possibility of adverse litigation. Technically, it appears that Secretary Smith was correct, as certain exact requirements were not observed in the publication of the applications in question. Upon examination it was evident that not only in the Cripple Creek cases, but in a great number of other cases all over the country, the same omissions had been made, so that had Secretary Smith's decision been carried into effect it would have compelled readvertising of probably 75 per cent of all the mining claims in the United States, for which application of patent had been made, but for which patent had not been issued.

There were four separate hearings given this case, and the decision this week by Secretary Bliss reversed Secretary Smith's, which makes it unnecessary to readvertise any of the old claims; but all such applications of patent of mining claims published since the 1st of June, 1897, must be advertised in exact, precise accordance with all governmental regulations pertaining thereto.

This will be a matter of relief to thousands of miners all over the country, and is also of importance to those who have not yet secured patent for their mining claims, or who are about to make application therefor, it being necessary for them to comply in every respect with all governmental requirements.

Another Generation.

The great influx of new men into the business of mining is noticeable. Thousands of young men, especially, all over the country, are starting from a variety of motives into what may be styled the business of mining; probably this fact accounts as much as any other one thing for the enormous increase in the circulation of this paper; and this leads to the consideration of a question which has more than once come up. Old experienced mining engineers and practical miners in every part of the country have at times, by letter and in conversation, evinced some slight surprise that now and then appears in these columns some article on some subjects of practical mining that, while every word is true and practical, tells little that they do not already know. It has been the privilege of the MINING AND SCIENTIFIC PRESS for the last thirty-seven years to publish a great deal of practical information on mining subjects, and it has been the custom of the most prominent miners and mining engineers to contribute through its columns accounts of their individual work and records of their practice, thus making a great fund of practical information as to scientific mining. And thus for over a generation it has kept pace with the increasing importance of this branch of American industry. But years pass on and new men constantly come into the ranks. What an old experienced mining engineer might consider almost "a kindergarten proposition" is just precisely what an enthusiastic beginner would consider the very thing that he wanted to know.

Thousands of young men all over the country are now taking their first lessons in mining, and the very article in this paper that would be considered unnecessary, as containing nothing new, by the veteran, is seized upon with avidity by many who know just as much about mining now as the more mature reader did when he was of their age.

THE prophecy continues to be heard that silver will go to twenty-five cents per ounce. Nothing is more unlikely. There are several reasons why silver is more likely to appreciate than depreciate. The foremost is that trade conditions are against it as a cold business proposition, imperatively removed from the domain of politics; the trade of silver-absorbing countries cannot and will not be lost by exporting nations. The tremendous shrinkage in coin value of silver might be overcome by the increment of future earnings, but the permanent trade conditions existing between world producers and consumers preclude the possibility of further decline in the price of silver from the low figures reached last week.

Amending Federal Mining Law.

The meeting of the Denver committee—which, so far as the recent convention in that city is concerned, has charge of the proposed amendment of the Federal mining laws—which was to be held on the 7th inst., has been postponed to the 23rd inst. So much has been said in these columns regarding the necessity of many important changes in the Federal mining law that it seems like repetition to further discuss the matter. A great deal of proposed legislation has been blocked out for the California committee having charge of this matter to report at the coming convention of the California Miners' Association to be held in this city on the 18th prox., and it is assumed that they, as well as the Denver committee, will give due attention to the most prominent needs in this very important matter of amending the Federal mining law.

Amid the multitude of necessary reforms stands most prominently the necessity of radical change in the United States Statutes governing the apex law and the question of side lines. As the statute now stands the owner of a mining claim may follow and develop any lode having its apex or outcrop within the surface lines of his location, regardless of where such lode may extend in its downward course. This paper has all along held that for this law should be substituted one providing for square locations confining the rights of claim owners within their surface boundaries, and thus make our mining laws conform in this regard with the rest of civilization and bring our statutes into harmony with our practice as regards all other land claims, the owners of which have no right to go outside of their surface lines.

It is only necessary to point to the history of mining litigation in this country to illustrate the need of such a change. It may be asked, why, if necessary, has such a change not been made? Well-meant and almost successful endeavors have been made from time to time, backed up by the best thought and sentiment of the mining public; but the process of legislation in the National Congress is very slow, and time and again such a revised statute as suggested has been passed in one house of Congress, only to be delayed from passage in the other by adjournment, or the interposition of what the general public or the legislators themselves have deemed of more importance.

Meanwhile the courts have continued to be crowded with litigation growing out of this apex law. Decisions without number have been rendered in every court, including the great final court of appeal, the Supreme Court of the United States, where a minority have at times dissented from the prevailing judgment. As is also well known, the best geologists, mining engineers, mining "experts" and others who by occupation and education are assumably well informed, have given diametrically opposed testimony in important cases; it being a usual occurrence when a case involving great sums of money is in court to find equal expert and intelligent testimony on both sides, and without the slightest intimation of other than an honest opinion.

A great deal of trouble for the miner would be swept away by the repeal of the present apex laws. True, it would likewise remove a great deal of lucrative business for the mining lawyer; and this matter has in late years resolved itself into a question as to which is worthy of more consideration—the miner or the mining lawyer.

This is worthy of earnest and active consideration and positive action by the Denver committee at their meeting this month and a similar committee which reports to the convention of the California State Miners' Association next month.

Concentrates.

COKE at Northport, Wash., costs $10 per ton.

CHINESE miners are invading the South African labor field.

"LONG-LOST" mines are now being discovered in Venezuela.

PROBABLY to retort it is the best way to clean foul quicksilver.

NATIVE wages on the Rand, South Africa, average $7 per month.

CALIFORNIA'S gold yield for '96 was $17,181,562; for '92, $12,571,900.

THE famous old Washoe Club of Virginia City, Nevada, has closed its doors.

THE Anaconda mine, Montana, yearly uses one million pounds of powder.

THE aggregate value of California's mineral production for 1896 was $24,291,398.

DURING July the Alaska-Treadwell mine milled 21,000 tons ore; net profit, $60,500.

JOHN D. ROCKEFELLER is credited with trying to corner the Canadian nickel mines.

DURING August 257 notices of assessment work were recorded at Nelson, B. C.

IN the U. S. Circuit Court last June the Caminetti act was held to be constitutional.

O. J. SMITH is reported to be making a success of his smelting plant at Eureka, Nev.

MERCUR and Gold Mountain are at present Utah's two most prosperous mining camps.

AT Cripple Creek, Colo., five new railroads are under way to encircle the district and tap the mines.

AT Coalinga, Fresno Co., Cal., Chancellor & Canfield have struck a well flowing 110 barrels of oil a day.

ANGELS, Calaveras Co., Cal., is tired of forty-seven years of village government and proposes to incorporate.

THE first quartz mill in California run by electricity was that of the Dalmatia mine, El Dorado Co., in 1890.

THE Secretary of the Virginia, Nev., Miners' Union is at Standsburg, Cal., to institute a branch union there.

A WHITE ROCK correspondent of the Placerville, Cal., *Republican* has discovered that mice will eat amalgam.

THE Copper Queen mine, Bisbee, Arizona, has on the payroll about 1200 men. The main shaft is down 216 feet.

PLUMAS Co., Cal., papers deny the recent report that the Halstead property had been sold to a Scotch syndicate.

THE Canadian Government will try to maintain dog trains between Dyea and Dawson City, N. W. T., the coming winter.

IN pan amalgamation of gold the use of cyanide of mercury with cyanide of potossium solution will be found of advantage.

A MEETING of the Committee on Revision of Mining Laws has been called to assemble in Denver, Colorado, next Thursday.

PRES'T REPASS of the Kettle River M. & M. Co. will put in a 50-ton chlorination plant, costing $20,000, at Grand Forks, B. C.

WHEN the Congress mine gets down to the proposed 3000-foot level it will be the deepest mine west of the Rocky mountains.

IT is expected that the monthly output of the Alaska-Treadwell mine will be $125,000 when the 300-stamp mill is completed.

C. L. HODGE will replace the recently destroyed mill on the Last Chance, Bingham, Utah, with one of 100 tons daily capacity.

CONTRARY to custom many southern Colorado mines and mills will not shut down the coming winter, but will continue in operation.

THE question whether or not mineral claims may be located within the boundaries of the recent forest reserves has not yet been settled.

"THE days of '98" will probably be the reminiscent rhythm of the many who propose facing the dangers of the upper Yukon next spring.

THE current quotation for black peroxide of cobalt is $2 per pound; carbonate, $2.55; chloride, $2; nitrate, $2.20; oxide, $2.25 per 100 pounds.

"POGONIP" is said to be rife on the Yukon. If it is the same kind of frozen fog experienced in White Pine, Nev., it is a breeder of pneumonia.

A NEVADA Co., Cal., correspondent announces a discovery of nickel there. The current New York quotation for that metal is 38 cents per pound.

MINING LAWYERS agree in the belief that the U. S. statutes intend that where the expression a "known mine" is used, it is synonymous with an operated mine.

A DITCH six feet wide at the top, three feet at the bottom and three and one-half feet deep will carry from 2500 to 2800 miners' inches of water according to its grade.

WHEN the extent and magnitude of operations are considered, there are relatively fewer and less fatal accidents in mining than in any other branch of human industry.

THE reports of the United States mine inspectors show the total coal product of New Mexico during the last fiscal year to have been 733,939 tons, estimated value $1,196,915.

SUPT. TURNER, who fell down the shaft of the National Nickel Company's mine near Lovelock, Nev., last week, is dead from the injuries which resulted from his terrible fall.

THE Boston & Montana Company is reported producing at the rate of about 5,000,000 pounds of copper a month, over 3,000,000 pounds of which is said to be electrolytically refined.

IT is probable that many Dawson City miners will go down the Yukon and winter at St. Michaels, where they can at least secure food. There are 3000 tons of provisions at the latter place.

T. F. BENNINGTON, who operated a mine at Dog Hill, Butte county, Cal., last week during the noon hour undertook to draw out some giant powder cartridges, which exploded, instantly killing him.

THE steamer Excelsior, from St. Michaels, Alaska, with returning miners from Dawson, N. W. T., arrived in San Francisco last Wednesday, with sixty-three passengers and about $500,000 in gold.

THE Denver & Rio Grande and the Colorado Midland Railway Companies have agreed to establish an emergency rate on low grade ores from Aspen to Pueblo and Denver of $3 per ton on ores running 35 ounces silver or less, until silver reaches 57 cents an ounce, the roads reserving the right to restore the $5 rate after thirty days' notice.

THE government engineers have approved the plan projected by the State Commission of Public Works for improvement of the Sacramento river, and it is assumed that active operations will shortly begin.

IN British Columbia an inch of water is officially defined to mean one-half the quantity that will pass through an orifice 2 inches high by 1 inch wide, with a constant head of 7 inches above the upper side of the orifice.

LEAD'S lowest price was thirteen months ago, when the average exchange New York price was $2.73. There are several good reasons for the belief now so confidently expressed by many that it will go to $4.50.

WHERE a mining claim is located in this State after Nov. 2nd of this year it will be possible to do the $50 worth of work required by the California statute, and make it a part of the $100 assessment work specified in the federal statutes.

AT the Baliol mine, Sutter Creek, Amador Co., Cal., last April, forty stamps crushed 5885 tons ore in twenty-seven and a half days, at a cost of 26⅓ cents per ton. The cost of mining and delivering the same to the mill was 33¼ cents per ton.

SAYS the Marysville *Montanian*: This has been the poorest season for placer mining in Alder gulch for the last fifteen years, owing to the scarcity of water. From nearly every part of this west half of America comes the same statement.

THE annual meeting of the El Dorado County Miners' Association will be held in Placerville, Cal., next Saturday. Officers will be elected and delegates chosen to the State Miners' Association convention in this city on the 18th prox.

A $70,000 fire at the Iron Mountain mine, Shasta Co., Cal., on the afternoon of the 13th inst., destroyed the company's building, including the sawmill, old 40-stamp mill, men's quarters, and temporarily suspended the work of 350 men.

T. G. B. MASSICKS of Prescott, Arizona, is credited with contriving a gravel-washing and amalgamating machine, which on a recent run of forty-nine minutes from an open cut automatically dug and run through 79 cubic yards of gravel, from which $15.55 was realized.

A FRENCH company now building a ditch to take water from Trinity river, Cal., will use twenty-five miles of iron pipe which is ¼ an inch thick and 32 inches in diameter; it is estimated that it will cost $2,000,000 to complete the work, this being but one of similiar California hydraulic enterprises.

AT Creede, Colo., the *World* says the managers have signed an agreement to cut wages in wet mines from $3.50 to $3 per day, in dry mines from $3 to $2.50. Trammers in wet mines are cut from $3 to $2.75 and in dry mines from $2.50 to $2.25. Other mine labor, including the bosses, is cut in proportion.

THE California State Board of Equalization has lowered the tax rolls of all the counties in the State, except San Francisco and the mining counties of Alpine, Amador, Calaveras, Contra Costa, Del Norte, El Dorado, Inyo, Lassen, Mariposa, Mono, Nevada, Placer, Plumas, Sacramento, Sierra, Siskiyou Trinity and Tuolumne.

THE annual report of the Anaconda Copper Mining Company of Montana shows that for the year ending June 30 the receipts were $22,940,383 as against $16,945,697 the year before: the profits amounted to $5,136,048, an increase of $878,133 over the previous year. Dividends amounting to $3,000,000 were declared, as against $750,000 in '96.

L. J. COURT of Prescott, Ariz., has the gigantic idea that the Grand Canyon of the Colorado is a great sluice box, and proposes to locate 300 miles of that slit in Arizona, stretch steel cables across, suspend ground sluices with copper plates attached and occasionally pulling up the aforesaid plates scrape off gold, and "set 'em again."

IF a Northport, Wash., statement is to be believed, four men at the north end of Christina lake, B. C., have a deposit of "nearly pure aluminum." This remarkable find has not yet attracted unusual attention, though the deposit "has been traced a distance of 1300 feet." The substance is probably a sulphate of aluminum, which sometimes contains 30% alumina.

AMONG the most noticeable features in California this year are the large amount of preparatory work in hydraulic enterprises, the sinking of shafts to greater depth, the discovery by several foreign investors that as much money is to be made by developing prospects as by buying "going" mines, and the establishment of dredging machines in several parts of the State.

FOR the first time in financial history, leading members of the conservative side of New York finance are publicly associating themselves with investments in gold mines. Chauncey M. Depew, ex-Postmaster General James, H. Walter Webb, Smith M. Weed and John Carstensen are among those who in a published prospectus invite the public to buy shares in a gold mining development company.

IN giving a case over into the hands of an attorney, two things are taken for granted: 1. That the client has confidence that the attorney selected is competent to handle the case, which confidence has been installed in the mind by personal knowledge and public reputation. 2. The attorney, in accepting the case, confirms the assumption that he has the required ability and is in every way competent to act.

IN two recent cases State Supreme Court decisions have been to the effect that where the vein enters a claim on one side, passes out on the same side, and does not run approximately parallel to the side lines, such side line must be treated as the end line, with the laws of the United States (Section 2322) providing that the owner of the apex of a vein cannot follow the dip outside the vertical plane of the "end lines."

AT the car works at Pullman, Ills., there is now building by the Bowman-Ormsbee Gold Harvesting Company a gold milling plant to be taken to Charlotte, North Carolina. The train of machinery occupies two-thirds the length of the car, the other third being taken up by an office and stateroom, with berths for eight persons, a buffet and an assayer's laboratory. As auxiliaries to the Pullman car are two other cars, on which the ore is reduced by chlorination and leaching.

IT is but natural that a big gold placer deposit like that of the Klondike should have its accompanying frauds and swindles, but the brazen dishonesty of some of the concerns advertising broadcast almost transcends belief. A great many people do not object to being fooled, but they like to have it done in a gentlemanly manner. The raw methods of some of these Klondike investment companies is an insult to ordinary intelligence. Of course, it is unlikely that any practical miner or reader of this journal will be cajoled into a dollar's investment in such schemes, which are mostly as meritorious as a proposition to extract sunbeams from cucumbers.

THE Board of Public Works and the Government and State engineers held a conference in San Francisco this week over the proposition to remove the Newtown shoals, near Rio Vista, Cal. The plan has been approved, with a few modifications, and a favorable report from the Government engineers will in all probability lead to an appropriation from Congress to carry on the work. Had the Government engineers not endorsed the plan, no appropriation could have been expected.

THE Weaverville, Cal., *Journal* sensibly says: "Trinity's mining future is assured, and the next ten years will see a tremendous development of her leading industry. Trinity never needed a boom and cannot be injured by the puncture of one. Her mines are too well known, her gold output is too well established. She rests upon her merits only. All the county needs is a better system of communication with the railroad and a systematic development of her mineral resources."

"THE biggest nugget ever found in the Klondike" came down on the steamer Excelsior to San Francisco on the 15th inst. It weighs almost 34 ounces and is valued at $583.25. Put alongside one of the many big nuggets found in California—in Tuolumne, Trinity, El Dorado, Placer or Sierra counties, chunks of gold worth from $10,000 to $40,000 each—"the biggest nugget ever found in the Klondike" would look like a pea beside a pumpkin. Bigger nuggets are daily found here, but this is California, and that is far away.

ASSISTANT ATTORNEY GENERAL VANDEVENTER has recently given an opinion, which has been endorsed by the Department of Interior, to the effect that persons who have, in taking up homesteads, taken only a fraction of the 160 acres, to which every one is entitled, may make an additional entry to make the full quota of 160 acres. It has always been construed that when one homesteads lands, he forfeits his entire privilege, whether he takes up the full amount or not. It is claimed that it was the intention of Congress that every homesteader should acquire 160 acres of land if he desired it.

IN the issue of the 4th inst., the concentrate stating the price of lead "$3.85 brokers, exchange $4.22½," may be thus explained: The "exchange" quotation is the actual price. The "brokers'" price is a sort of current fiction, assumedly the wholesale price, but only a reminiscence, as "steamer day" is still referred to in the San Francisco of 1897. As between the smelter's price, the price in Chicago or St. Louis, as compared with the price in Salt Lake City or San Francisco, it is to be said that the smelter's price is entirely a business agreement between buyer and seller; quotations at distributing points are usually for refined lead in carload lots, and when lead is quoted at a certain price in Salt Lake City, it is about 25 cents per 100 pounds more in St. Louis and about as much more in New York City.

THE Mount Morgan, Australia, is the greatest gold mine in the world. It was bought about twelve years ago for $3115, and since then $75,000,000 has been refused for the mine and works. The most recent report of the company, to hand for the calender year 1896, states that the second, third and fourth sections of the new reduction works, which will be capable of treating 100,000 tons of low-grade ore per annum, will be completed in January, '98. A plant for treating the mundic ore is being designed, and it will be able to treat ore yielding 7 dwt. to the ton at a profit. The report says that since the opening of the new reduction works large bodies of hitherto unpayable ores had been able to be treated profitably. The removal of this ore has revealed the existence of immense bodies of payable ore. The report of the superintendent of treatment showed that the quantity of gold rock treated was 105,244 tons for 159,046 ounces.

"IS THERE such a thing as intrinsic value?" Certainly. It is intrinsic qualities which give intrinsic value. Generally, what is meant is that the article embodies in the form in which it is offered for sale, not only original intrinsic qualities, but the actual labor and expense of its production. It is a term, however, which is applied in many different ways, and often is used when "exchangeable value" is meant. An article may have intrinsic value and yet have no exchangeable value. Water is one of the necessities of life, but it is usually so easily obtained that it has no commercial value. A man will be slow to give up a thing, which has cost him labor, for water, when he simply has to dip it up or stoop down and drink. The moment, however, that water has to be forced long distances to the places where it is needed, it immediately possesses both intrinsic and exchangeable value. The cost of transportation may add to the value of an article just as surely as labor.

THE Kennedy mine, Amador Co., Cal., some time ago reached a depth of 2200 feet, and will be 2400 feet deep ere long. The Idaho mine at Grass Valley, Cal., is 2182 feet deep. The Kennedy is probably the deepest purely gold mine in the country. The deepest shaft in the world is believed to be in Paruschowitz, Upper Silesia, where a depth of 6753 feet is reported to have been attained. The previous record for depth was the hole drilled some years ago at Schladebach, near Leipsic. The latter bore hole was made in a search for coal, and eighty-three separate seams, some of considerable thickness, were penetrated. The hole was 12 inches in diameter at the beginning, and this was lined with a tube about 0.4 inch thick; at a depth of 230 feet the bore was reduced to 8¼ inches in diameter, and this continued for 351 feet. At this point the blue marl encountered became so compact that the diamond drill had to be used; and, under the action of the water, the marl swelled to such a degree that the diameter of the pipe had to be again reduced. The greatest difficulty encountered was the great weight of the boring rods as the depth increased. Though steel was used, at a depth of 6560 feet the total weight of the rods reached 30,155 pounds. Under this weight ruptures of the rods were frequent, and an accident of this nature finally stopped the work. About 4500 feet of rods fell to the bottom, and, being jammed under a part of the tubing, it was impossible to withdraw it. The diameter of the well at the bottom was 2¾ inches. Temperature observations made showed 15° F. at the surface, and at a depth of 6571 feet the temperature reached 157° F., equivalent to an average augmentation of heat of 1° F. for every 63 feet. The boring at Paruschowitz was commenced on March 26, 1892, and it reached its maximum depth in 399 working days. The Calumet & Hecla's Red Jacket mine is 4900 feet in depth.

Robinson Gold Mining Company's Report.

We are indebted to Capt. Thos. Mein for the directors' interim report for the six months ending June 30th, 1897, of the Robinson Gold Mining Company, Limited, Johannesburg, South Africa, as follows:

MINE WORK.

The development work done during the half-year is:

	Feet.
Drives	4,061
Raises	1,295
Crosscuts	1,860
Total	7,216

An estimate of the ore in sight at the close of the half-year has been made by the company's surveyor and is as follows:

	Main Reef Leader, Tons.	South Reef, Tons.
East mine	159,840	104,173
West mine	104,925	99,537
	264,765	203,710

Making a total of 468,475 tons, and showing an increase of 26,969 tons on the stocks reported at the end of 1896.

The quartz mined and sent to the mill amounted to 90,300 tons, obtained from the following reefs:

	Main Reef, Tons.	Main Reef Leader, Tons.	South Reef, Tons.	Total, Tons.
East mine	....	31,771	12,375	44,146
West mine	4,010	19,313	22,831	45,154
	4,010	51,084	35,206	90,300

From the above tonnage was recovered:

BULLION.

From—	Total. ozs.	dts.	Per Ton Milled. dts.	grs.
Mill	64,599	7	14	7.38
Concentrates—by chlorination	6,302	..	1	9.50
Tailings—by cyanide process	17,621	6	3	21.67
Slags	70	4	..	0.37
Total	88,592	18	19	14.92

VALUE.

From—	Total. £	s	d	Per Ton Milled. £	s	d
Mill	234,130	1	4	2	11	10.27
Concentrates—by chlorination	26,295	2	8	..	5	9.89
Tailings—by cyanide process	56,232	6	4	..	12	5.45
Slags	284	11	7	..	..	0.75
Total	316,942	1	11	3	10	2.36

The company's revenue from slimes was derived from the sale of slimes only. The average monthly tonnage treated works out at 6299 tons. During June the pumping plant for the delivery of fresh slimes direct to the works was in operation, and benefit accrued from treating the slimes before they became of an acid nature. In the treatment of the accumulated slimes, great difficulty is experienced through their extreme acidity and working costs are materially higher than in the case of slimes delivered direct from the mill. In terms of contract, the company has the option of taking the slimes plant at the end of February, 1898, by paying the Rand Central Ore Reduction Co. the amount it shall then figure at in their books, but as the exercise of this option would involve a cash expenditure of something over £40,000 in one lump sum, they are as yet undecided whether it will be advisable to acquire the plant or not.

EXPENDITURE AND REVENUE.

Crushed 90,300 Tons.

WORKING EXPENDITURE.

	£	s	d	Per Ton Milled. £	s	d
Mining account, including mine maintenance	56,570	11	9	..	12	6.35
Milling account, including mill maintenance	16,892	17	9	..	3	8.90
General maintenance account	2,595	13	7	..	..	6.90
General charges	7,592	19	6	..	1	8.18
Special charges: Bonus to employes, exchange on dividend, com. on coupons, etc.	3,272	14	10	..	..	8.70
	86,924	17	5	..	19	3.03
Expenditure on mine development, including main shafts	20,935	7	3	..	4	7.64
Expenditure on machinery, plant and buildings	9,236	2	5	..	2	0.55
	117,096	7	1	1	5	11.22
RETREATMENT ACCOUNT.						
Working expenses at cyanide and chlorination works	20,961	18	8			
Cost of concentrates purchased, including receiving	62,385	12	10			
	200,443	18	7			
Cash profit for half-year	207,305	1	9			
	407,749	0	4			

REVENUE.

	£	s	d	£	s	d
Gold account, mill, 64,599 ozs. 7 dts	234,130	1	4			
Sundry revenue	3,283	7	2			
				237,413	8	6
SLIMES PLANT ACCOUNT.						
37,794 tons slimes				5,507	11	4
RETREATMENT ACCOUNT.						
Gold account, tailings, 17,621 ozs. 7 dts	56,232	6	4			
Realized from cyanide slags	284	11	7			
Go'd account, own and purchased concentrates, 25,932 ozs. 19 dts	108,311	2	7			
				164,828	0	6
				407,749	0	4

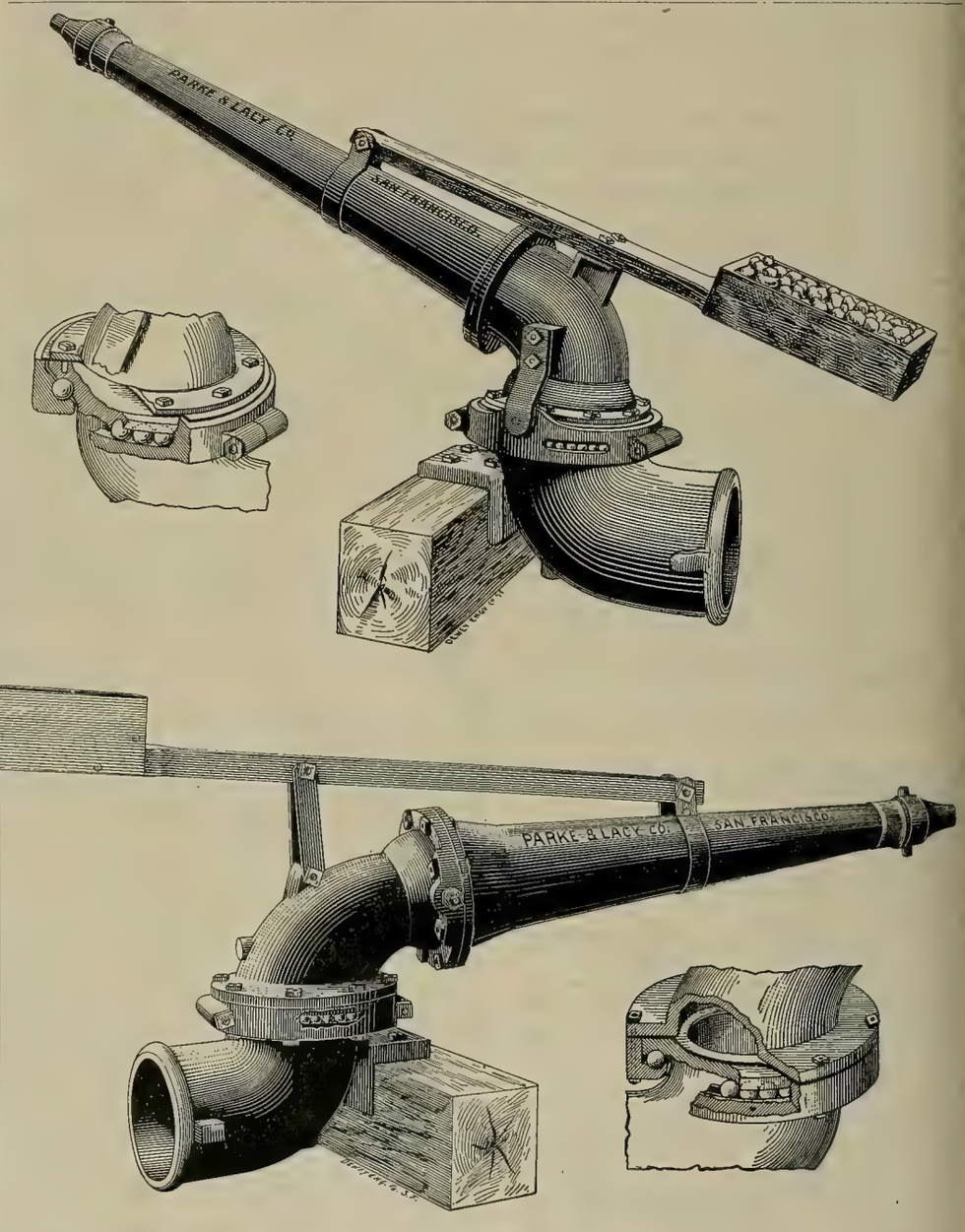
The net profit on the half-year's working amounts to £207,305 1s 9d. Of this sum dividend No. 14 of 7s per share, declared on June 28th, absorbed £192,500, leaving a balance of £14,805 1s 9d., to be carried forward to the second half-year. As far as can at present be seen, the profits for the second six months will average about the same as for the period under review.

Native Labor.—The reduction of native wages introduced at the beginning of June has, so far, been successfully carried through. "We have lost a considerable number of Kaffirs—a usual occurrence during the winter months—and, owing to the restrictions placed upon boys traveling through districts infected by Rinderpest, we have been unable to replace the shortfall, and have had, in consequence, to employ part of the rock drill plant in stoping. The Government's consent to boys being brought from the east coast is to be asked, and, should it be granted, we intend availing ourselves of the opportunity to introduce a different class of native labor."

Simmon's Ball-Bearing Hydraulic Giant.

Simmon's ball-bearing hydraulic giant was patented July, 1897. In the double-jointed giants the ball bearing is arranged in a groove under a flange surrounding the upturned end of the stationary or supply pipe, and a groove ring bolted to the flange of the upper or movable section of the giant. The groove formed by the flange and movable ring is filled with hard iron or steel balls, forming a rolling contact between the movable section, arranged around the upturned end of the supply pipe, which takes the vertical or upward thrust due to the pressure, as well as the end thrust due to the spouting force of the water. The pressure of the water is distributed upon thirty-seven balls in the No. 1 or 7-inch giant, and in a proportiontely larger number in other sizes. A free space is left between the stationary pipe and the movable elbow to prevent contact of any surfaces but the ball bearing. The leather packing is in the same form as in the old style double-jointed giants. By arranging the ball bearing in this manner the inventor aims to dispense with the obstructing king bolt in the center of the pipe. In place of the screw and lock nut a steel pin is provided which passes through the rim of the swivel plate and into the side of the ball. The other end of the pin is riveted to a steel plate which is bolted to the side of the giant, thus giving a support to both ends of the swivel pin. Owing to the shape and position of these ball bearings in the giants, they can be made of sheet steel riveted in sections.

In addition to the hydraulic giant above described, the builders, the Parke & Lacy Co., 21 and 23 Fremont street, San Francisco, have another new form of hydraulic giant, which they consider to be of a superior style. It is a single-jointed giant, but in a reversed form, viz.: the globe, which in the old style of single-jointed giant is part of the lower or stationary section is, in this new form, attached to the upper or movable section. By this arrangement is obtained a large and unobstructed passage for the water, while the working parts are low down, thus giving strength and steadiness. The trunnion or swivel screw is, in this new form of giant, two and one-half times larger and is made of solid steel forging, with no swivel screw or lock nut to come loose. The vertical strain and the end thrust are taken up by a series of ⅛-inch ball bearings arranged under a projecting rim of the lower section of the giant in such a manner that there is no contact of metals other than the rolling surface of the balls. The water packing is held in place by a separate ring, and, in addition to making a water packing, covers the joint of the ball bearing. These are estimated to be about 20 per cent lighter than the old double-jointed giants, having the same strength of material. In this, as in the other form, the obstructing center bolt is dispensed with. Messrs. Parke & Lacy wish to direct special attention to the statement that this is the pioneer invention of the ball-bearing hydraulic in giants, and that all others are necessarily infringements.



SIMMON'S BALL-BEARING HYDRAULIC GIANT.

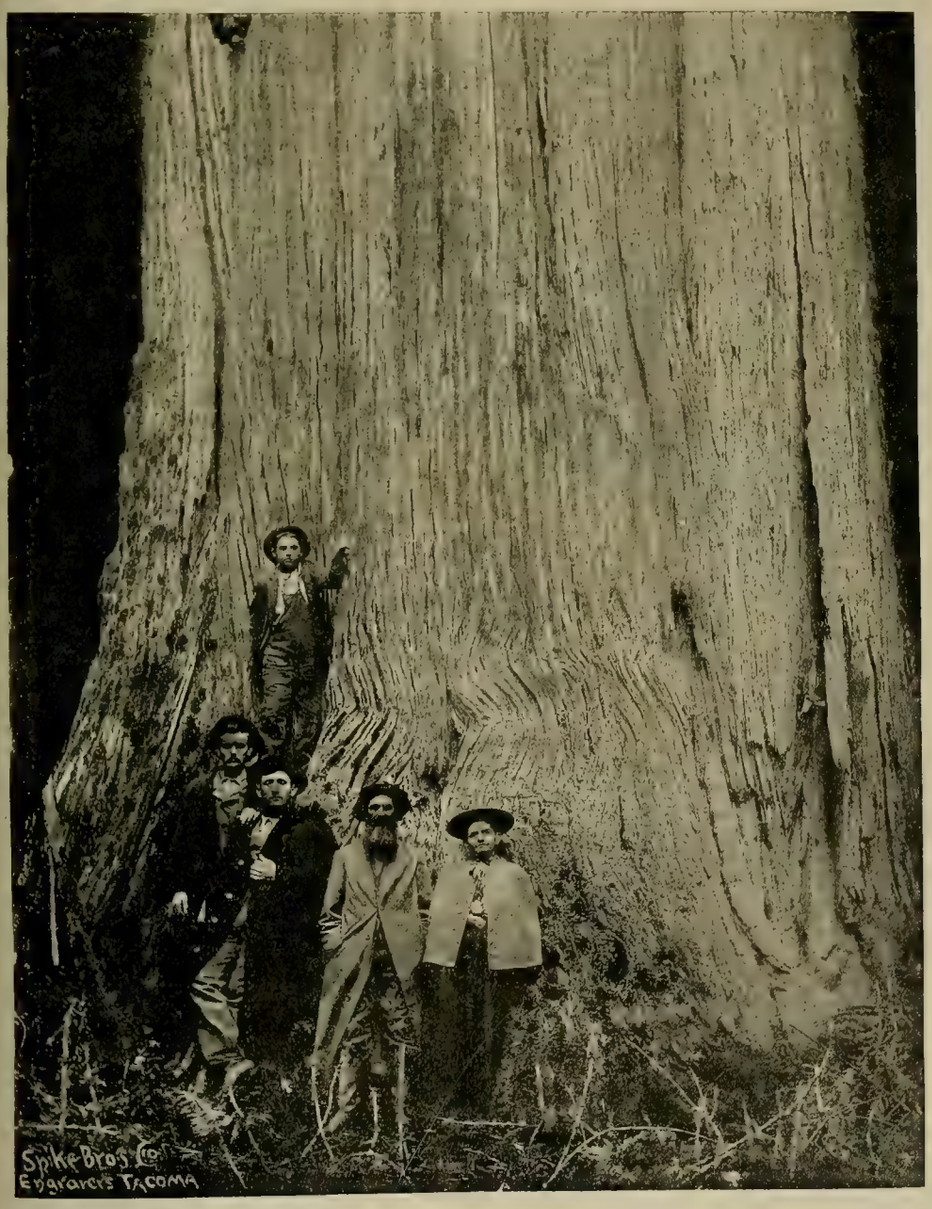
THE term "limited" in connection with a partnership or corporation applies solely to the extent of the liability of the members as determined by the articles of incorporation. This limitation is not equally distributed among those concerned in the business, but may vary in amount as agreed upon,

one being liable for one-half of the capital stock and the remainder being distributed among a dozen or more of the remaining shareholders. The law that gives the authority or privilege of making these limitations also requires that the word "limited" shall always be used in connection with the firm or corporation. Wherever it is seen it stands as a post of warning to all that they must look out and satisfy themselves as to the liability of the firm members. There is nothing unfair in adopting it; it is fair and just that outsiders should not presume that, because a man of means has become identified with a firm, his liability is equal to that of a less responsible member. One may desire to undertake a certain venture and be willing to risk his investment, but nothing more. The word "limited" enables him to do so.

Arbitration Preferable to Litigation.

As to the respective rights of owners of mining claims, lying one above the other upon a stream or mountain, in Colorado in the case of a placer claim the owner of the claim lying above the other upon a stream must not allow the tailings from his sluice to wash down and be deposited upon the claim below. Though he is permitted to use the water of the stream for sluicing purposes and is not liable for any damages for having muddied the same, without some prior claim, other than that incident to the working of his placer he cannot divert the water from the gulch, or use it for other purposes to the detriment of claim owners lying below. As to lode claims, the owner of a claim lying above another upon the mountain must not allow rock or water to pass from his workings down upon the property below so as to damage it in any way, or there will be liability. The owner of a claim lying below another, who provides drainage for both properties, in case both are being worked at the same time, can collect from the owner of the property lying above the proportionate cost of such drainage. A right of way is given across any and all claims, to and from another, for the purpose of hauling quartz. Generally the principle is that the owner of the location lying higher up shall not use the natural advantages of his location to the detriment of his neighbor below, and if he should do this he will be liable for the damages caused by his acts. To tell what the respective rights of each owner may be with any degree of certainty would require a knowledge of the facts in each particular case, and most miners should come to an agreement upon such matters. If each views the case from each other's standpoint, they can usually agree upon what is right without becoming involved in litigation.

THE MOULTON HOIST AND MILL.—(See Page 261.)



CEDAR TREE NEAR SNOQUALMIE FALLS ON SEATTLE & INTERNATIONAL RAILWAY, CIRCUMFERENCE OF BUTT 100 FEET 7 INCHES.

How Emery is Quarried.

Co-operators may be pleased to know that among the few trades in the world in the hands of the laborers is that of the emery quarryman. Emery comes from the island of Naxos, in the eastern Mediterranean, whence it has been exported for the last two centuries or more. The beds are in the northeast of the island, the deposits descending into some of the neighboring islands, the emery being found in lenticular masses, resting on layers of schist in limestone, almost identical w th Parian marble, the finest marble known, which comes from the island of Paros, close by. There are about 300 men engaged in the trade, all of whom have to be married before they are admitted into the fraternity.

The material is much too hard to be dug out, or even blasted. Great fires are lighted around the blocks until the natural cracks expand with the heat, and levers are then inserted to pry them apart.

This system is continued until the blocks are reduced in size to masses of a cubic foot or less, and they are then shipped as if they were coals. There are said to be 20,000,000 tons yet available at Naxos, and last year's export was 3,950 tons.

It is one of the hardest substances yet known, coming next to the diamond, and among its crystalline forms known to the jewelers are the ruby and the sapphire.—Pearson's Weekly.

A Huge Cedar Tree.

That California has not a monopoly of the big trees on the coast is strikingly exemplified in the accompanying cut of a giant cedar near Snoqualmie Falls, Washington State, the circumference of which, at the base, is over one hundred feet. The picture of this old monarch of the northern forests is furnished by the *West Coast and Pacific Shore Lumberman* of Tacoma, Wash.

ONE of the most remarkable things about a man's walk is the diagonal movement which characterizes it. The hands and feet may be regarded as forming the four corners of a parallelogram, and the diagonal limbs are, of course, the right arm and left leg and the left arm and right leg. By "diagonal" movement is meant that the diagonal limbs during locomotion always swing in the same direction. The arms swing by the body like a couple of pendulums, and with a speed which entirely depends upon the rate at which he may be walking. The athlete, anxious to complete the given number of "laps" in a mile or couple of miles and outstrip his competitor, swings his arms to and fro with a quickness which corresponds with the motion of his swift feet; the business man always swings his arms with a motion which, if not so quick, exactly times with the motion of his legs. Now, if the motion be even carelessly observed, it will be found that the right arm swings forward the same time as the left leg, and when the right leg is advancing it is the left arm which accompanies it. This diagonal movement of the limbs is the natural method adopted by man when walking, and it is the first and most apparent fact that one ascertains in studying human locomotion.

The Solution of Gold in Accumulated and Other Slimes.

The following is a paper read by Mr. W. A. Caldecott before a recent meeting of the Chemical and Metallurgical Society of South Africa:

The problems presented in the treatment of accumulated slimes are in a great measure of the same nature as those which occur in dealing with slimes direct from the mill. In one important respect, however, there is usually a considerable variation, and this is as regards the primary operation of dissolving the gold. As is well known, the gold in slimes fresh from the battery is generally very readily soluble in cyanide solution. When slimes are settled in dams or pits, however, certain reactions take place which result in the formation of decomposition products corresponding with conditions obtaining. Among the products of importance, so far as subsequent cyanide treatment is concerned, is ferrous sulphide (FeS) derived from the decomposition of pyrites (FeS_2). This compound imparts a dark gray or black color to those layers in the slimes dams in which it occurs in any quantity and may be readily identified therein by the odor of sulphuretted hydrogen on adding acid, by the darkening of moistened lead acetate paper exposed to these fumes and by the purple reaction in an alkaline solution with potassium nitro-prusside. The exact stages by which it is derived from the pyrites may be open to discussion. My own view as to its formation may be expressed by setting forth as follows the main stages of gradually increasing oxidation through which iron pyrites, either as pyrite or marcasite, passes before it finally attains its final stage of highest oxidation under natural conditions:

(1) FeS	Iron pyrites.
(2) FeS+S	Ferrous sulphide and sulphur.
(3) $FeSO_4+H_2SO_4$	Ferrous sulphate and sulphuric acid.
(4) $Fe_2(SO_4)_3$	Ferric sulphate.
(5) $2Fe_2O_3, SO_3$	Insoluble basic ferric sulphate.
(6) Fe_2O_3	Ferric oxide.

As may be seen by detailed references to authorities mentioned in a communication by myself to the Proceedings of the London Chemical Society of 29th April, 1897, it has long been known that ferrous sulphide is produced by the reduction of iron sulphates in nature by decomposing organic matter, but I am not aware that its derivation from pyritic ore or its presence in slimes dams has hitherto been publicly recognized. The formation of ferrous sulphide proceeds very rapidly after the deposition of slimes in the dams, where they settle, forming a compact mass practically impervious to air and water. After a few days the more pyritic layers of slimes contain as much as .25 per cent FeS, soluble ferrous salts and free acid being almost nil. Certain gold ores naturally contain a large amount of ferrous sulphide in the form of magnetic iron pyrites (6FeS, FeS_2), copper pyrites (CuS, FeS), or arsenical pyrites ($FeAs_2S_2$).

When dry iron pyrites are heated in absence of air or are finely pulverized in an iron mortar, ferrous sulphide is readily produced. The same reaction takes place to a slight extent during the operation of crushing in a mill, particularly when the water for the plates has been heated beforehand to assist amalgamation, and in some cases there may be sufficient FeS thus found to affect the treatment.

During the treatment of slimes by cyanide the presence of finely divided ferrous sulphide causes abstraction of oxygen from the solutions, whereby the solution of the gold is prevented. Other ferrous compounds, such as ferrous hydrate (FeO_2H_2), react in the same way as does the decomposing organic matter always present in a more or less degree in slimes dams. The obvious remedy for these difficulties is to supply oxygen artificially, either in the form of air delivered from a perforated pipe fixed near the bottom of the agitation vat containing lime pulp, or in the form of an oxidizing agent. The cheapest and most suitable of the latter has been found to be potassic permanganate. The present slime plants of the Rand Central Ore Reduction Co. have employed æration of all pulp in their dissolving vats as part of the regular treatment since the latter part of last year, accelerated when this operation took too long or when much organic matter was present with one-eighth pound to one-half pound $KMnO_4$ per ton of dry slimes. All plants now under construction for the treatment of accumulated slimes will be equipped with large air compressors delivering up to 1800 cubic feet of air per minute. The advantage of deep vats where æration is employed so as to get as much efficiency as possible out of the air is obvious, as is also the necessity for delivering the air in small bubbles so as to bring the maximum amount of surface into contact with the slime pulp. Again, it has been found by experiment, as might have been anticipated, that for a charge containing a certain amount of ferrous compounds and other reducing substances a corresponding volume of air was required, whether applied in one hour or distributed over ten hours. Hence the advisability of ærating as quickly as possible in order to lessen the time and power required for keeping the slimes in suspension by agitation.

Speaking generally, old accumulated slimes are considerably more acid than accumulated tailings, and although in the stirring process all possible efficiency is got out of the lime employed to neutralize this acidity, yet consumptions of from 8 lbs to 20 lbs of lime per ton of dry slimes are by no means uncommon. The ferrous sulphate in the slimes and on ferrous sulphate formed by oxidation of ferrous sulphide through aeration has a tendency to abstract nitrogen from the solutions and also to consume cyanide by converting it into ferro-cyanide. By a further aeration this ferrous hydrate is converted into innocuous and inert ferric hydrate. Hence in the treatment of accumulated slimes preliminary aeration or its more costly equivalent in the form of an oxidizing agent has lowered the cyanide consumption by about 50 per cent, a saving which more than pays the cost of aeration; even with the acid slimes above-mentioned, the actual cyanide consumption is now only ½ lb per ton of dry slimes, or less than the cost of the lime employed. Of this ½ lb only about one-half is consumed by the slimes themselves, the remainder being discharged as dilute solution with the residues, or lost by exposure to the air, and by decomposition in the precipitating boxes.

The use of air for accelerating the solution of the gold in auriferous material has long been talked of and experimented upon, and forms the subject-matter of various patent specifications. In the treatment of most accumulated slimes, however, the gold simply does not dissolve without its application, so that, instead of merely accelerating the reaction, it becomes as necessary for their treatment as cyanide itself. It is probable that before long aeration, now regularly used for the first time on a working scale, will also serve as a means of agitation in place of mechanically driven paddles at present employed, but this application of its use, as well as various other adaptations, now under investigation, is still in the experimental stage.

At the present time the method of dealing with accumulated slimes differs only in the earlier stages from the treatment of fresh battery slimes, the subsequent operations of settling, decantation, precipitation, etc., being much the same. These earlier operations, which vary in detail according to the particular slimes under treatment, are generally as follows: The truck loads of slimes are dumped into a small constant-discharge pulping vat containing fast-running paddles. A pipe delivers a continual stream of weak solution at the bottom of the vat near one side, and at the top on the other side is an overflow launder, through which the slime-pulp continually discharges, as the lumps become disintegrated, into the dissolving vat. Here it is aerated whilst being stirred by air delivered from an air compressor through a perforated pipe fixed near the bottom of the vat, until sulphides are no longer apparent in the pulp on applying the acid and lead acetate paper test. This aeration may take from two to twenty hours, and varies with every charge. After the sulphides are oxidized, an hour or two longer aeration is given to oxidize any ferrous hydrate remaining, and the cyanide is then added. This brings the solution up to .005 per cent KCy to .008 per cent KCy, which, though containing only a couple of ounces of potassic cyanide to a ton, is found amply strong enough to dissolve the gold. During the charging and subsequent aeration lime is also added to bring the alkali strength of the solution up to .006 per cent to .010 per cent, as any higher percentage of lime is found to be unnecessary for expediting the subsequent settlement of the slimes. The agitation and aeration are continued for a period of from two to five hours after the addition of cyanide, as experience shows, and the slime-pulp containing all the gold in a state of solution is then transferred to another vat and diluted, preliminary to settling. Any permanganate to be added is put in as soon as the dissolving vat is full, as it is found that but little of the ferrous iron present is oxidized whilst much organic matter is present.

Such, in brief, are the operations involved in dissolving the gold in slimes containing reducing substances; and it may be stated that the acquisition of the experience requisite for successfully dealing with such material has been very costly, both in money and in labor. The solution of the gold in the treatment of slimes can now be ensured, but much still remains to be done in the investigation of the various constituents of slimes and their interaction with one another and with the agents—lime, air and cyanide—used in slimes treatment. In the running of a slimes plant it is obvious that considerably more skill and attention are required both of manager and shift men than with a sand plant of equal capacity. Besides, constant attention to the machinery and appliances for stirring, transferring and decanting, continual tests for and records of sulphides, alkali and cyanide are necessary, and the whole treatment of a charge must be completed in a fraction of the time required for sands.

In conclusion, one or two details of laboratory practice in connection with slime work may be given. The percentage of dry slimes, or the ratio of slimes to solution, in any pulp may be determined with fair accuracy from its specific gravity x by applying the following formulæ:

$$\text{Percentage of dry slimes in pulp} = \frac{158.8(x-1)}{x}$$

$$\text{Slimes: Solution} = (x-1) : (1-.37x)$$

All tests to determine gold extraction from pyritic slimes should be made on the moist material, as the process of drying effectually changes the conditions of actual working by oxidizing the reducing substances present.

Alkali determinations, as already remarked, constantly require to be made by shift men in a slimes plant. This is done as follows (according to the method suggested by Mr. J. E. Clennel): Take 100 c.c. of solution to be tested; determine cyanide strength with standard silver nitrate solution (1 c.c. Ag NO solution = .01 per cent KCy); add a drop or two more of Ag NO_3 solution to the test, and a few drops of .5 per cent solution of phenolphtalien as indicator, and titrate with decinormal acid (1 c.c. $\frac{N}{10}$ acid = .004 per cent alkali). The best acid to use, being stable, is $\frac{N}{10}$ H_2SO_4, prepared in the usual way; but, in case the appliances for preparing this are not available, a decinormal oxalic acid solution may be used, as recommended by F. Mohr. A decinormal solution of this, sufficiently accurate for practical purposes, may be prepared, like the standard silver nitrate solution, by dissolving 6.3 grms. pure dry oxalic acid in distilled water, and making up to a litre.

Mr. Crosse—I know the discussion on this paper will be postponed. There is only one important question I would like to ask Mr. Caldecott, because he might be misunderstood. He said the amount of slimes in any solution could be determined by taking the specific gravity.

Mr. Caldecott—With fair accuracy.

Mr. Crosse—I do not see how that can be managed. How do you take the specific gravity?

Mr. Caldecott—I took the specific gravity in the ordinary way, by weighing equal volumes of water and slime pulp. The hydrometer readings are not sufficiently accurate owing to the rapid settling of the slimes.

Chas. Butters—There is a good deal more in Mr. Caldecott's paper than appears on the surface. When you have a contract to treat some hundred thousand tons of slimes, and you cannot dissolve the gold, owing to the want of knowledge, it is a very great relief to find out. At the time these experiments were carried out we were in very great difficulties at the Robinson on account of the gold not dissolving, and Mr. Caldecott deserves a very great deal of thanks from us. There are millions of tons of accumulated slimes on these fields. I was obliged to close down the Crown Reef slimes plant because we could not make it pay, and I think we would be obliged to close down a good many others if this matter had not been worked out.

Believe It Will Advance.

The general impression prevailing among smelter men and others familiar with the lead situation, says the Denver *Republican*, is that lead will advance until it reaches not less than $4.50 per 100, and the reason for this belief is that the demand for several years has been so trifling that stocks were kept as low as possible. Now that there has been an abnormal increase in the demand the market is caught with nothing on hand and not enough production in sight to meet the call, and the probabilities are that under the stimulating influences of construction in all lines the price will go higher.

"I think," said a well-known ore buyer and smelter yesterday, "that in a short time the price will advance to such an extent that a large number of mines that were closed down when the drop in silver first commenced will be opened up and do better than ever. Let lead once reach $4 and the effect will be seen at once. It is a very simple matter to figure it out on any given basis. Take, for instance, ore that runs six ounces silver and 15 per cent lead. The loss in the silver has been 60 cents. The gain in lead between $3.60 and $4 per 100 is $1.20, a net gain of 60 cents on the ore. For that reason I believe that when lead reaches $4 there will be as many low-grade silver-lead mines in operation as there were before the decline."

J. B. Grant shares this view and thinks that lead will go up to $4.50. He says there is no probability of the supply of lead being sufficient to reach the demand. There is a short supply in the country, with all the known resources taken into consideration, and there is not much probability of an increase. He is still of the opinion that silver will not go below 50, and even if it reaches that point the advance in lead will more than offset the loss in silver from ores carrying not less than 15 per cent lead, and running low in silver. With lead at $4.50, even ores running ten ounces in silver and 10 per cent lead will make a net gain of 60 cents per ton, with silver at 50 cents, as against 62 cents on July 1.

Preservation of Mountain Forests.

Written by M. B. CURTIS, Nordhoff, Cal.

The forest primeval is our most valuable inheritance. It is the ready cash of Nature's bountiful provisions for our future; it is a bounty that we, as Americans, are ruthlessly destroying. Already statisticians are figuring out how many years will elapse before we have a timber famine. The shortage of timber for building and fuel are the least of the evils of forest destruction. Iron and steel are taking the place of wooden beams, strawboard and other materials are pressed and rolled into shape to substitute for wood; and, as for fuel, oil, coal and electricity can supply us with heat. As to the value of our forest products, Mr. Fernow places that in round numbers at one billion dollars annually. It ranks third in importance of our industries, manufactures of all kinds and agricultural products of all kinds ranking respectively first and second.

Evils of Forest Destruction.—The great and almost irreparable evils of forest destruction are the influence on climate and the destruction of our watersheds—with the attendant evils, alternate drouth and flood—and increase of cyclones, blizzards and hurricanes, with attendant loss of life and property. It is in this last phase of the evils of forest destruction that we are principally interested, although as citizens of this great Republic we should be interested in all that pertains to the common welfare of our country, for what affects the interests of one part of our country in a measure affects the whole.

A few years ago the mountain region to our north, the Sierra Madre range, was set aside as a forest reservation and to preserve to the people the possible reservoir sites. The preservation of our mountain forests means the preservation of our summer water supply. Each succeeding dry season sees a large area swept by forest fires, the woodman's ax is ringing in the accessible mountain canyons, and man, or, at least, some men, seem to be doing all they can to destroy our heritage. The denuding of our mountain forests means that our winter rainfall, instead of sinking slowly into the ground through beds of decaying vegetation and slowly percolating down the mountain side, to gush from rocky crevices as springs and rills in the hot summer months and swelling the mountain streams, in turn to be conveyed to our orchards, or, flowing underground, supplying our tunnels and wells, and touching with life our thirsty land, will rush, demon-like, down the bare mountain side, swelling the winter torrent, devastating our fields and orchards, and in a comparatively few hours lost in the sea—lost to all good to the rancher in his time of need. To the stranger gazing at our mountain side the question might arise: "Why so much fuss about a little scrubby brush? A season or two will supply it with a new growth." Let our stranger climb the mountain sides, where the mountain fire has not swept, and what looks like new brush from the distance will prove to be a dense growth of scrub oak and chaparral, and underneath a dense covering of decaying leaves and twigs a foot in depth. This acts as a mulch, preventing evaporation, and the growing brush above prevents the fierce rays of the summer sun from shining directly on the soil. The taller trees, swaying in the winds, loosen the soil around their roots and it more readily absorbs moisture. Man attains this loose soil only at a great expense of labor and cultivator teeth.

A Local Instance.—As an illustration in a small way of what the destruction of our mountain cover means, I will cite an instance that came under my own observation within the past year. A mountain fire swept the sides of one of our mountain arroyos bare last July. From this arroyo came the domestic water supply of a foothill rancher. A pipe line conveyed the water to his residence. This pipe has lain undisturbed by flood for more than a dozen years. The first rain of the season swept it out, bending and twisting the pipe, and the second rain doing the same. The pipe was finally moved up the hillside. In the same storm immense quantities of drift were swept down the Wolfskill creek, the mountain torrent dashing 20 feet high. I venture the assertion that the sole cause was not a cloudburst, but was the sweeping away of large areas of forest cover. To-day a large force of men and teams are at work cutting and hauling timber from San Dimas canyon. The work of destruction has been going on all last season and is being pushed with great vigor. The Los Angeles parties who claim the timber—though how they came to be possessed of it no one seems to know—avow it as their purpose to cut every stick of timber in the canyon that can be reached by team. This canyon is one of the prettiest and most accessible to Pomona and the surrounding country, and it will be rendered bare and unattractive. The growth of years seems destined to be ruthlessly swept away unless prompt and energetic action be taken.

What is being done here inside the forestry lines is being done from the sea to the desert, and it is only a question of time till the beauty of our mountain canyons will be lost to us forever. Instead of being places of beauty and attractive resorts for pleasure parties, they will be bare, dry canyons, through which the winter floods will rush in unchecked violence.

The Use of Cyanide.

In a recent report issued under the auspices of the Colorado School of Mines the following reference is made to the uses of cyanide:

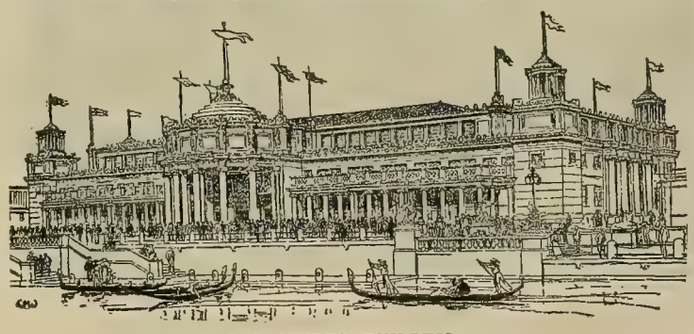
The cyanide process, while generally applicable to oxidized ores containing fine gold, is quite unsuitable to such ores if the gold occurs partly in a coarse state, unless the cyanide is preceded or followed by amalgamation. It may also be broadly stated that copper ores are unsuitable for cyanide treatment, even with dilute solutions. I am aware that the statement has been made that dilute solutions have no effect on copper sulphides. Practical experience, however, does not confirm this statement. Copper invariably passes into solution and accumulates until it becomes of such strength as to be precipitated on the zinc in the boxes.

Two experiments of Mr. Skey of New Zealand in this direction are to the point. Chalcopyrite and copper glance were taken by Mr. Skey, crushed, thoroughly washed and afterward placed in a 0.03 per cent cyanide solution for one hour. The solution being then tested, a perceptible quantity of copper cyanide, traces of sulphur and oxidized sulphur compounds were found in it. Sulphur of antimony is another objectionable mineral often stated to be quite unaffected by cyanide solutions, although as a matter of fact it is quite soluble. It is probable that in the foregoing copper and antimonial minerals part of the sulphur combined with the potassium, forming potassium sulphide that may possibly coat the gold with a sulphide film, which protects it more or less from the solvent action of the cyanide. In this connection an experiment by Skey is suggestive. He found that a 1 per cent solution of pure cyanide dissolved a given weight of gold in ten minutes, but on the addition of 1-100,000 part of sulphur (as a sulphide) to 1 per cent solution of cyanide, it required two hours to dissolve the same weight of gold. While fully admitting the deleterious qualities of alkaline sulphides, I must state that I have not found such minute quantities to be of serious moment in the practical application of the cyanide process. When the sulphur of a soluble mineral combines with the cyanogen it does not interfere with the solution of the gold, and very probably for this reason. Galena, though soluble, is usually quite amenable to cyanide treatment. Zinc blende and pyrites are practically insoluble in cyanide solutions.

In making extraction tests on ores it is important to note that an abnormal consumption of cyanide is invariably associated with a low extraction of precious metals. This consumption may be due to free acid in the ore, acid or basic salts, or ores easily soluble in the solution. The cause should at once be investigated and the evil corrected as far as possible before proceeding with the test. Cyanide of potassium, though a most active chemical, is easily broken up by acids, base metals and organic matter, forming numerous perplexing compounds while in contact with the ore changes and in passing through the precipitation boxes. It is doubtful if the complete chemistry of these changes is fully understood even by those who have made it a careful study.

Transmississippi and International Exposition, Omaha, June to November, 1898.

The principal feature of the lagoon facade is a circular dome 150 feet in circumference, rising to a height of 75 feet. The four corners of the building are marked by square plain towers surmounted by



MANUFACTURES BUILDING.

ornate, open, columned pavilions, circular in form and to serve for electric lighting. The Manufactures building is 300 feet long and 140 feet wide.

Unusual Surgical Operation.

A remarkable surgical operation has been performed upon Adrian Dehertoghe, a machinist of San Francisco. Fifteen yards of silver wire, as large around as an ordinary hypodermic needle, have been introduced into and coiled within his aorta, the arterial channel leading directly from the heart. Those 45 feet of wire have been in there for three months and, surgeons say, have saved his life. They were inserted at a time when death seemed certain—complications resulting from a severely injured aorta, the patient's trouble being an aneurism, or saculated tumor of the arterial wall. Its development to a rupture of the aorta was only a question of time, with instant death as the result. The wire was introduced into the distended or abnormal sac formed in the aorta, in order partly to fill it and form there a clot, that would in time contract and be there absorbed, thereby restoring the channel to its normal formation.

The Co-operative Plan.

An illustration of the advantages of co-operative mining is the success which has attended operations at the Unity mine, near Nevada City. The mine was partially developed under the old company and a small plant was secured, consisting of hoisting and pumping rig and a 5-stamp mill. The company did not make their operations pay, and after sinking to a depth of 300 feet work was stopped and the Gold Flat Company failed. The mine afterward came into the possession of Weissbein Bros., of Grass Valley. Nine practical miners took a three-years' lease of the mine, with the privilege to purchase for $15,000. The lease provides that a certain proportion of the receipts from the mine shall be paid to the owners, when the rock yields more than $8 per ton. The percentage is to apply upon the purchase price.

They found the mine full of water, the batteries in poor condition and the need of repairs everywhere. They set to work with a will about the 1st of June, soon had the water pumped out of the mine, sank an air-shaft 116 feet and ran a 40-foot drift to improve the ventilation of the mine. They began at once to take out ore. By gradually improving their mill, and experimenting as to proper speed for the stamps, they obtained from the ore double the results previously obtained. Their last cleanup showed the rate of $12 per ton. They crush six tons per day with the 5-stamp mill. Fifty-two ounces of amalgam were cleaned up in three days' run. The ledge from which the ore is taken is well defined and permanent in character, about 14 inches in width. There are three good ore shoots. These miners are planning to sink another 100 feet in the shaft, and will then run drifts to strike the same shoots. There is every reason to believe that the percentage which they are to pay under the lease will buy the mine long before the expiration of the term for which it is made.

We congratulate these plucky miners upon their success in this venture. It shows what practical men can do with property of any promise whatever. We believe there are numerous other mines in Nevada county which could be developed in a similar manner, provided miners with grit can be brought into contact with mine owners who will make reasonable conditions. Let the Unity be an example for other co-operative associations to follow.—Grass Valley, Cal., Tidings.

Several Others.

A local paper at Kaslo, B. C., says: "The Payne ore chute is believed to be the longest continuous ore chute in the world. One tunnel is now 756 feet in ore the entire distance, and the end not yet reached. In places the ore body is 4 feet wide." In the vein of the Smuggler-Union mine, San Miguel county, Colorado, a length of one mile has been worked along on various levels. There is one stope in that mine 800 feet in length where, in raising it, not a single point was found where the ore narrowed or grew so poor that it was left standing, while the limits of the ore chute is not yet reached. There are others.—MINING AND SCIENTIFIC PRESS.

Yes, "there are others" right here in the San Juan. The Silver Lake has leads that have ore chutes 1000 feet in length, 9 feet in width and a known depth of 800 feet. The Iowa Company, in the same basin, have ore chutes nearly as large in width and just as much in length and richness. The Virginius has an ore chute developed over 3000 feet in depth and about 1100 feet in length.—Silverton, Colo., Standard.

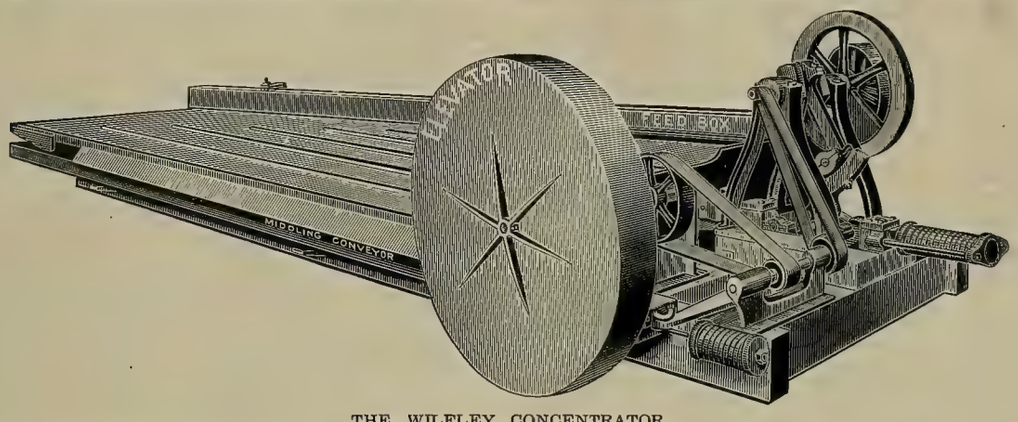
New Sulphur Mines.

The Mexican Sulphur Company have begun the extensive development of their property near the Hardy Colorado river in Lower California. J. A. Dubbs is general manager. A railroad is to be built from the mine to the river seven miles. A thousand tons of sulphur ore is now on the dump, the result of prospecting for some weeks. Manager Dubbs says the ore assays 80 per cent pure sulphur. It will be shipped in a crude state: that destined for the Pacific coast on river barges to Yuma; eastern shipments will be made on vessels loaded from barges at the head of the Gulf of California. The method of mining the ore is simple. Wagons are driven in the deep vertical cuts, the walls of which are of sulphur, and the ore is simply broken down and loaded in the wagons below by means of chutes. Very little time is required to load a two-ton wagon and another immediately takes its place. The ore is combustible and a piece of it burns readily if lighted.

Mechanical Progress.

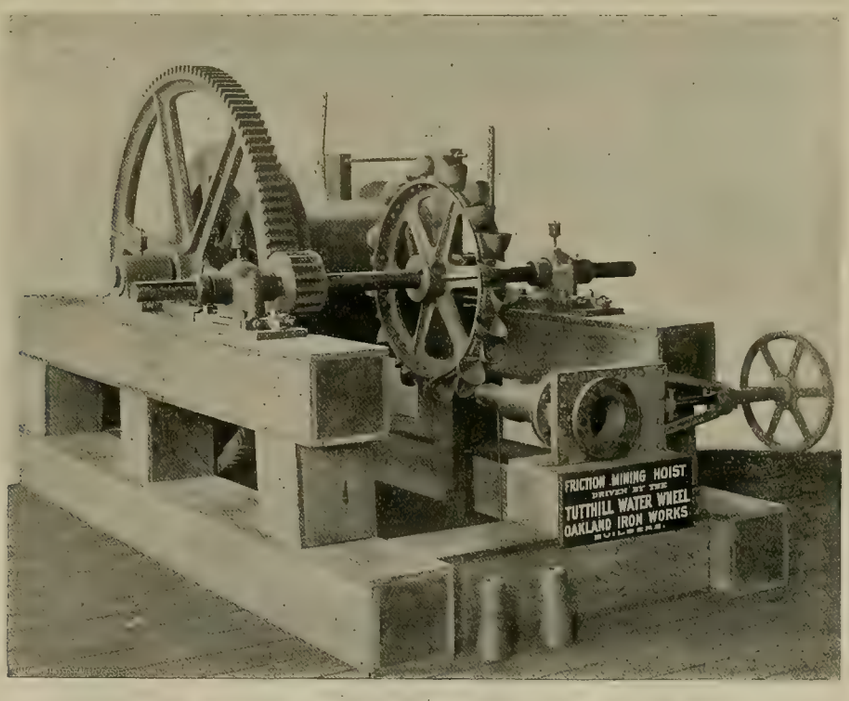
The Wilfley Concentrator.

The concentrator consists of a flat table, 7x16 feet, resting on rollers, and is operated by an eccentric, giving a jerking motion, which carries heavy material to bottom of bed, then forward to head end of table. The pulp is fed through a feed box extending from end to end. This box is divided in such a way as to feed pulp at one end and clean water at end where concentrates pass off. All the material is kept continually under water and not exposed to the air. The silica passes across the table, it being slightly inclined, and off at the side, it passing over cleats, coarse silica passing off first, the table acting as a sizer to a certain extent. The table is covered with linoleum, on which is nailed from two to seven cleats about ½-inch high at tail end of table and tapering to a feather edge toward head end. The first cleat is put on lower edge of table and runs up to within 2 feet of head end; the other cleats are shorter and shorter as they cross the table toward feed box, making the last cleat about 4 feet long. The pulp is fed onto table as near tail end as possible and the jerking motion sends concentrates to bottom, and at the same time moves them toward head end. When concentration commences, the coarse silica passes over high end of cleats, and, as ore moves forward, finer silica rises as height of cleat decreases and passes off. This, the manufacturers say, is done without materially disturbing bed of concentrates, which moves forward and around end of cleats until a sufficient quantity collects to go straight forward and off head end. The space left between end of first strip and head of table allows middlings to pass into a long trough on side and pass to wheel conveyor at extreme tail end, where it is elevated and passed over table into feed box to be retreated. The adjustment is done by turning a hand wheel connected with a rod running entire length. This rod operates wedges, which raise on lower side of table evenly from end to end. The capacity is from fifteen to twenty-five tons per day of twenty-four hours per table, and the agents, Messrs. White & Rogers, 306 Pine St., San Francisco, say with this load it will take the finest kind of material forward.



THE WILFLEY CONCENTRATOR.

THE accompanying cut illustrates a single drum-geared hoist designed to be operated by a Tutthill water wheel at the Hedrick gravel mine, Calaveras county, Cal. The hoist is of the V friction type—simple in design and strongly constructed. The brake, as will be observed, is of the post type and will be operated by a foot lever from the working platform. The friction and gate will also be operated by hand lever from the same platform, thus, the manufacturers claim, insuring instant and positive control when the hoist is in operation. The bearings are mounted on sole plates, which are provided with adjusting screws so that the gear and pinion can be held in proper mesh at all times. The Tutthill wheel shown in the cut in connection with the hoist is designed to develop 30 H. P. under a head of 150 feet, and can be furnished and connected with these hoists suitable to any requirements or heads. The hoists and water wheels are manufactured by the Oakland Iron Works, Second and Jefferson streets, Oakland, Cal., and their San Francisco office is at No. 108 First street. The shipping weight of this hoist and wheel, knocked down and boxed, without wooden frame, is 4900 pounds.



FRICTION MINING HOIST DRIVEN BY TUTTHILL WATER WHEEL.

Scientific Progress.

Water Power Possibilities.

Far-seeing men all over the world are looking for substitutes for the coal which, as the source of steam power and as a necessity in various metallurgical operations, lies at the basis of nearly all manufacturing enterprises. Coal is getting dearer everywhere, even in regions where, as in the greater part of the United States, no scarcity has yet been developed. With the rapid increase of consumption which follows an increase of population, the day can not be far off when scarcity will be felt even in what are now the most favored regions. The yoking of the winds or the sun's rays was to the chariot of industry occupies the thoughts of not a few. Ericsson taught us, before he died, that a caloric engine set in motion by the sun's rays was not an impossibility, and in the direction of power generated by thermo electricity—the sun furnishing the heat—still more definite successes seem to lie. But it is in the greater development of natural water power that the most practical men look for the readiest substitute for steam. Lord Kelvin, the eminent British scientist, said recently in a public address that he looked for such scientific and successful use of water power that the industrial conditions of all Scotland would thereby be transformed. All classes and all parts of the country, he thought, would be profoundly affected. The localities where the "scientific and successful" development of water power can be achieved at the smallest expense are those which will take the lead now held by localities most accessible to coal deposits. Such water-favored localities, where natural power has been used in a wasteful way by old-fashioned methods, are studying how best to get the full value from the natural endowments of their sites by the use of more scientific methods. California is occupying prominent place in utilizing the unyoked water power of mountain and valley, in producing electric power and light and thus creating a new industrial era.

Andree's North Pole Balloon Voyage.

In Andree's balloon the total buoyancy of the gas was 12,000 pounds. The three men would weigh 500 and the balloon probably not over 1700 pounds. Very tight balloons have been made in this country that would weigh for the same size about 900 pounds. This would give eighty days' flotation. It is probable that the computation calls for even a heavier balloon, and also for carrying the car all the way. It is customary, however, to prepare the car so that it can be used as ballast and at the last use the ring of the balloon. It is a pity that more experience was not gained in a long voyage before attempting the extremely hazardous voyage to the Pole. The fact that the balloon was beyond control at the very start is very significant. It is doubtful if any aeronaut living can release safely a balloon of 170,000 cubic feet capacity in a twenty-five-mile wind. If plans had been made to keep the balloon at 6000 feet or so the success of the voyage would have been better assured. By using a small pilot balloon it would have been easy to send the overflow into the smaller balloon, and, after the larger had leaked out enough, the gas in the smaller balloon could have been sent into the larger and the smaller used as ballast. At 6000 feet the danger of rain and sleet freezing on the balloon would have been avoided and the currents which are far steadier and more rapid would have reduced the voyage by one-half or even one-third. It is not generally known that this country holds the record for a long-distance voyage.

On July 1, 1859, La Mountain and three others sailed from St. Louis, Mo., to Henderson, N. Y., 870 miles, in nineteen hours. Such constancy and velocity of air currents is seldom thought of and could have been found only, as in this case, at a height of 6000 to 8000 feet.

The balloon route would seem the ideal method of reaching the Pole, and the French are already planning for such a voyage in 1898. Let them first bring their balloon to this country and make the Atlantic voyage in the track of the steamers, where the least untoward event will not be absolutely fatal. Also, let the balloon be placed at a height of at least 6000 feet. It is just as easy to keep a ballon there as close to the earth. At Mt. Washington (6300 feet) there have been frequent cases of west winds of 100 miles and over per hour for thirty-six hours, and this would mean less than forty hours for the trip.

Of course, the great question is as to the occurrence of storm and high-area conditions at the Pole similar to those in more southerly latitudes, and the evidence from weather maps made near the Pole seems to show a great similarity. If so, any steady wind near the Pole would give a straight course to the Pole, and the same wind would give a straight course back to civilization. It is a pity that with so much interest centered in this enterprise there should be so many fakes of carrier pigeons, etc., started. It is very rare, indeed, that a carrier has been known to fly 1000 miles, and then only after being taken over some part

of the course half a dozen times. For a carrier to go 1500 or 2000 miles is an unheard-of feat.

Only One World.

Scientific contemporaries have come to the conclusion that there is only one earth, and such being the case, it is a very desirable place of residence. An idea prevails in the common mind that our world is only one of countless similar bodies; that space is filled with solar systems not unlike our own, and that it is possible other globes are inhabited and quite as habitable, if not more so, than the one on which we dwell. *Popular Astronomy* says: "Although our solar system is only one among thousands of systems now known to exist in every part of the heavens, among all these other systems there is not yet a single one which closely resembles our own."

This is not a positive assertion that ours is the only world in which human beings live and move and have their being, but it leads up to that belief, and this is sustained by much argument dealing with astronomical technicalities which may be omitted here.

Not only is our earth unique in its favorable position in our system, but our system as far as is known is unique in the universe of systems. We rarely think on how narrow a margin we live. A little more heat or a little more cold, and we die. Our existence depends on keeping changes of temperature within a range of about 1 per cent of what we know as possible extremes. If the moon were very much larger the tidal wave would carry the entire ocean twice a day over the surface of the earth. If the earth were much smaller we would lose our atmosphere; if it were much larger we could not stand upright more than five minutes, nor would we be able to mount a hill except by painful crawling. If the year were twice as long as it is, it is doubtful if we could raise food enough in the summer to carry us through the winter, or if we could survive the accumulated cold. In every way our earth lies just at the meeting point of two kinds of death which "on this bank and shoal of time" we must fight with either hand. It makes no difference whether we have fitted ourselves to the earth through a long process of evolution, or whether it was fitted to us; as far as we know, it is the only habitable spot in the universe, and the chances are almost infinite that no other is so favorably located. Let us make the most we can of it.

THE primary cause of the low barometric pressure which marks the storm center and establishes the cyclone is expansion of the air through excess of temperature. The heated air, rising into cold upper regions, has a portion of its vapor condensed into clouds, and a new dynamic factor is added, for each particle of vapor, in condensing, gives up its modicum of latent heat. Each pound of vapor thus liberates, according to Professor Tyndall's estimate, enough heat to melt five pounds of cast iron, so the amount given out where large masses of cloud are forming must must enormously add to the convexion currents of the air, and hence to the storm-developing power of the forming cyclone. It is doubted whether a storm could attain, much less continue, the terrific force of that most dreaded of winds of temperate zones, the tornado, without the aid of those great masses of condensing vapor which always accompany it in the form of stormclouds.

A MIXTURE of 90 per cent of lime, 5 of resin and 5 of calcium carbide is claimed by an Italian, H. de Fazi, to be better and more economical than calcium carbide for producing gas. No special burner is required, and there is no fear of explosion from mixture with air.

FRENCH peasants have a belief that if a fire with much smoke is made in the stove on the approach of a storm, safety from lightning will be assured. Schuster shows that the custom is based on reason, as the smoke serves as a very good conductor for carrying away the electricity slowly and safely. In 1000 cases of damage by lightning 6.3 churches and 8.5 mills have been struck, but the number of factory chimneys was only 0.3.

Advances of Modern Science.

There are some, says W. T. Stead, who imagine that this age has been destructive of the belief in miracles. In reality it, more than any other since the world began, has brought home to the average man the stupendous miracle of the world. They call it a materialistic age, which has chained the soul of man to inert matter. But almost before the reproach is heard, science proclaims that there is no such thing as inert matter, that every atom is alive, and that our mortal bodies are vast composite conglomerations of living organisms, upon whose pitched battles in our veins depend our health or our disease. To take but one instance: Imagine all that we understand by the word microbe, and then recall the fact that the microbe was practically unknown sixty years ago. In a very special fashion, science has revealed to us a new heaven and a new earth, infinitely marvelous, testifying to an understanding so vast that the mind of man cannot by searching find it out. Behind each discovery that advances our knowledge, the infinite unknown indefinitely recedes. We weigh the stars, analyze their composition in the spectroscope; we photograph the moon and make maps of the canals in Mars. But far more stupendous are the discoveries that have been made, not in the infinitely distant abysses of space, but in the infinitesimally small molecules which are all around. Science has sent its Roentgen ray through the darkened veil and revealed the invisible and summoned all men to enjoy it as their inheritance.

THE Treasury Department will send out a special agent to make an investigation of the value and market price of calcium carbide, used in the manufacture of acetylene gas.

Electrical Progress.

Bursting of a Bubble.

The New York scheme in which were interested John Jacob Astor and Dr. W. Seward Webb has apparently collapsed. Incidentally, a system of electrical propulsion which it was thought would revolutionize marine engineering has failed to prove successful. The enterprise was the Samuels Dynamic Accumulator Company. The company manufactured a storage battery cell invented by Zak Williams. This cell was expected to solve the problem of electrical transmission both on sea and land, because it was thought that it could do twice the work of any other battery while weighing and costing only one-fourth as much. The first test of the battery was made on Mr. Astor's small yacht Progress. Sixty-eight of the cells, weighing only thirty-two pounds each, including the case, were put in. The expert's report of the efficiency of the system was so glowing that Mr. Astor at once began building a big 72-foot yacht to be equipped with the batteries and gave it a suggestive name—Utopian. Dr. Webb had buffet car No. 66 on the Chicago Limited equipped with sixty cells to supply incandescent lights for the round trip and arranged to have his car Elsmore and his locomotive Nehasene lighted by the same system. Dr. Webb hoped to build an electrical storage locomotive to haul a train to Buffalo and back without recharging the battery. The factory went ahead at its full capacity, turning out the 400 cells needed for the Utopian and the several hundred more to be used by Webb. Then came the experiments. They were not successful. The system did not prove effective on a large scale. The Utopian soon went out of commission and the batteries were not installed in Dr. Webb's private car, because they had not worked well in the buffet car. The result is that Dr. Webb and Mr. Astor have withdrawn from the company.

Firing Dynamite by Electricity.

At the Verbelia, Colorado, tunnel the dynamo used is located in the gulch 25 feet from the mouth of the tunnel; wires are run into the tunnel connecting with the electric caps, which, when the current is turned on, explodes the dynamite. This electric cap, in construction, resembles an incandescent lamp, inasmuch as it has two wires leading into it with a filament of platinum, but it differs from the incandescent lamp filament in action; the filament in the lamp is strong enough to carry the current which makes it incandescent, and therefore gives out a steady light, but the filament in the cap is not strong enough to carry the current, but burns off, causing an electric spark to ignite the fulminating powder in the bottom of the cap and explode, thus exploding the dynamite. The wire and filament in the cap are held in place by sulphur, which is poured in while it is hot, thus making the cap waterproof. The dynamo, which connects by wires with a round of holes in the tunnel, has a pull-up or push-down handle, which is connected to the armature by means of cog wheels which causes it to revolve at a high rate of speed, thus generating a large quantity of current, which is held in the dynamo by means of a short circuit until the armature has gained its highest speed, when the short circuit is automatically broken, allowing the current to flow through the caps and causing them to explode.

This is a safe way of exploding dynamite, because the miner must get out of his shaft or tunnel before the current can be turned on, and, consequently, there is no danger of any of the shots going off prematurely or of any of them hanging fire; and, to be doubly safe, the miner can keep his dynamo locked and the key in his pocket.

The English of It.

(*From the London Electrical Review.*)

LUDLOW, September 1.—The Corporation of Ludlow offers a prize of £20 to the best and most economical scheme of electric lighting for the borough. Town Clerk, Mr. John Herbert Williams. Should the Corporation employ the engineer whose scheme is awarded the prize to carry the work out, then the £20 will merge in commission.

That is to say, the Corporation of Ludlow wants all electrical engineers to draw up specifications for lighting the borough and promises to contribute $100 to some one of the lot—the Corporation, however, to have the benefit of all. And then, says *Electricity*, should the successful competitor also be chosen to carry out his plans, he will be permitted to relieve the Corporation of the necessity of paying him the $100 by taking it out of his commissions.

AS IN California, so elsewhere in this west half of America, great electrical plans are fast being put in tangible shape. A site has recently been selected for the proposed dam on the Big Hole river, Montana, at which point will be erected a $500,000 electrical generating plant to transmit current to Butte, Montana. It is expected that the plant will be completed by February, 1898. The power house will be 212 feet long, with a steel smokestack 150 feet in height. The dam on the Big Hole river, four miles from the divide, will be 60 feet high, built of masonry. The penstocks will be 10 feet in diameter. It is expected to transmit 5000-horse power to Butte, at an approximate loss of 10 per cent in transmission.

NOTHING more forcibly illustrates the resources, skill and inventive power of our people than the development of electrical industries. It is estimated that the capital invested in all of the various industries reaches $1,200,000,000. Inventions are almost in sight which will require vast quantities of money to develop. The practical application of electricity in the house and factory will be pushed to an extent now thought impossible. The rapidity with which improvements come absorbs and eats up great quantities of time, money and materials. A newer and better piece of electrical mechanism takes hold at once, the old going into the scrap heap.

F. SMITHSON has a model of the Meyer apparatus for immediately stopping the machinery from any part of the establishment by the simple pressure of an electric button. This device is in successful use in some large works and consists of a throttling valve applied to the main steam pipe, near the boiler. By a simple mechanism the valve can be instantly closed by an electro magnet, operated by a current of 10 to 12 volts. At the works where the experiment is in progress a Corliss engine, running eighty to ninety revolutions and delivering steam through a 3-inch pipe, is stopped by the device in a very few seconds. At the instant of making the electrical connection a whistle is automatically blown to attract the attention of the engineer in charge. In the larger works in France, in addition to the valve, there is an automatic brake which is set in action simultaneously and applied to the fly wheel. The possibility of stopping machinery from any part of an establishment by simply pushing an electric button will save many lives and much damage to property.

A NOVEL gang plank is being employed by the International Steamship Company at its wharf at Eastport, Me. Owing to a variation of 26 feet in the tide level and the fact that loading is accomplished by trucks, considerable trouble has always in the past been experienced in loading and unloading, and at times several men would be required to push the trucks up the steep gang plank. The present arrangement, as constructed by the Belknap Motor Company of Portland, Me., is in brief a reversed treadmill operated by an electric motor through suitable gearing. The gang plank is a frame supporting a moving floor 60 feet long and 4 feet wide, upon which the stevedores simply run their loaded trucks and stand until they are carried to the top of the incline. It is found that the conveyor is in every way a success and effects a great saving in time and money.

ONE evening last week at the Mechanics' Fair Pavilion, in this city, a band playing at Coronado Beach, 600 miles south on the California coast, was distinctly heard by long-distance telephone, and an operatic selection by the band in the Pavilion was as distinctly heard at Coronado. The long-distance telephone line connecting San Diego with Los Angeles and San Francisco is in operation. San Diego can now talk with Redding, Cal., direct over 904 miles of wire—one of the longest circuits in the United States.

THERE are now three completed electric railways in Japan, and work on four other roads has begun—one an electric railway, fifty miles long, through a number of small towns in the vicinity of Kobe. Current for the line will be generated by water power.

H. C. FAIRBANKS of Sibley College, while reconstructing a gas engine, observed a singular though probably not exceptional phenomenon which, so far as known, has not been previously described. The machine exhibited a great loss of heater efficiency, which was unaccounted for and was not affected by any changes made in the process of repair. Finally it was suspected that the conductivity of the metal of the cast iron "fire pot" had been impaired by oxidation or otherwise, and it was replaced by a new one. The engine at once started off at full power and regained its origininal efficiency.

THE Australasian Chamber of Mines in London are making arrangements for an international mining machinery and metallurgical exhibition to be held in London in 1899, in time for the exhibits to be forwarded to the Paris Exposition in 1900.

Mining Summary.

CALIFORNIA.

Amador.

At the Black Prince mine, Mount Echo district, four miles from Ione, E. N. Alexander foreman, the shaft is being deepened 50 feet.

Republican: The Oneida shaft is down over 1200 feet. Everything is running along smoothly. This is about the quickest work in shaft sinking that has been witnessed in Amador county, especially considering the excellent character of the work. It is the intention to go down at least 500 feet deeper before exploring for the ore body.

The South Eureka is reported to be paying, ore yielding a liberal margin over expenses.

Butte.

Mercury: About fifteen tons of mining machinery is at the depot, consigned to the Oregon Gold Mining Company, J. Champion superintendent, at Enterprise. A big stamp mill, steel bars, sheeting, etc., make up the lot.

Calaveras.

The Rising Star gravel mine, recently in operation under the management of J. L. Gleeson and subsequently closed down, has been bonded to San Jose men, who will resume operations.

El Dorado.

The new mill and twenty stamps at the Buena Vista mine are being constructed.

The Starlight mine, El Dorado, has shipped a carload of sulphurets to San Francisco.

The "800 nugget" found at the Shaw mine was worth $457.

New buildings and machinery are being put up at the Pocahontas mine.

The *Republican* says a move is being made to interest capitalists in the slate quarries on the American river, and adds: "It cannot be said that these mines have been tested till they are worked by good business managers with a clear working capital of $100,000 to start with. Nobody has yet tried them under conditions that would bring success in any quarries."

The *Nugget* says the company who have had the Griffith Consolidated mine near Diamond Springs bonded have paid for the property and are preparing to thoroughly develop it. Heavier machinery will be put in and the mine will be worked full-handed.

Fresno.

The Minaret mineral area, on the headwaters of the San Joaquin river, is about eight miles square; on the west and northwest sides are large deposits of high grade iron ore. On the east branch of King's creek are the Lake Superior gold, copper and silver mines, assaying high in silver and gold. One of the many advantages for mining in this district, says an *Expositor* correspondent, is the cheap water power there. On the headwaters of Minaret creek and Kings creek are sixteen large lakes, and the water capacity of any of these lakes can be increased by a small dam at the outlet. These creeks carry a large quantity of water, with many waterfalls from 25 to 1000 feet. For instance, on Kink's creek, at the lower end of the Comstock vein, the whole body of the entire stream within half a mile falls over 200 feet, and the same can be said of the Minaret creek and the three branches of King's creek, above the Comstock.

The Mammoth mines now get their heavy castings and machinery from Chicago and Columbus, Ohio. It comes by railroad to Bishop creek and Benton, and then by wagon to the Mammoth mines.

Inyo.

Considerable life is reported from Ballarat, where several prospectors have good finds. Montgomery Bros. are operating their mill.

Kern.

At Randsburg the Wedge Company is down nearly 400 feet. Assays of the ore run $50 to $107. There is a favorable change in the character of the ore, now running in sulphurets, indicating a permanency of the ore bodies.

At the Durnal quartz mine, situated between Angua Caliente and Piute, improvements are in contemplation. An 8-stamp mill is to be erected at the mouth of the tunnel and an additional mill is talked of farther down the ravine. The *Californian* says the number of men prospecting for quartz and gravel mines in that vicinity is greater than any previous year since the pioneer days.

J. Waugaman, on Greenhorn mountains, in a recent clean-up, says he got $6480 for a run of six days in a 5-stamp mill.

At Colorado camp, five miles from Garlock, the Cavil Gold Mining & Milling Company, incorporated under the laws of Arizona, has seven claims to be developed.

The Randsburg Placer Mining Company has incorporated with a capital stock of $1,000,000, of the par value of $1 per share. The incorporators are: J. M. Bracewell, J. P. Carroll, D. C. Kuffel, S. H. Reynolds and W. H. Hevren. The company will operate a group of eighteen placer claims two miles southwest of Randsburg.

Marin.

(Special Correspondence).—Marin county is so associated in men's minds with the idea of dairy pastures, milk, butter and cheese that most people will be surprised to hear of its claims to the production of minerals also. The surprise will not be of long duration, however, since in a few years it will stand without a peer as the great copper county of the State.

If anyone be inclined to doubt this assertion, let him take a horse and buggy, cross the "divide" and see for himself. Vast copper fields extend up the Pacific coast north of the bay of San Francisco, and the principal developed property in the belt may be reached by a drive of twenty miles from San Rafael. It is wonderful what a little enterprise will do towards advertising or showing up the resources of an entire section. Scarcely eighteen months ago the fact that there were precious minerals in the Coast Range at all would have been laughed at by old-timers. Now it is another tune. A few energetic men about that time, knowing "what was what," bonded some of the ranches on the coast and proceeded quietly to develop the same for copper. Their success has been phenomenal. They have opened in one place five immense parallel veins, running from 50 to 100 feet in width and carrying from 2 to 20 per cent of copper and small quantities of silver and gold. They are sinking on one particular vein, and from this they expect to reach the others by crosscuts underground. They have already some 200,000 tons in sight, and in a year they can have five times the quantity. This is little, however, compared to the prospects ahead of them. All these developments are confined to a few acres in one locality, whilst the whole property is five miles long and two wide, and copper prospects are found from one end to the other of it.

The company is putting up buildings and a concentrating plant, and will be shipping sulphides, in all probability, early the coming year. Some of the ore is rich enough to ship now without further treatment, and large quantities of this kind are expected when they strike one of the parallel veins for which they are running. The history of this property resembles that of the bean in the fairy story, which grew from the earth to the skies in a single night, for where there were only a few sheep walks or cow sheds less than two years ago are now to be found all the paraphernalia of a complete Sierra Nevada mining camp; and it all seems about as incongruous to San Francisco as the discovery of such an anomaly at Sandy Hook or Cape May would be to New York. This property, however, is only an avant courier. Now that the ice has been broken other investigations have been going on, and copper has been discovered all along the coast in quantities to distinguish this as one of the great copper localities of the world. With good harbors everywhere and boundless forests to draw on for mining timbers and charcoal, it needs no seer to predict the commercial blessings in store for Marin county and the San Francisco bay regions generally as soon as our financiers wake up to the presence of these deposits, and proceed with their usual enterprise to work them.

TAMALPAIS.

Mariposa.

Boston officials of the Merced G. M. Co. say rich rock has been found on the sixth level of the Mary Harrison, the lowest level opened in that mine.

Modoc.

A permanent mining camp will be established at Pueblo mountain, sixty miles east of Surprise valley. The Denio mine is now running a 5-stamp mill, yielding $1700 per month.

Mono.

During August the receipts of the Standard Consolidated were $34,700, disbursements $21,600, net profits $13,100.

Nevada.

(Special Correspondence).—On the Slate Ledge mine, five miles west of Grass Valley, Mrs. Perrin and sons are taking out good ore. They have a tunnel 800 feet in the hill, from which a winze is operated several hundred feet in depth. The east drift is 900 feet on a 4-foot ledge. The west drift is 200 feet. The ore averages $12. The sulphurets run 6 per cent and average $50 per ton. There is a 10-stamp mill in operation.

The new air compressor, power drills and dynamo placed last week in the Orleans mine are doing rapid work, and the Orleans will soon be among the dividend-paying properties of the district. It adjoins the faithful old Empire, which, with its forty stamps, is (since 1857) one of the financial props of this district. The Orleans is owned by only a few people, Mrs. Mills of Mills' Seminary being one of the principal holders of the stock.

At the Crown Point last week, on the 600 level, a 4-foot ledge was opened. After long years and great perseverance, the company (a French syndicate) are finally meeting with success.

At the Independence Messrs. Chevaune and Fricot are doing extensive and expensive development work. They spare no cost in doing their work thoroughly. They are sinking for the Maryland chute. Their present depth is 900 feet; it is expected to find the chute at 1100. The footwall is serpentine. The formation is the same as the Maryland. Mr. H. L. Body has charge of the work.

At the Brunswick Consolidated the east drift on the 900 is in 229 feet; the west is in 300 feet; both drifts are on the ledge, which averages 20 inches. They are placing two plunger pumps and other machinery, expecting to run twenty stamps in the near future. At present ten are in operation. C. H. Mallon is the superintendent.

Grass Valley, Sept. 15, '96.

The *Herald* says the "intermediate ledge" in the Providence mine, on the 1300 level, is 2½ feet thick.

Union: Work will be done this fall on the Old Men's mine at Dutch Harbor, on the Middle Yuba. The company own 2000 feet of the river bed and will let a contract to sink an incline under the bedrock. The claim is owned by Lademan, Bates, Liebrich, Tautphaus, Eastin and Walrath.

Union: Work on the Texas mine in Willow valley will be soon begun. A drain tunnel will be run 180 feet from the face, an upraise started which will practically give a three compartment vertical shaft 80 feet deep when finished. Hoisting works will be erected. Two plants, one for water and one for steam power, are to be built. A pipe line 3000 feet long will be run from the Snow Mountain ditch. There are eighteen different ledges on the property, ranging in width from 15 inches to 10 feet.

Placer.

Six miles northeast of Lincoln the Curtin Mining and Milling Company of San Francisco has the Old Valley mine, T. G. Durning general manager. This mine has a 30-foot vein of pyrites—50 per cent sulphur—a 6-foot quartz vein, a 9-foot vein of iron ore and a 9-foot vein of copper. The company expects to begin shipping pyrites in thirty days, and will commence milling their gold ore in sixty days.

In the Eureka Con. drift gravel mine at the head of the upraise the slate is becoming softer and very wet. Mr. Chappellet is so sanguine of reaching the gold-bearing gravel soon that he has let the contract for building the washing dump near the mouth of the tunnel and will be ready to go to washing the gravel as soon as the channel is struck.

Following is a statement of the Pioneer Mining Company for June, July and August:

	August.	*July.*	*June.*
Tons rock crushed	765	807	650
Value of gold bars.	$14,543	$13,241	$14 156
Pay roll	4,367	3,614	.....
Bills	1,723	2,968	.....
Total expenses	6,090	6,582	5,100
Net earnings	8,453	6,659	9,056
Average value rock	19.01	17.65	21.77

The mine now employs fifty-three men.

Plumas.

The Plumas *Independent* says: "Operations in the Robinson mine have been for the past few weeks suspended, but the cause of suspension having been removed, operations are to be resumed, which will set thirty men at work.

Independent: The twenty stamps in the Little Jamison mill, ten of which have been recently added, are crushing ore day and night. Forty men are employed in the mine and mill.

Riverside.

A ledge which is said to assay $2000 to the ton has been discovered by Superintendent J. M. Sigafus in the Good Hope mine, eight miles from Perris. The Good Hope has employed as high as one hundred and twenty-five men. Now thirty are at work.

San Bernardino.

Placer gold mining is being successfully prosecuted on Lytle creek and prospects are good for repeating the rich strikes of twenty years ago. Platt & Crawford are putting in hydraulic machinery. An $86 nugget was recently found in the canyon.

The application of the Pacific Borax Works for permission to cross a county bridge at Daggett with a narrow-gauge road to the Board of Supervisors has called the attention of the management of the Santa Fe to the plans of the company. A conference was held last week looking to a change of route, and instead of building from the works to Daggett, a distance of fifteen miles, to bring down the borax and avoid the heavy freighting for shipment, it is now proposed to build from the works to Newberry.

Shasta.

The force of the Mountain Copper Company, Ltd., has been increased. The sample rotary roasters are a success and more will be added. These roasters are of particular advantage in handling the crushed ore that could not be made to burn in the ordinary roasters or surface kilns because of the tendency to smother. A new locomotive, recently received, will be used for hauling ores.

The Altoona mine, at Cinnabar, is still flooded and it is estimated that it still contains 200 feet of water. After the big pump is erected it will require ten days' work to drain the mine.

Searchlight: The Mountain Copper Company, Limited, is erecting a residence for Mr. Bennie, shortly expected from the Rio Tinto mine in Spain, to be chemist for the company. Mr. Neilson, who combines this position with that of superintendent of the roasters, will devote his whole attention to the roasters. About three acres of land has been cleared for additional roasting surface, which will largely increase the daily tonnage of calcined ore. All indications point to a material increase in the capacity of mine and smelter.

Sierra.

The Downieville *Messenger* says affairs at the Gold Valley mine have been satisfactorily settled, and the workmen received their wages in full. The mine and works are now running with a good force of men.

Siskiyou.

Journal: The Scheld brothers have put in pipe from the shaft at Yreka creek, on Steele's place, to their boxes coming from Greenhorn, and started their pump, capacity 850,000 gallons in twenty-four hours.

The showing in the Schroeder mine at Deadwood has encouraged those who are thinking of taking hold of the Spencer mine, on the other side of the mountain.

A large number of placer locations in the South Fork of Scott river district have been located lately.

The most excellent results have been realized this season nearly at all the river mines on the Klamath, the majority of which are operated by Chinamen. They have had a long season to work in, and are now experiencing their first trouble with low water, which renders it hard to keep their wheels in motion.

The dredger on the Klamath has been working night and day, taking out good pay gravel.

The Hop Yick company of Chinamen, who have been working the Montezuma mine near Callahans, this season, have made that property pay handsomely. This mine comprises about 60 acres, lying along the bed of the South Fork of Scott river. The bedrock lies from 20 to 30 feet below the water level.

The Klamath Flume and Mining Co. expect to have their plant in operation in 1898. When their ditch and flume are finally completed, which will furnish them with the water for their giants, they will have one of the finest water privileges in the State. This company has a number of acres of fine placer ground along the Klamath, and from prospects that have already been made, at different points on the property, they will be rewarded for the expenditure of their capital.

Most all of the hydraulic claims on the Klamath are waiting anxiously for the fall rains, so they can begin operations on their mines, although it will be the first of the year before many of them can begin. The season has been shorter this year than usual, but the mines have paid well in nearly every instance.

Journal: The recent rich strike in the Schroeder mine on Deadwood, means much to the future prosperity of Siskiyou county, as the future of any section depends largely on the permanency of its lode mines. Heretofore the cry has been that our ledges do not carry value in depth. The fault has been in the operators, not in the mines. Comparatively low grade on top, this ledge has steadily improved with depth, and on the 1200-foot level shows an ore body 4 feet wide of quartz. The old Spencer mine is to be opened by San Francisco men. Worked to a depth of 190 feet, it yielded a large amount of $100 ore. At this depth a zone of low-grade quartz was struck, and, with very little further investigation, the pumps were pulled and the work suspended. Prospectors on Greenhorn creek, a tributary of Yreka creek, are constantly finding bunches of rich paying pockets and taking out considerable gold from the placers at bedrock.

Trinity.

Journal: Owing to the flooding of the Altoona company's mine only twelve men are working there at present. The old pumping works were found to be incapable of handling the flow and a new boiler and pumping plant are in operation now. As soon as the mines are pumped dry and it is demonstrated that the water can be kept under subjection work on a large scale will be resumed. When the mine is being actively worked seventy-five men are employed, and indirectly it supports 155 men. It requires twelve cords of wood a day to keep the furnaces going. The mine runs ten months in a year.

A large amount of iron pipe is passing through Weaverville for the Cle F'se Company at Junction City to be used in the construction of a siphon to carry water to the Keno claim, one of the properties of the company. The largest pipe is 34 inches in diameter. The line will be about 6000 feet in length. Preparations are now being made at the mine to lay the pipe under the management of E. Saladin, superintendent of the mine.

Tuolumne.

The Tarantula mine is to have new hoisting works. Drifting continues on the 100 level.

Two and one-half tons of ore shipped from the Manzanita mine to the Selby smelter footed up $145.

The Tuolumne Water Company has rejected all bids for the building of a cob-work timber dam on the river near Hale's mill. The lowest bid was $19,000, being $3000 above the engineer's estimate. The company has decided to construct the dam itself.

Banner: At the Gerrymander, J. L. Joseph supt., the main shaft is down 210 feet. The 5-stamp mill is hung up owing to a lack of water power. This handicap will be done away with, with the return of a full water supply, when a fine modern stamp mill and air compressor will be put in. There are 2000 tons of high-grade quartz on the dump.

The Marble Point is an East Belt property near the main Tuolumne river, in the Buchanan district, recently opened up by the Diamond Consolidated Gold Mining & Milling Company. The main or level tunnel has been driven in 50 feet on the vein.

At the Rawhide in the south drift of the 600 level, the face of the drift shows an 18-foot ledge, which when put through the mill gives large returns. In the 600 a fine body of ore is in evidence as is the case in the 1100.

Wm. Boyle has taken charge of the Carolyn mine. At the Modoc work is still being prosecuted on the lower tunnel. The Ready mine has been bonded to a company who contemplate building a 10-stamp mill.

Independent: The Gold Bug has been bonded by Campbell, Fitzpatrick and Burns of San Francisco. A two-compartment shaft 4 feet 6 by 8 has been sunk 50 feet. The company will erect a hoist.

It is reported on good authority that the old Soulsby mine will soon start operations again. It has been closed on account of disagreement between the shareholders.

The Yellow Jacket at Arrastraville has passed into the hands of Dutch Gold Mining Company.

Tuolumne county does not get the benefit in the records of the output of the Dead Horse. The rich sulphurets are taken to Angels Camp for treatment. The mine is producing more gold than ever from the deep 1400-foot level, and the 20-stamps are never left idle.

On the grounds of the Tarantula, Surveyor Hopper has been surveying for a hoist site. The excavation will require the removal of 20,000 cubic feet of rock.

Yuba.

The Allison & Co. mine at Smartsville, leased from the Marysville Quartz Mining & Tunnel Co., ceased operations last week, the new machinery failing to find the pay dirt.

NEVADA.

The Jackson cyanide plant near Silver City is running on about ten tons daily.

After the fire at the North Mountain mines, Egan canyon, several miners left for Utah; but when the owners uncovered the mouth of the shaft they found the fire only extended down the shaft some 50 feet, which will prob-

ably soon be repaired when the mill will be in full operation again. Meanwhile there is over 3000 tons of ore on the dump, by measurement, and the mill will keep grinding.

The De Lamar *Lode*, in its summary of the week, says: The De Lamar mill is now making a record for fast work that is hard to beat. One thousand and forty tons is the latest. The entire mill is in first-class shape now and is far surpassing all past records.

The Grande Oro placer location of 4,000 acres, at the mouth of Gold canyon, at and above Dayton has been thoroughly tested, yielding over $90,000 in the last two years, and is still turning out over $1,000 per month. A shaft 45 feet deep has been sunk at Dayton, showing gravel prospecting from two bits to a dollar to the pan, but a very strong influx of water prevents deeper sinking. A long bedrock tail race from an eligible point below on the Carson river will eventually be brought up at a heavy expense to effectually drain the whole country.

At Horseshoe Bend, on the Carson river, twenty-four miles above Carson, an extensive gravel gold deposit has been more or less prospected for the last three or four years but without paying results, it being very fine float or drift gold, difficult to save, and with but little fall for washing and drainage. A shaft has been started to test its deeper aspect and possibilities.

The *Lyon Co. Times* says Peck Bros. have arranged for the purchase of the Logan and Hully mine in Palmyra, having a ninety-day option on the mine for $70,000. They will ship a carload. Should it be demonstrated that the ore can be successfully worked by the process contemplated, the sale will probably be closed at once. A carload of material from the Douglass tailings reservoir will also be shipped. Should these objects be accomplished a $30,000 or $40,000 reduction plant for Dayton, a tramway from the mill to the mine a distance of ten miles and the employment of a large force of men will result.

The Gold Creek *News* says that the beneficial working of the new mining law is seen in the development of Island Mountain. It is now covered with 10 foot holes, dug this summer, showing up good ore, while older sections have been held for years without a stroke of work.

White Pine *News*: At the Star mine Supt. Farren has machinery on the road for the 20-stamp mill, and tests will be made to find the best process of working the ore preparatory to erecting a 200-ton capacity mill for which there is an abundance of ore in the mine.

OREGON.

Trefren & Snowgoose Bros', mine near Merlin is a bar claim in Rogue river and is mined by the wing-dam method. They have been on the pay streak channel for three weeks, taking out $40 per day, with an expense of $15 per day.

Judge W. H. Reid of Tacoma has bought the Hammersley mine on Jump-off-Joe.

WASHINGTON.

At a recent meeting of the Methow Mountain Mining Company it was decided to let a contract for development work.

BRITISH COLUMBIA.

A Nelson dispatch says at the Hall mines smelter Supt. Nichols, who assumed charge the morning of the 1st, resigned that evening. Robert Headley, formerly of the Pilot Bay smelter, has charge. A permanent superintendent is to be sent from London, it is said.

The Hall mines smelter reports the following business done during the four weeks ending August 27th: There were 5766 tons of ore smelted, which yielded 522 tons of matte, containing (approximately) 232 tons of copper, 157,360 ounces of silver and 215 ounces of gold.

J. M. Harris, president Reco Mining Company, proposes to drive a crosscut tunnel through Noble Five mountain—2 miles long, 12 feet high, wide enough for a double car track, and chambered the entire length so as to allow for drainage and natural ventilation. These workings would tap at a great depth, thousands of feet in some instances, and within a distance of two miles several rich leads, all of which parallel the main Slocan belt.

The shipments of ore from Sandon from August 1st to September 9th, inclusive, were as follows: Slocan Star, 1160 tons; Ruth, 1140; Payne, 1598; Idaho mines, 426; Noble Five, 235; Reco, 100; American Boy, 16; Slocan Boy, 15; Wonderful, 13; total, 4704 tons.

A shipment from the Athabasca mine, near Nelson, last week, consisting of twenty-nine tons, gave a smelter return of $97.70 per ton. Twenty-seven men are now employed at the mine and only a portion of the ore taken out is being shipped. The balance, which is free milling ore, is being put to one side for the mill, which will probably be erected this winter.

Shipments from the Nelson smelters last week were as follows: Hall Mines smelter, 94½ tons matte; Trail smelter, 79 tons matte; total value, $87,988.98.

At Ainsworth the Petersons of Philadelphia are erecting a plant that will handle 200 tons a day. They will handle ores for $2.75 per ton. The Pilot Bay smelter has announced free transportation of ores on Kootenay lake for treatment at its smelter, and instead of following the example of the Hendryx smelter and charging a few dollars more per ton than was charged at American smelters, to support home industry, the Pilot Bay people promise a much lower rate than the existing $21 freight and treatment charge.

THE KLONDIKE.

The following may be read with profit by those who contemplate a sojourn in the Yukon valley. The report is made by Assistant Surgeon A. E. Wills:

"Men should be sober, strong and healthy. They should be practical men, able to adapt themselves to their surroundings. Special care should be taken to see that their lungs are sound, that they are free from rheumatism and rheumatic tendency, and that their joints, especially knee joints, are strong and have never been weakened by injury, synovitis or other disease. It is also very important to consider their temperaments. Men should be of cheerful, hopeful dispositions, and willing workers. Those of sullen, morose natures, although they may be good workers, are very apt, as soon as the novelty of the country wears off, to become dissatisfied, pessimistic and melancholy.

"The climate is wet. The rainfall last summer was heavy. Although there is almost a continuous sun in summer time evaporation is very slow, owing to the thick moss which will not conduct the heat, in consequence the ground is always swampy. It is only after several years of draining that the ground will become sufficiently dry to allow the frost to go out, and then only for a few feet. During the winter months the cold is intense, with usually considerable wind.

"A heavy mist rising from open places in the river settles down in the valley in calm extreme weather. This dampness makes the cold to be felt much more and is conducive to rheumatic pains, colds, etc.

"Miners are a very mixed class of people. They represent many nationalities and come from all climates. Their lives are certainly not enviable. The regulation 'miners' cabin' is 12x14 feet, with walls 6 feet and gables 8 feet in height. The roof is heavily earthed and the cabin in generally very warm. Two, and sometimes three or four men, will occupy a house of this size. The ventilation is usually bad. Those miners who do not work their claims during the winter confine themselves in these small huts most of the time.

"Very often they become indolent and careless, only eating those things which are most easily cooked or prepared. During the busy time in summer, when they are 'shoveling in,' they work hard and for long hours, sparing little time for eating and much less for cooking.

"This manner of living is quite common among beginners, and soon leads to debility and sometimes to scurvy. Old miners have learned from experience to value health more than gold, and they therefore spare no expense in procuring the best and most varied outfit of food that can be obtained.

"In a cold climate such as this, where it is impossible to get fresh vegetables and fruits, it is most important that the best substitutes for these should be provided. Nature helps to supply these wants by growing cranberries and other wild fruits in abundance, but men in summer are usually too busy to avail themselves of these.

"The diseases met with in this country are dyspepsia, anæmia, scurvy, caused by improperly cooked food, sameness of diet, overwork, want of fresh vegetables, overheated and badly ventilated houses, rheumatism, pneumonia, bronchitis, enteritis, cystitis and other acute diseases, from exposure to wet and cold; debility and chronic diseases, due to excesses."

The steamer Farallon arrived at Seattle, Wash., on the 16th, from Skaguay and Dyea with thirty passengers, who have given up the attempt to reach the Yukon gold fields this winter. C. F. Shaw, representing an English syndicate, accompanied by a party of seven, took passage on the Farallon from Fort Wrangle and is in Seattle. He has been prospecting the divide between Cassiar and the headwaters of the Yukon emptying into Lake Teslin. He reports the existence of large quartz ledges of the same grade as the Treadwell, but they cannot be worked with profit on account of not being able to get machinery. Mr. Shaw says that these difficulties will be overcome by the construction of the Cassiar Central Railway and the Teslin Lake Railway, which is now being surveyed by the Canadian Government on Stickeen river. Shaw believes that Fort Wrangle will be the point of departure for all goods and machinery that will be sent into that part of the country. He intends sending in an outfit of twenty men via Wrangle, the Stickeen river and Teslin lake next spring with instructions to prospect the more remote districts of the headwaters of the Yukon immediately adjacent to the old Cassiar gold diggings. The placers on this divide undoubtedly have derived their quartz reefs in the immediate vicinity, as Shaw has in his possession a quantity of placer gold which is quite unworn and full of quartz.

The purser of the Farallon says there is a scarcity of boats at Lake Bennett and that they are bringing upwards of $500 each.

Sulphur creek, a branch of Dominion creek, which is a tributary of the Indian river, is the scene of the latest gold excitement in the Klondike. Gold is reported found just below the surface running $34 to the pan. A stampede followed the reports of the new finds, which reached Dawson City August 15th. In a week five hundred men had crossed the mountains between Eldorado creek and Dominion creek. They traveled day and night, and in two weeks the whole stream was staked out. J. E. Light, who left Dawson City on the steamer Bella, August 18th, owns a claim on Sulphur creek. He says: "When I first heard of the strike on Sulphur creek I went over the mountains to investigate it. I spent one day with two brothers, the McKinnon boys, of Wellington, B. C. I saw them take out $300 in one day from simply sinking two prospect holes. The formation is the same as at Eldorado creek. It bears the same relation to Dominion as does Eldorado to Bonanza. The streams empty into the Indian river. They are just across the divide from the Klondike. Of course, when the news of the new discovery reached Dawson there was a great stampede and hundreds left the Klondike for Sulphur creek. It is all staked out now."

Louis Sloss, Jr., of the Alaska Commercial Co. arrived from St. Michaels on the steamer Excelsior on the 15th. He says there is no food to be had in that country and very little can be got up the river this winter. The rush is greater than anybody up there expected, and so the trading companies were unprepared to supply the miners. His company tried to keep the people out, but to no avail. He left Dawson August 18th, but spent some time at other points on the Yukon. It's the same all along the river—a lack of food, but apparently lots of money. All the supplies that have been taken up were already ordered and paid for, so that no extra provisions are to be had. "If there is not a famine in Dawson this winter," he says, "I will be greatly surprised."

A. J. Green says: "One notable feature observed on arrival at Dawson City is that every man who has been there over winter and has made any money wants to get out, and the more money he has the more anxious he is to go. Nearly every one who has a mine wants to sell and come out in the spring, and those who can't sell look forward to next spring's cleanup, when they are sure to come. There is not much building in Dawson City, for town lots and building logs have been so high that the luxury of a house could not be afforded. The people are nearly all living in tents, and I do not know what they will do this winter. Wood was $14 per cord when I left, and everybody predicted that it would be $30 a cord this winter. Wages are $10 to $15 per day, but when one considers that the laborer has to pay such exorbitant prices for everything, he don't come out much ahead."

UTAH.

Park City *Record*: The Ontario Company is still working the mine with a small force and extracting ore, and the Marsac mill has commenced its test run on the Ontario tailings. The ditch for the new Silver King pipe line is about completed and ready for the 6-inch steel mains that will hereafter supply the mine and reduction works with water. The camp has steadied down to a normal condition now, and the fright is over. Many people have gone away, but a great many—between 4500 and 5000—still remain, and business goes on as usual.

Tintic *Miner*: During the past week the Bullion-Beck Company has commenced prospecting in a new direction with the intent of putting that mine into line as a gold producer. While it is generally overlooked, it is a fact that several years ago the Beck sent out a considerable quantity of high-grade gold ore. This ore was discovered between the 600 and 700 foot levels, about 1000 feet south of the shaft, and was followed through to the 850 level, where the vein was lost. Several tons of the ore was marketed, which showed values in the neighborhood of $400 to the ton. A winze was sunk 100 feet below the 900-foot level, but was abandoned on account of not finding the gold vein. During the past week an 8 H. P. engine has been put at the top of the winze on the 900 level and drifting south in search of this lost vein has commenced. Supt. Kirby is confident of being able to find the gold. The great silver-lead stope north of the shaft is holding out in good shape and at the 1150 level is as strong as ever. About eighty tons of this ore is being hoisted daily.

IDAHO.

At Osburn, owing to the low price of silver, the Nellie and Mineral Point, each of which has been making occasional shipments for months past, have closed down. Their ores are gray copper.

The Elmore mine and mill at Rocky Bar, Mr. Church manager, has renewed development work. It will take four weeks to dry the mine.

At Murray the Anaconda Gold Reduction and Revivification Company will crush its ores by rolls, driven by steam. No other machinery of consequence will be used.

Supt. E. H. Dewey of the Florida Mountain Mining Company has instructions from the Eastern office of the company to discontinue all work upon the property, due to the dull outlook for silver.

W. H. Watt is appointed receiver of the Red Elephant mine at Hailey, owned by the G. V. M. Mining Company, in foreclosure proceedings by the First National Bank of Hailey on a mortgage for $6500. The Red Elephant has been one of the best silver properties on Wood river.

J. D. Gibbons of San Francisco is on the Snake river, where he has a new machine for saving fine gold. The machine is operated by electricity furnished from a dynamo which charges a powerful magnet. This magnet will lift a body of iron weighing 250 pounds if placed within 18 inches of it. By the use of this machine its inventor claims that all the gold will be saved, as well as the iron sands in which the gold is found on the Snake river. He claims that this iron sand makes the finest of razor steel, and the gold is not only separated from this and saved, but the sand is melted by electricity into pig iron. He claims the iron alone will pay all operating expenses of the machine, leaving the gold as clear profit. The machine costs about $600 besides the engine and dynamo, and has a capacity of forty tons of sand per day. Two men besides the shovelers will be required to operate the machine. The first test will be made at Lewiston.

The Wallace *Tribune* says that never before was there such activity in the Cœur d'Alene country as at present. Between 1200 and 1300 men are working for wages in mines that are producing ore, besides 200 or 300 more who are doing assessment or development work, some for wages and others on their own account. Over 15,000 tons of concentrates are turned out every month.

Hailey *Times*: The Red Elephant mill was started up the 2nd inst. with a sufficient ore supply to keep it going between two and three months. From 35 to 40 tons of ore, making 2½ to 4 tons of concentrates, are run through per twenty-four hours.

MONTANA.

At Basin the Katie people will soon commence building a 500-ton concentrator and a smelter. C. M. Allen of Butte will superintend the work.

The first car of concentrates from the Keystone mine was shipped from Leonia September 1. There are now several cars on hand at the Keystone mill at Sylvanite, which is being shipped to the United Smelting Company at Great Falls.

Dredging having been so successful at Bannack it is being tried with profit elsewhere. Another dredge is being successfully operated twelves miles from Avon. It differs from the first dredge put in, in that it runs on a truck. The Helena *Independent* says the dredge for Prickly Pear creek will apply a still different principle to the process of raising the gravel. It will be by means of a large suction pump that will take the gravel clear down to bedrock and convey it to the sluice boxes, where the treatment will be much the same as in other dredges. The Avon dredge is saving the gold and making money for its owners.

MISSOURI.

Joplin correspondence *Journal of Commerce*: Lead ore advanced again during the past week $1 per 1000 pounds and was in great demand, but zinc ore declined 50 cents a ton. The weather was favorable for mining, but the output was considerably reduced on account of many mines being shut down several days to allow the miners to attend the various attractions occurring in the mining vicinity.

The top price paid for zinc ore in all portions of the district except Springfield was $22.50 per ton. One carload of Springfield ore brought $23 per ton, the top price of the preceding week. Most of the zinc ore brought from $20 to $22 per ton. The average price paid for zinc ore was 50 cents per ton less than the preceding week, there being a general decline in all grades. Considerable of the Joplin ore, all of the Stotts City, Alba and Oronogo product brought $22.50 per ton.

Lead ore started in at $23.75 per 1000 pounds, delivered, and on Friday advanced to $24.75. The week closed firm at those figures, with indications of still further advances this week. The demand for lead ore was very strong, and since many of the low-grade silver mines, which reduced a great deal of galena, have shut down, there is considerable outside demand for Missouri lead ore.

The shipments of zinc ore were twenty-six carloads less than the preceding week, but were thirty two carloads more than the corresponding week of last year. There was an increase of 3,980 pounds in the week's sales of lead over the sales of the preceding week and an increase of five carloads over the sales of the corresponding week last year. The price paid for lead ore last week was $10.25 per thousand pounds more than during the corresponding week last year.

Following are the district sales of zinc and lead ores for the week ending September 4, and the sales of the year up to date:

Mines—	*Zinc.*	*Lead.*	*Value.*
Joplin	849,790	327,310	$ 17,963
Carterville	1,161,430	170,820	15,954
Webb City	683,700	44,110	7,928
Galena	2,820,000	306,000	33,120
Aurora	672,000	30,000	6,191
Stott City	118,310	41,840	2,348
Oronogo	140,470	4,950	1,635
Springfield	98,750	25,000	1,711
Belleville	10,440	16,840	531
District total for last week	6,564,890	967,170	87,381
District total for 36 weeks	230,062,370	38,540,560	$2,839,158

COLORADO.

The Pueblo smelter handles more Slocan, B. C., ore than any other. The August shipments to Pueblo were 5,124,595 pounds out of a total of 7,784,995.

The Colorado Springs *Telegraph* says the output for the Last Dollar for the past month was 54 carloads of ore—18 high grade and 36 cyanide ore. Work was started again on shaft B, which will be sunk 200 additional feet.

The output from the Legal Tender for August was 1500 tons—100 tons of high-grade ore worth $100 or more to the ton, 300 tons of smelting ore at $60 to the ton and 1100 tons of cyanide ore which will give a valuation of $30 to the ton.

The Telluride *Journal* says there is now a prospect for greater activity in the mining business in this county during the coming winter than ever before in the history of the camp. The larger properties are increasing facilities for enlarged production of the precious metal, and smaller properties are endeavoring to reach substantial and paying operations by adding to working capacity. New properties are coming into notice, some of which bid fair to become, with systematical development, the richest producers of the district. Several mines will continue working throughout the winter, which heretofore have shut down, more mills work and at greater capacity, and altogether the prospect is very brilliant.

A power scheme is organized by the Leadville Power and Electric Company for the transmission of electric power for mining operations. The electricity is to be generated by water power, brought from a point on Lake Creek about five miles northwest of Leadville.

The new roasters of the Colorado-Philadelphia chlorination plant at Colorado City were blown in on the 15th, increasing the capacity of the plant from 170 tons to 240 tons daily.

Says the Cripple Creek *Citizen*: Placer mining in connection with lode claims may seem somewhat of an anomaly, but nevertheless placer mining methods are being carried to a successful issue by Malins & Co. in their treatment of the Vindicator dump, which they are working under lease. The idea is novel and has proved so much of a success that the plan has already been adopted by other dump lessees. The system in question is simply the washing of all dump ore too coarse to go through the screens. The sediment thus obtained has been found to be extremely rich in gold values and runs as high

as $300 to the ton. After the dump rock has been run over a screen, or if it should be too wet to screen the rock is dumped into a large trough about half filled with water and fitted up with a false bottom of perforated iron. It is then stirred and sifted with a fork, the talc on the rock is washed off and as a matter of course filters its way through the perforations of the false bottom, from whence it is taken after the water has been drained off, and a cleanup is made. The sediment is then spread out on canvas for the moisture to evaporate and then sacked. This method is a simple and inexpensive one, and should be practically applicable for the treatment of dumps of mines in which high grade talc leads are found and which it is next to impossible to clean from the waste rock.

NEW MEXICO.

Notice has been posted at the Blossburg coal mines, operated by the Raton Coal and Coke Company, of a reduction of 10 per cent in wages, to take effect immediately. The present price is 65c., with scant employment.

At Trinidad the Chicago & Trinidad Gold Smelting Company, formed for the purchase and operation of the Copper King smelter, hope to have the plant in active operation this winter.

A special to the *Republican* from Santa Fe says: The Chaffee estate of Denver, L. M. Lawson of New York, Senator S. B. Elkins of West Virginia and R. C. Kerens of St. Louis, owners of the Ortiz mine grant in South Santa Fe county, have sold the property to a New York and London mining syndicate for $1,500,000. The property consists of 69,000 acres, which includes much of the gold-producing territory in New Mexico, and is in the hands of the New Mexico Mining Company, of which the above are the principal stockholders. L. S. Burns, an English mining expert, has spent six months investigating the mineral resources thereon, and his report has recently been verified by Mr. Fleming.

The Jumbo group of fifteen full mining claims in the La Belle district has been sold to an Ohio company.

Seventy men are employed on the Confidence mine, in the Mogollon district, and are taking out plenty of ore to keep the mill supplied.

Forty men are now employed on the old Hanover mine, in Grant county, and the mine is shipping almost 120 tons of ore per week to the Copper Flat reduction works.

The south drift on the 300-foot level in the Texas, Central district of Grant county, has been driven 85 feet from the shaft, and 12 inches of high-grade argentite disclosed.

The following from the Las Vegas *Optic* is a good sample of a newspaper account of "a big strike:" "W. S. Williams is superintendent for the Monte Cristo placer mining company of Kansas City. Recently he entered into a contract with M. Harrold, the Pennsylvania well expert, to sink a tubular well for the purpose of supplying water to wash the rich placer deposits owned by this company in "Old Timer" gulch, near Golden. They sought higher ground, and leased from the above named Las Vegans the privilege of locating the well on their property. At the depth of 350 feet it was noticed that the drill was bringing up pure white quartz carrying free gold. The stuff was panned and grains of the yellow stuff as large as an average grain of wheat were revealed. The miners of the camp went wild. The well was being sunk in virgin ground; no mining shaft in the vicinity had ever attained one-fifth of that depth, and it was recognized that a great find had been made. Yet nobody, not even the most enthusiastic, was prepared for what came after. As the well tools pounded away the white quartz ledge was shown to be thicker and thicker, and now after reaching a depth of 500 feet it has been demonstrated that underlying the surface ground owned by these Las Vegans there is a free gold deposit of at least 50 feet, the whole of which prospects $1000 to the ton and upward. Within this extraordinary deposit has been encountered a flowing underground river—its roar is akin to a small Niagara—which is good for the placer miners, but tough on the lode miners, who must sink a shaft, or several of them, to get at these newly found riches. It will probably cost, considering the quantity of water in sight, $20,000 to sink a shaft 400 feet there, but nobody questions the ability of Manzanares et al. to go after the great riches which have thus been shown to exist beneath the surface of their south Santa Fe county mining claims."

ARIZONA.

The wages of the miners employed by the Commonwealth Mining Company at Pearce are to be cut to $2.50 per day. Pearce has been a $3 camp.

At Saginaw camp, nine miles from Tucson, three carloads of machinery are being hauled to the mine, the crushing capacity being increased to 100 tons per day. The company have forty-eight men employed.

Crittenden reports that a twenty-eight-day run of the Empire smelter resulted in 250 tons of bullion of lead, silver and gold of the value of about $200 per ton.

At Rosemont the company has shipped 150 tons of copper bullion carrying a good percentage of gold and copper. About forty men are employed.

The work of rebuilding the Kasser Gold Mining Company's mill (ten stamps) in Lost Gulch is finished. The structure has been erected to accommodate ten stamps more, which may be added next year. It is expected that the stamps will drop about Oct. 1st. The Globe paper says it is the intention of M. W. Gibbons, general manager for the company, to sink 500 feet.

LOWER CALIFORNIA.

The schooner Anita is at San Diego from Santo Domingo with two gold bars, one valued at $5967 from the Ibarra mines at Calmalli, and the other worth $2933, from the Viznaga mine at Mexican Gulch. The first bar represents two months' work on the tailings, which are being worked over by the cyanide process,

PERU.

F. J. McKenna of Denver, Colo., has gone to Arequa, Chile, where he will manage the Choquelempie mine and mill for the owners, Deves & Co. of Tacna, Chile. The property is one of the oldest working mines in the world, having a record running back into the fourteenth century. From the Spanish records running to the early part of the sixteenth century, soon after the Spanish conquest, it is shown that the mine had been worked by the natives not less than one hundred and fifty years prior to the advent of the Spaniards, and it has been operated more or less continuously ever since. It is a silver mine and has produced an enormous amount during the five hundred years or more. It is located sixty miles from the coast, Arequa being the seaport of Tacna, at an elevation of 14,000 feet. The ore is rich and carries a high percentage of lead. It is sent to Germany for treatment, the freight charges being $8 per ton. From the mine to Arequa it is packed on llamas and mules. There is a large body of low-grade ore which will be concentrated, the owners having recently purchased machinery for concentration. Coal is $25 per ton; the fuel is wood.

The Beam Process.

A Colorado correspondent furnishes the following description of the Beam roasting and converting process, as is demonstrated by the experimental plant erected in Denver by Steele, Bristol & Co.:

The furnace is constructed of red brick, fire brick, tiling, fire clay and cement, forming a series of airtight muffles, 6x6 feet each, which in this plant are capable of roasting 500 pounds of ore at a charge. The roasting is done with a low degree of heat, and thus sulphides are converted into sulphates, leaving the gold in free condition. The roast is made for the first twenty-five or thirty minutes without air, during which time, it is claimed, the conversion takes place. Then a blast of hot air is introduced through pipes and valves arranged for that purpose. They further claim that before the hot air is introduced the product is in a condition which absolutely precludes the possibility of a loss by volatilization, and that for this reason their roasted product usually shows values in excess of that indicated by assays of the raw material. It is necessary to crush the ore to a 40-mesh before roasting, and after the roast the product is reground to an 80-mesh. In this condition, it is asserted, the ore is ready for any method of amalgamation desired.

Personal.

T. A. RICKARD of Colorado is now at Kalgoorlie, Australia.

JNO. W. MACKEY arrived in San Francisco from New York City last Wednesday.

L. L. ARCHER succeeds J. F. Parsons as general manager of the Dexter M. Co., Tuscarora, Nevada.

W. H. STORMS, superintendent Junction mine, Tuolumne county, Cal., is in the city purchasing supplies.

A. S. MILLER of San Francisco has been appointed to the Chair of Mining and Metallurgy in the University of Idaho, Moscow, Idaho.

HULET MERRITT, Jno. D. Rockefeller's private secretary, is en route to California with a view to mining investments herein.

GEORGE W. MAYNARD of New York is in Esmeralda county, Nev., where he has taken charge of the mining property at Silver Peak.

A. P. SCHNEIDER, the new manager, has started up the Red River, N. M., smelter after an enforced idleness of several months.

E. M. DOUGLASS, who has charge of all U. S. geodetic survey work west of the Mississippi, with R. M. Goode, is in Salt Lake City, Utah.

COL. W. S. KEYES, the California member of the Committee on Revision of Federal Mining Law, leaves for Denver to-morrow to attend the meeting there next week.

L. N. MCQUESTEN, who has been in Alaska for 26 years and has two stores, at Circle City and Forty Mile, arrived on the Excelsior last Wednesday. Like all the rest, the pioneer says nothing but the improbable arrival of thousands of tons of provisions at Dawson City will prevent a famine there next winter. McQuesten went to Alaska as an employe of the Hudson Bay Company, but from trading went to prospecting. He has grub-staked many a miner and is known all through the region for his numerous acts of generosity. He is the founder of the Alaska Pioneers' Society, members of which must have lived for seven consecutive years in the territory.

Coast Industrial Notes.

—The Sierra Wood & Lumber Co. will build a box factory, to cost $12,500, at Truckee, Cal.

—The National Government will now go ahead with the construction of a breakwater at San Pedro, Cal., and will push the work.

—The California State tax rate for 1897 has been fixed at 51 cents on each $100 worth of assessable property as against 42.9 last year.

—The Puente Oil Co. is daily producing 800 barrels of oil at Chino, Cal., and is trying to stand up against a local onslaught of the Standard Oil Co.

—W. A. Platt has made preliminary survey for a railway from Takua to Lake Teslin, Alaska, via the Trahaua river, 140 miles, and says the route is feasible.

—In Lakeview, Or., this week Reynolds & Edson are buying beef, says the *New Era*. They are paying 5 cents for three-year-old steers and 4 cents for cows.

—C. B. Jones is en route for Peru to begin construction of a railway from the present terminus of the Peruvian road, Paieasmayo, toward the head of navigation on the Amazon, the present scheme being to tap the Hualgagoe mining region in the Andean Cordilleras.

—The Randsburg, Cal., Railway Company has contracted with the Union Construction Company for the construction of its railway from Kramer to Johannesburg, to be completed and in operation by Dec. 10, '97. The road will be owned and operated as an independent line.

—From Yokohama comes the doubtful report that "a syndicate has been formed there for the purpose of telegraphically connecting Yokohama direct with San Francisco via Hawaii. The cable will cost $11,000,000, and the Japanese Government has promised to defray $500,000 of that sum."

—A. M. Allen of Oakland, Cal., who for some time past has had an option on the Carmelo coal mine, near Point Lobos, ten miles from Monterey, will commence the preparatory work necessary to get the coal out. The Carmelo mine has been shut down for four years. Formerly bituminous coal was shipped to San Francisco.

—The problem of how to obtain help enough to harvest this year's crop has become a serious one to the fruit growers of California. One employment agency has places open for 3000 men in Fresno and Tulare counties alone, while Napa, Sonoma, Yolo, Santa Clara and Yuba counties are not far behind. Last year for this class of work men were paid $20 a month and board; now $1 a day and board is the regular thing, and with this rise as an inducement the demand for men is greatly in excess of the supply.

—Poor's Manual for 1897 shows that of the railways of Washington, Oregon, California, Nevada, Arizona, Utah and Idaho in 1884 their gross earnings aggregated $33,530,716; in 1896, $56,575,922; in 1884 the percentage of expenses to earnings was 59.21; in 1896 it was 68.45; in 1885 it was 55.71, so that the increase from 1885 to 1896 was 12.74 per cent. In 1884 the railroads of this group paid 4.52 per cent interest on their bonded debt and 1.75 per cent dividends on their capital stock—a total of 6.27 per cent. In 1896 they paid 6.21 per cent on their bonded debt and one-hundredth of one per cent on their capital stock. At the close of 1896 the Pacific States had a railway mileage of 14,141 miles, divided as follows: California, 4948; Oregon, 1525; Washington, 2811; Nevada, 915; Arizona, 1412; Utah, 1441; Idaho, 1087. In 1860 they had but 23 miles of railway—all in this State. In 1870 Oregon had 159 miles of railway, but Washington and Idaho had none. In 1880 Washington had 289 miles; Idaho, 206.

—It is stated that the negotiations between the Vanderbilt railroad system and the Los Angeles Terminal railroad for an extension of the former's road from Utah to San Pedro harbor, Cal., have been settled and the route selected in a southwesterly direction from Milford, through the southern portion of the State of Nevada, passing through Las Vegas valley, across the Mojave desert, crossing the Atlantic and Pacific railroad a few miles from Ludlow station, thence in a direct line to the Morengo pass, then heading for the San Gorgonio pass to Redlands and Riverside, to Chino, north to Anaheim, to Los Angeles and San Pedro bay.

—The shingle mills of Washington State are operating on large advance orders, and an average from 60 to 75 carloads are being daily shipped out of the State to Eastern markets. It is thought that this year's output will be 2,500,000,000 pieces, valued at $3,000,000—an increase of 40 per cent in shipments and 50 per cent in value, arising from advanced prices. The lumber cut of the State, which was last year approximately 500,000,000 feet, valued at $4,000,000, will bring in about $5,000,000 during 1897 according to present indications, giving a total income from Washington forests of $8,000,000—an increase of about $1,500,000 over '96.

—The greatest run of salmon ever known in the Pacific Northwest has just ended. It is estimated that 1,500,000 Sockeye salmon were captured in the Fraser river during the past season, which was at its height from July 21 to August 5. The prices for the season average 22 and sometimes 35 cents for each salmon. The oversupply this year has been so great that the fishermen were glad to get 3 cents apiece for their fish. As a consequence, the market prices of canned salmon this year will be the lowest ever known on the coast. Upward of 5000 men were employed during the season, two-thirds of whom were Japanese. A conspicuous feature in connection with the big catch is that humpback salmon by the hundreds of thousands were thrown out of the traps to die on the mudflats.

Recent California Mining Incorporations.

Ord Mountain Copper M. and S. Co., Los Angeles; capital stock $1,000,000, all subscribed; W. H. Sowles, Santa Ana; S. W. Greene, W. S. Palmer, H. A. Priser, Ontario.

Gold Bug Mining Co., San Francisco; capital stock $1,000.000, $250 subscribed; J. D. Byrnes, H. C. Woodrow, H. Hale, C. B. Hawley, J. S. Spilman.

Bushman Gold Mining Co., San Francisco; capital stock $500,000, $2500 subscribed; L. P. Drexler, J. F. Cummings, J. T. Bradley, L. Alexander, C. Sutro.

Ina G. M. Co., San Francisco; capital stock $80,000, $50,000 subscribed; R. Harrison, A. H. Marchand, J. F. Cowdrey, A. B. and H. L. Moulder.

Spence Mining Co., San Francisco; capital stock $100,000, $20 subscribed; O. T. and E. M. Weber, T. J. and L. A. Wrampelmeier.

Alaska Dredging and Development Co., Hanford; W. A. Shahan, J. Anderson, L. R. Mills, G. W. Follett, D. R. Cameron; capital stock $150,000, subscribed $40,000.

Blue Ravine M. Co., Sacramento; capital stock $10,000, all subscribed; A. J. Hechtman, R. Graham, W. M. Sims, U. Stroup, A. W. Bonner.

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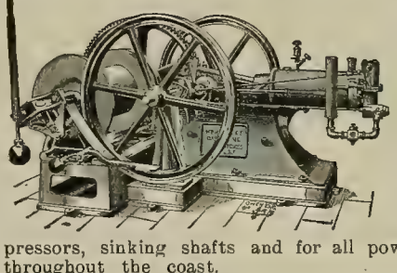

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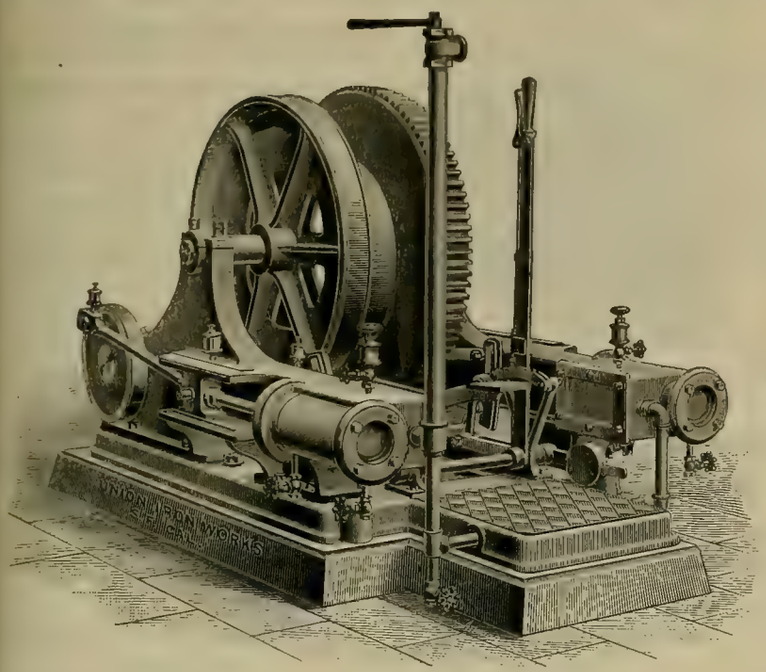

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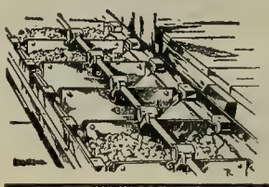

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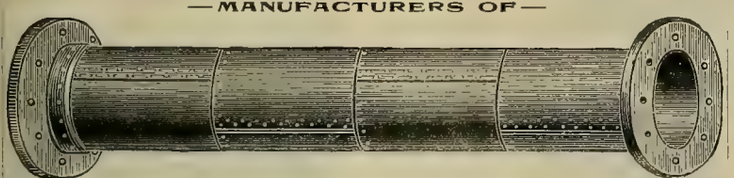

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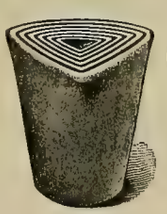

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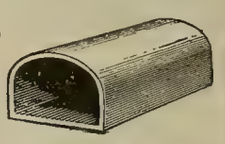

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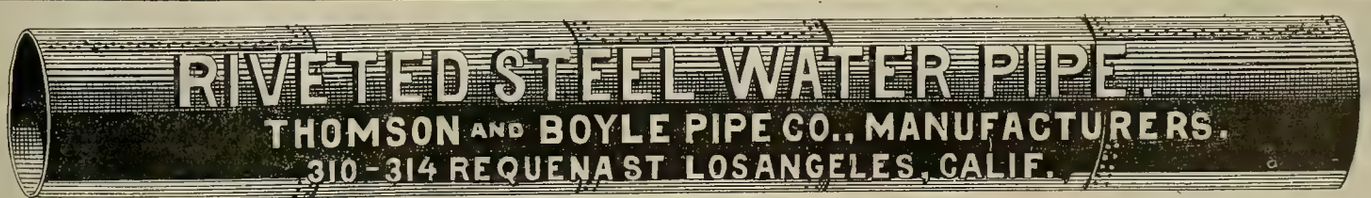

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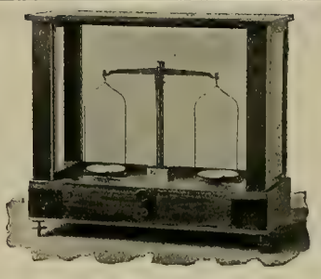

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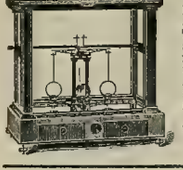

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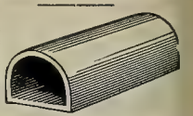

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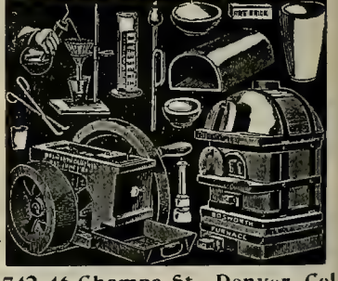

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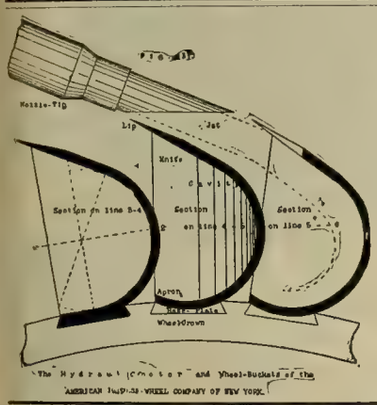

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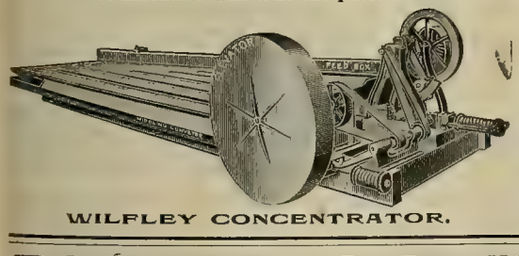

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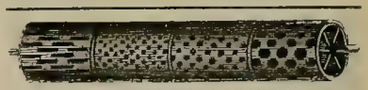

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING SEPTEMBER 7, 1897.

589,634.—CARBURETOR—Dan'l Best, San Leandro, Cal.
589,464.—BICYCLE REST—E. Church, Tacoma, Wash.
589,698.—BOTTLE STOPPER—W. A. Coghlan, Santa Rosa, Cal.
589,712.—MEDICINE APPLIER—P. J. Fouquier, S. F.
589,651.—CAR FENDER—E. Groat, San Luis Obispo, Cal.
589,654.—FEEDER FOR ROPEWAY CARRIERS—A. S. Hallidie, S. F.
589,509.—IGNITER—E. R. Moffitt, S. F.
589,667.—DINNER PAIL HEATER—Montague & Dougall, S. F.
589,746.—ELECTRIC SIGNAL—Owen, Williams & Donaldson, Garvanza, Cal.
589,747.—ANNUNCIATOR—Owen, Williams & Donaldson, Garvanza, Cal.
589,617.—SIGNAL BOX—A. C. Robbins, S. F.
589,618.—SWITCH AND CUT OUT—A. C Robbins, S. F.
589,619.—TELEPHONE TRANSMITTER—A. C. Robbins, S. F.
589,627.—CONCENTRATOR—A. C. Springer, S. F.
589,673.—CAN LABELING MACHINE—J. P. Simmons, S. F.
589,541.—FIRE ESCAPE—W. B. Wilson, Aberdeen, Wash.
589,458.—PUMP—W. C. Woodward, Los Angeles, Cal.
589,520.—WAVE MOTOR—P. Wright, Keswick, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ENDLESS BELT ORE CONCENTRATOR.—Amos C. Springer, San Francisco, Cal. No. 589,627. Dated Sept. 7, 1897. This invention relates to that class of ore concentrators in which the pulp and water are supplied to the surface of an endless traveling belt which is mounted at an incline so as to have an up-hill travel whereby the heavier particles clinging to the surface of the belt are carried up over its higher end and are washed off below while the lighter and worthless particles pass off down the belt over the foot, the class being called "Endless Belt Concentrators." It consists essentially in the combination with the bed frame and shaking belt frame of supporting standards having convex end castings fitting corresponding concaved recesses so that the movable frame can be shaken upon these supporting standards. A means is provided for vertically adjusting one pair to vary the inclination of the shaking belt frame. A worm engaging the gear on the driving drum and a series of pulleys of different diameters on the worm shaft serve to vary the rate of travel, and with them is employed a means for tightening the belt and holding it in the proper position. The belt has independent side strips with side flanges vulcanized to the strips, the side strips being removably secured by lines of stitching. A centrally located hopper having oppositely extending inclined chutes with longitudinal partitions of varying lengths dividing the chutes into parallel longitudinal runs of different lengths form a pulp distributer, and gates are adapted to control the communication between the hopper and the runs. An underlying box or casing is provided with parallel cross runs adapted to receive the material from the openings in the chutes and discharge holes from each deliver the material upon the belt.

CARBURETOR.—Daniel Best, San Leandro, Cal. No. 589,634. Dated Sept. 7, 1897. This invention relates to an apparatus which is especially designed to produce an explosive mixture of gas from crude or other hydrocarbons for use in engines and for other purposes. It consists essentially of a means for distributing a hydrocarbon liquid over surface in thin sheets, means for admitting air which passes through the steam chambers and mingles with the vapor of the hydrocarbon, means for directing the hot exhaust products of the engine around this chamber in such a manner as the regulate the heat to which the vaporizing chamber and the incoming air is exposed. The air is drawn through this apparatus and being mixed with the vapor a gas is produced which passes directly to the engine where it is exposed at the proper times to produce the impulse which drives the engine piston.

CAN LABELING MACHINE.—John P. Simmons, San Francisco, Cal., assignor to L. C. Parke, same place. No. 589,673. Dated Sept. 7, 1897. This invention relates to an apparatus for automatically applying labels to cans while the latter are rolled by gravitation successively over the labels. This object is to improve the mechanism of the gravity can-labeling machine, and make it more accurate. It consists of an inclined runway over which the cans are adapted to move by gravitation, a label support or table interposed in the length of the runway, with means for raising it to keep the surface of the labels at a constant level, means for applying the paste, and means for rolling the labels upon the can as they pass. The table upon which the labels are placed is spring-actuated so as to keep the surface of the labels at a constant level, guides are arranged which true the edges of the labels so that they are always placed at the proper point to be accurately pasted upon the cans. A means is also provided for pressing upon the labels and holding the rear edges until they are removed by the passing of the can. The paste is delivered from a suitable receptacle into a horizontal tubular chamber, and a compartment shaft is rotatable therein so as to carry forward a small portion of the paste in each of its compartments, a spring-actuated rod pressing against the front edge of the shaft so as to wipe off the paste and deposit it upon the rear edge of the labels ready to be applied to the approaching can. The shaft is rotated by a suitable arrangement of ratchet wheels and reciprocating bars which act periodically upon it.

DINNER PAIL HEATER.—W. W. Montague and Wm. G. Dougall, San Francisco, Cal. No. 589,667. Dated Sept. 7, 1897. This invention relates to a device which is especially useful for laborers and workmen who are obliged to carry lunches or dinners. The object is to provide a cylindrical or outer casing into which the bottom of the pail may be telescoped and entirely closed, said casing having handles extending up alongside the pail latching into the cover so that the device can be carried thereby. This casing is provided with draft openings around the lower edge, an opening at one side by which access is obtained to the interior and spring latches fixed upon opposite sides and adapted to hold the pail in an elevated position so that the heat of the lamp may be applied to warm the contents. The lamp is secured centrally in the bottom of the casing, and there is a means for easily removing it when desired. By releasing the holding latches the pail is allowed to descend and its bottom serves as an extinguisher for the lamp and also forms a cap to prevent evaporation of the alcohol with which the lamp is charged.

SIGNAL BOXES.—A. C. Robbins, San Francisco, Cal., assignor to E. C. Hughes, of same place. No. 589,617. Dated Sept. 7, 1897. This invention relates to automatic signal boxes, such as are commonly used for the transmission of signals, as in fire, police and messenger service. It consists essentially of a device for automatically cutting the mechanism of a box out of the main circuit when not in use. In this class of boxes, it sometimes happens from continued disuse or other causes that the spring or brush through which the current is conveyed or the clock-work bearings become non-conductive, the result of which would be the disabling of the entire circuit. The object of this invention is to remove the liability of such interruption and this is effected by mechanism which transmits the electric current through the plate and brush independently of the operating mechanism when said mechanism is in a normal state of rest and the current is shunted through the mechanism and the latter is placed in operative condition.

ELECTRIC SWITCH AND CUT OUT FOR TELEPHONE BOXES.—A. C. Robbins, San Francisco, Cal., assignor to E. C. Hughes, of same place. No. 589,618. Dated Sept. 7, 1897. This invention relates to an electric switch and cut out mechanism for telephone boxes, and it applies principally to telephonic apparatus which is inclosed in boxes or closets such as are used in police and fire alarm systems and usually placed upon posts in the street. It consists of mechanism so arranged that the opening and closing of the door actuates it for cutting the telephonic apparatus in or out of the main circuit, at the same time placing the local telephone battery in or out of the circuit.

TELEPHONE TRANSMITTER FOR SIGNAL BOXES. A. C. Robbins, San Francisco, Cal., assignor to E. C. Hughes, of same place. No. 589,619. Dated Sept. 7, 1897. This invention relates to the use of telephones in boxes, such as are commonly used for police, fire alarm, street railway on other purposes where a narrow compact space is required for the telephone. The object of the invention is to provide means for closing or folding the long arms which the more recent improvements in carbon dust transmitters renders more convenient and perfect. The box has an outwardly opening door and the telephone transmitter arm hinged or pivoted within the box rests against the door when the latter is closed, and falls into position for use by gravitation or otherwise whenever the door is opened. An attachment is connected with the door by which the act of closing operates to raise the transmitter and enclose it within the box.

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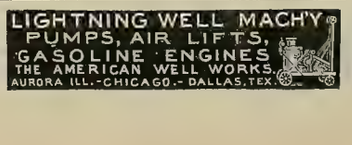

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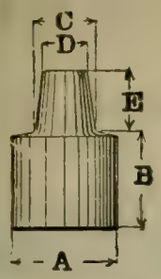

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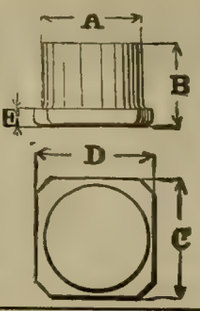

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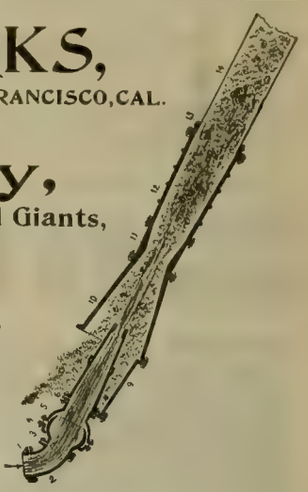

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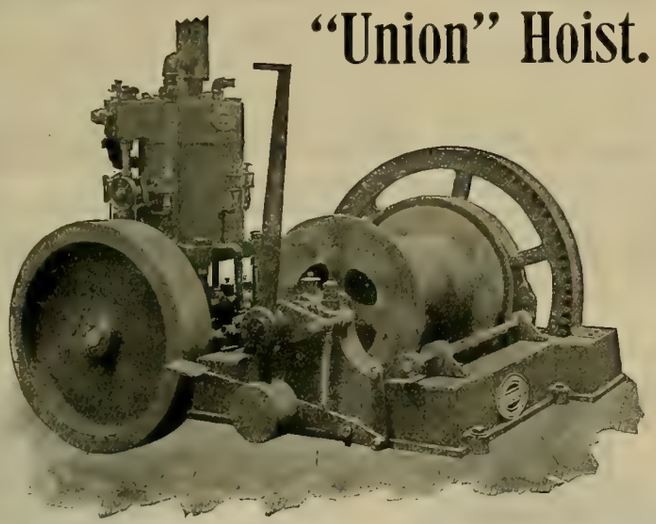

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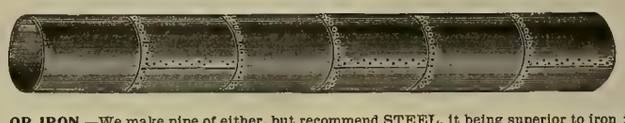

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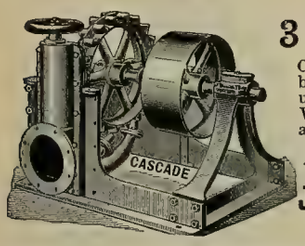

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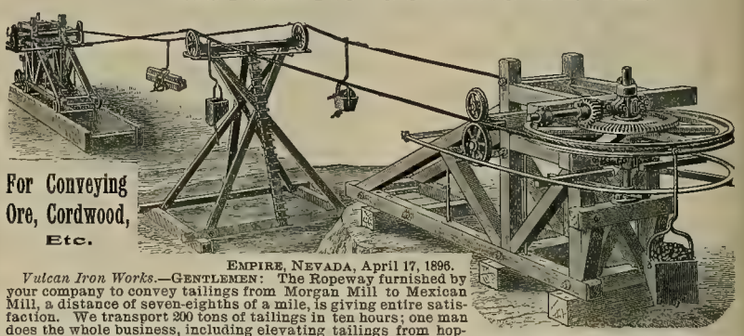

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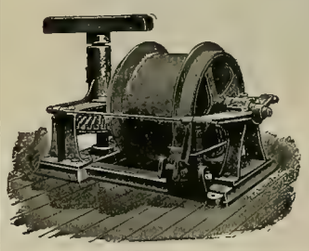

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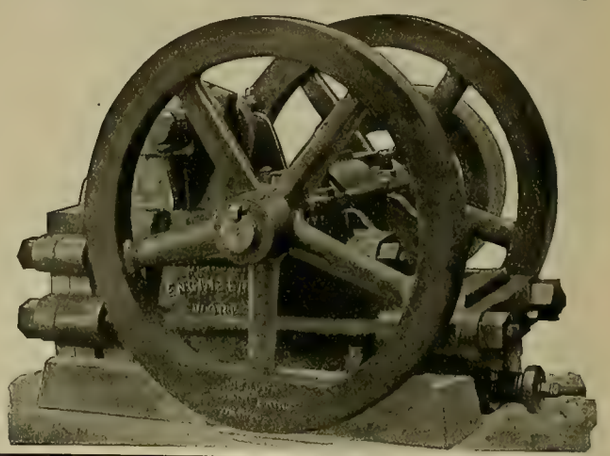

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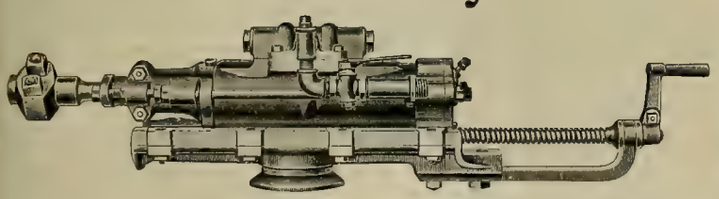

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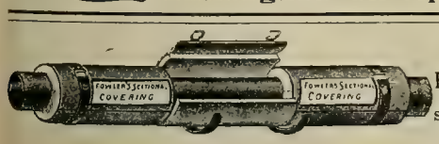

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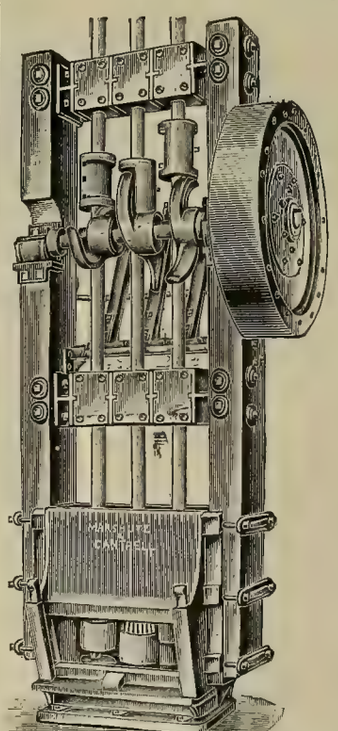

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The Markets.

SAN FRANCISCO, Sept. 16, 1897.

Business has been exceptionally good and, as prices for goods continue to strengthen, jobbers are more hopeful than for several years. The outlook is of a very promising character, bidding fair for 1898 to excel in prosperity any one year for over five years. The only cloud in the clear sky of coming prosperity is the fear that too many producers will be blinded to their own interest and not sell their grain and other produce while prices are up. The highly-colored, exaggerated reports of a shortage in the world's supply are calculated to make them hold while moneyed speculators sell out, after which will come bear reports and breaking prices. As farmers prosper, so do all industries. The inquiry for gold mining properties does not show signs of abating, but rather everything points to an increasing demand. There are more mining men looking around in the interest of Eastern and European buyers. The general tenor of advices indicates that next spring there will be a very large rush to the Yukon river and its tributaries. It looks as if it will equal the stampede to the Fraser river over thirty-five years ago. Large incorporated companies have been organized at the East and abroad for an active campaign in 1898.

The money market continues to work on easy lines, with the tendency to still greater ease, notwithstanding the free requirements for crop moving purposes. Banks report large increased deposits, which is an encouraging feature to the general situation. Conservative estimates of this season's farm products place the returns at over $60,000,000 for California alone. When is added to this large sum the receipts of our manufactures, mining and other industries, it will be readily seen that there is good foundation for asserting that 1898 will witness a still lower range of interest. The East reports active money markets, with a free call for funds for crop moving purposes.

The steamer Aztec sailed from this port on the 11th for Hongkong with the following specie: Silver bars, $150,000; Mexican dollars, $631,400; gold coin, $365. Total, $781,765.

New York Silver Prices.

NEW YORK, Sept. 16.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	25	53⅜
Saturday	25⅛	54⅛
Monday	26⅛	55⅛
Tuesday	26⅛	55⅛
Wednesday	25⅞	55
Thursday	25⅞	54⅜

	Copper.	Lead.	Iron.	Tin.
Fri.	11 10 @11 25	4 32½	9 50@12 25	13 65
Sat.	11 10 @11 25	4 32½	9 50@12 25	13 67½
Mon.	11 10 @11 25	4 30	9 50@12 25	13 67½
Tue.	11 10 @11 25	4 30	9 50@12 25	13 70
Wed.	11 10 @11 25	4 30	9 50@12 25	13 67½
Thur.	11 10 @11 25	4 30	9 50@12 25	13 70

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	2½@5c Prem
New York Telegraphic Transfer	5@7½c Prem
London Bankers' 60 days	$4.84
London Merchants	$4.83
London Sight Bankers	$4.86
Refined Silver, per oz., 1000 fine	54¾
Mexican Dollars	44½@45

SILVER.—The market made quite an advance the past week, but towards the close it is easier. On Sept. 3 sales were recorded at 51⅞ cents per ounce fine, against sales Jan. 3 of this year at 65@65½ cents. The reasons assigned for the decline have been given in previous issues, but what has made the advance we are not prepared to say, unless it is based on a demand brought about by reports that the Bank of England will use silver up to one-fifth of its reserve. Our advices from Europe state that there is a scarcity of silver money in the outlying districts of Austria-Hungary, especially in the western provinces. In Galicia and the Bukowina very serious inconvenience is being experienced owing to the scarcity of florins. The New York *Journal of Commerce* says: "It appears that not only is there a scarcity of small silver change in several of the States of the Latin Union, and in Switzerland especially, but that Switzerland is also finding her supply of five-franc pieces inadequate. It is stated that the Federal Department of Finance intends to apply to the Federal Assembly for the necessary credits for the coinage of a quantity of these pieces. The preliminary negotiations with the other States of the Latin Union have been already undertaken.

MEXICAN DOLLARS—There is a good, steady demand, which keeps the market fairly firm at quotations.

QUICKSILVER—The market is quiet but steady.

Our market is quoted at $38 for domestic consumption.

COPPER—The market has held firm at home and abroad. A New York private circular reports: Foreign consumption of copper during the first seven months of this year is on even a larger scale than during the same period last year. The increase in Germany is especially marked, and indicates rapid development in the copper trade of that country. Statistics of European copper consumption make the consumption of copper in England and France for the first seven months of this year 174,074,880 pounds. Add to this the German consumption for the same period, at the monthly average returned for the first six months of this year, and the total combined copper consumption of England, Germany and France, from January 1 to July 31 this year, is estimated at 250,962,880 pounds. According to the above figures, the copper consumption of the three above mentioned countries was only 26,785,920 pounds less than the total United States production for the first seven months of 1897. England alone is now estimated to be consuming at the rate of about 209,000,000 pounds of copper per annum. Since the year 1892 it is calculated that English consumption has increased about 93 per cent. In the same period consumption in this country has greatly decreased. Should consumption in this country recover its normal rate within the next twelve months, and no diminution take place in the foreign demand meanwhile, it is pertinent to inquire where the supply of copper would be found sufficient to meet such an increased demand.

The New York *Journal of Commerce and Commercial Bulletin* in its issue Monday, Sept. 13, says: Parties in a position to know confirm the reports of recent heavy sales of copper for export to France. It appears that representatives of the French Government and other foreigh consumers lately asked the Calumet & Hecla for prices on 20,000 tons. The Calumet concern named 11¾ cents as their lowest figure. Thereupon the Frenchmen bid 11¼ cents, which offer was promptly refused. After waiting a few days, the Calumet's terms were finally accepted. This sale is said to mean 11½ cents for ingot copper right away.

Our market is quoted as follows:

Ingot casting, jobbing	13 @—
Ingot " wholesale	12⅛@—
Sheet copper	— @16¼
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16¼

LEAD.—The market has held to firm prices, although the East is reported easier; but this, it is thought, is only temporary.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	5 00 @ 5 25
Sheet	6 25 @ 6 50
Pipe	5 50 @ 6 00

TIN.—The market is quiet but steady.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

SHOT.—The market is firm.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 40
Drop, B and larger sizes, " "	1 65
Buck, Balls and Chilled, do, " "	1 65

POWDER.—The market is firm and very active.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17½c, according to strength and quantity; No. 2, from 9c to 11c, according to strength and quantity.

COAL.—The consumption is steadily increasing. Unless charters advance the shipments from Australia will fall away.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$8 00@— —
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 50@ 6 00
Coos Bay	—@ 4 75
Cannel	8 00@— —
Egg, hard	12 00@13 00
Wallsend	6 50@— —

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	— —
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— — — —
English, to load	9 50 @ — —
" spot, in bulk	10 00 @ — —
" in sacks	11 00 @ 12 00
Cumberland	— — @ — —

IRON.—The market is steady to firm. The consumption is exceptionally large, with the outlook for 1898 promising quite an increase over 1897. At the East the markets are fairly steady with a veay heavy consumtion reported.

AMERICAN.

	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

ANTIMONY.—The market is steady.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 7¾c for Cookson's, 7¼c for Hallett's and 7c for Japanese.

NAILS.—The market is higher and strong.

Wire, carloads, basis per keg	
" jobbing, " "	$2 45
Cut, carloads, " "	
" jobbing, " "	2 35

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4½

PLATINUM.—The market is steady.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is firm.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

Chemicals.

The general tone appears to be to firmer figures owing to a steady demand depleting stocks in second and third hands, which will cause them to come in before long as buyers. When this takes place they will, on nearly all lines, have to pay an advance owing to the increased duties.

SULPHURIC ACID.—The demand is fair. We quote in a jobbing way at 1½c per lb for 66%.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported firm from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is firmer.

We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is firm.

Our market is quoted in a jobbing way at $1.40 a pound.

BONEASH.—The demand is fair.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3¾c; No. 2, 2½c.

PHOSPHORUS.—The market is firm.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firm at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is steady at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—There is a fair demand at 2½c a pound from stores.

NITRATE OF SODA.—The market is steady.

Our market is quoted from store at 4c for 95%.

Mining Share Market.

SAN FRANCISCO, Sept. 16, 1897.

The market has been fairly active throughout the week under review. The fluctuations were downward up to Monday, when a slightly steadier tone was noted in the afternoon, although not sufficiently pronounced to prevent margin selling and frightened holders from letting go Tuesday morning. After these had been cared for, the market began to appreciate, with Occidental, Sierra Nevada and Caledonia showing considerable strength, which brought about a strong closing for the entire line. The opening Wednesday was weak for all except Caledonia and Occidental. Towards noon the former sold at higher figures, which steadied the entire line. At the 2:30 session the market was steady, but after call everything sold off, except Caledonia, which sold up to 79 cents. The strength shown by Caledonia is no doubt due to the inside having secured about all the shares, and who, consequently, can commence work to show up the body of rich gold-bearing ore developed a few years ago. Assessments and keeping the shares down and inactive no doubt disgusted outside holders into selling. In three other other mines, whose shares are selling low, it is stated that good-sized bodies of ore can be shown up when the inside moneyed pool desire, although brokers', paid cappers' or tools' stock in trade is: "If only a body of ore can be struck." This has been the cry preceding every former deal, and will continue to be so long as Comstock shares are a gamble. The action of the market looks well, for keeping the heretofore leading shares down and advancing the low-priced is mystifying to the street, and causes a feeling of deeper disgust. This also admits of better concentration, particularly with a long line of assessments to collect and more to follow.

News from the Comstock mines through private sources considered reliable is hard to get, and the little reported is more or less conflicting, so that the main dependence is on official letters, which are always unsatisfactory, until the powers that be are ready to sell when the advices become too satisfactory, which cause outsiders to buy for the ore reported and insiders to sell at a good round profit.

From Con. Virginia they are working on the 1550-foot, 1650-foot and 1750-foot levels. On the latter level they report a streak of fair grade ore. No ore is being extracted. On the 1000-foot level of Ophir slow progress is being made in the west crossdrift. On the central tunnel level they are still drifting south. At last advices the quartz formation assayed $1 to $2 a ton. On the 1000-foot level the work is of a blocking-out character. It helps to kill time and also "kill off" outside shareholders. They continue to do dead work in Union on the 900-foot level. They are running the west crossdrift in Utah. Nothing new is reported from it. The news from Sierra Nevada is of a favorable character, yet it is not calculated to cause much enthusiasm. The work in this mine that is being closely watched by outsiders is on the Layton tunnel level. Bunches of fair to high grade ore are found. In Andes they are drifting north on the 175-foot level. The joint work by Best & Belcher and Gould & Curry is about the same as reported last week. From Savage nothing new comes to hand. The work is unchanged. Repairs are under way in Chollar in the west crossdrift, 450-foot level, and also in the station and main incline on the 1100-foot level. When shares are well concentrated then it is quite likely that important work will be inaugurated. From Potosi nothing new comes to hand from the levels heretofore reported. They are still "blocking out" in Alpha. From Con. Imperial, Confidence and Challenge nothing new comes to hand. They are still working ahead in the joint west crossdrift. From Yellow Jacket, Crown Point, Kentuck, Belcher and Seg. Belcher the news is about the same as heretofore reported by us. From Overman there is no change reported, while nothing comes to hand from Caledonia. In the Alta group the work is about the same as reported last week.

Brunswick lode advices speak rather encouragingly of the prospect on the 650-foot level of Occidental. The ore is wider and higher grade than on the 550-foot level. In Chollar they will soon make connection between the 500-foot and 600-foot levels, when the latter level will be opened up. There is a falling off in the number of tons of ore extracted from the upper levels. Active joint work by Best & Belcher and Gould & Curry is about the same as reported last week. From Savage nothing new comes to hand. The work is unchanged. Repairs are under way in Chollar in the west crossdrift, 450-foot level, and also in the station and main incline on the 1100-foot level. When shares are well concentrated then it is quite likely that important work will be inaugurated. From Potosi nothing new comes to hand from the levels heretofore reported. They are still "blocking out" in Alpha. From Con. Imperial, Confidence and Challenge nothing new comes to hand. They are still working ahead in the joint west crossdrift. From Yellow Jacket, Crown Point, Kentuck, Belcher and Seg. Belcher the news is about the same as heretofore reported by us. From Overman there is no change reported, while nothing comes to hand from Caledonia. In the Alta group the work is about the same as reported last week.

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MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied, Deling't and Sale.	Secretary.
Alta S M Co, Nev	57	10c	Sept 3..Oct 6..Oct 27	J E Jacobus, 309 Montgomery
Altoona Q M Co, Cal	1	75c	Aug 3..Sept 6..Oct 11	C Allenberg, 206 Sansome
Andes, S M Co, Nev	44	10c	Sept 1..Oct 4..Oct 25	J W Twiggs, 309 Montgomery
Chollar M Co, Nev	44	25c	Sept 1..Oct 7..Oct 28	C E Elliott, 309 Montgomery
Con Cal & Va M Co, Nev	9	25c	Aug 3..Sept 8..Sept 29	A W Havens, 309 Montgomery
Crown Point G & S Co, Nev	71	10c	July 27..Aug 31..Sept 21	Jas Newlands, Mills Building
Eureka Con D M Co, Cal	10	3c	Sept 14..Oct 16..Nov 6	D M Kent, 330 Pine
Gold Ridge Con M & M Co, Cal	5	4c	Aug 3..Sept 18..Oct 9	H Sylvester, 43 Sixth
Hale & Norcross S M Co, Nev	112	10c	Aug 18..Sept 22..Oct 13	R U Collins, 331 Pine
Horseshoe M Co, Cal	3	40c	July 12..Aug 23..Sept 20	C E Green, 532 Market
Inyo Marble Co, Cal	30	10c	July 27..Aug 28..Sept 20	M A Cahn, 323 Phelan Bldg, S F
Marguerite G M & M Co, Cal	7	10c	July 28..Sept 10..Oct 11	F Mettman, 237 Twelfth
Mexican G & S M Co, Nev	57	20c	July 28..Sept 1..Sept 23	C E Elliot, 309 Montgomery
North San Juan G M Co, Cal	3	7c	July 16..Sept 8..Oct 4	H W Morris, 141 First St
Occidental Con M Co, Nev	28	10c	Aug 3..Sept 7..Sept 30	A K Durbrow, 309 Montgomery
Osborn Hill G M & M Co, Cal	6	35c	Aug 4..Sept 6..Sept 27	R R Grayson, 331 Pine
Potosi M Co, Nav	48	25c	Sept 8..Oct 12..Nov 4	C E Elliott, 309 Montgomery
Red Cap M Co, Cal	1	39	Aug 25..Oct 1..Oct 23	E deK Townsend, 125 Beale
Savage M Co, Nev	93	30c	Sept 3..Oct 5..Oct 25	E B Holmes, 309 Montgomery
Sierra Nevada S M Co, Nev	113	20c	Aug 18..Sept 22..Oct 12	E L Parker, 309 Montgomery
Silver Hill M Co, Nev	35	5c	Sept 7..Oct 12..Nov 5	D C Bates, 309 Montgomery

WILL NEGOTIATE with owners or their duly authorized agents only.
WILL INVESTIGATE only thoroughly bona-fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell orlease.

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Marquette, Mich., U. S. A.
Operator and Dealer in
Mines, Mining Properties and Mineral Lands,
Mining Stocks, Bonds, Options, Leases, Contracts and Securities.
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WILL EXAMINE on reasonable terms all kinds of Mines, Mining Properties and Mineral Lands as to their value, method of working and the condition of their titles.
WILL GIVE Options, Leases, Bonds and Contracts on all kinds of Mines, Mining Properties and Mineral Lands.
Assay and Chemical Work Done on Reasonable Terms.
Have best of bank and other references. Use McNeill's or A B C Telegraphic Codes.
DO ALL OUR OWN EXPERT AND CHEMICAL WORK.

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SALT LAKE CITY, UTAH

WE are exclusive handlers of Automatic Acetylene Gas Generators for Northern and Central California. We are desirous of establishing responsible agencies for our territory. Correspondence solicited. WESTERN ACETYLENE GAS CO., Room 75, 916 Market Street, San Francisco.

Working Capital for Mines.
PACIFIC EXPLORATION COMPANY
Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from N. B. Willits, et als., in the Willow Placer Extension, near Howard's Station, Sierra Co., to deposit tailings in Little Deer creek; from G. A. Rosenthal, et als., in the California Mine, near Sierra City, Sierra Co., to deposit tailings in east fork of North Fork of Yuba river; from Jacob Yager, in the Schneider Diggings, near Spanish Ranch, Plumas Co., to deposit tailings in Spanish creek; and from Henry A. Halisted, in the Halisted placer mine, near Spanish Ranch, Plumas Co., to deposit tailings in a ravine, gives notice that a meeting will be held at room 59, Flood building, San Francisco, Cal., on September 27, 1897, at 1:30 P. M.

SCIENTIFIC PRESS PATENT AGENCY
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PATENTS
330 MARKET ST. S.F.

work is being done by Best & Belcher, Gould & Curry and Con. Virginia on the 300-foot and 600-foot levels. In Savage the work is of an interesting character.

The following illustrates the changes of the week:

MINES.	Sept. 8.	Sept. 16
Alpha	$ 26	$ 22
Alta Consolidated	17	15
Andes	25	23
Belcher	50	45
Best & Belcher	93	83
Bodie		
Bullion	15	11
Challenge	50	
Chollar	84	73
Confidence	1 25	1 20
Consolidated California and Virginia	1 85	1 65
Consolidated New York		04
Crown Point	43	40
Exchequer	07	06
Gould & Curry	82	70
Hale & Norcross		1 20
Justice		
Mexican	73	62
Ophir	1 30	1 05
Overman	18	30
Potosi	53	43
Savage	73	59
Sierra Nevada	1 35	1 10
Union	70	67
Utah	33	27
Yellow Jacket	54	53

San Francisco Stock Board Sales.

SAN FRANCISCO, Sept 16, 1897.

9:30 A. M. SESSION.

100 Alpha	20	100 Occidental	2 30
100 Alta	12	200 Ophir	1 05
100 Andes	23	600 Overman	21
500 Belcher	40	800 Potosi	41
500 Best & Belcher	77	500 Savage	53
100 Bullion	11	400 Sierra Nevada	99
600 Chollar	68	200 Silver Hill	04
200 Con Cal & Va	1 00	300 Standard	1 90
100 Confidence	1 20	400 Union	59
100 Crown Point	40	600 Utah	32
600 Gould & Curry	66	200 Yellow Jacket	49
600 Mexican	56		

SECOND SESSION—2:30 P. M.

400 Mexican	62	500 Belcher	45
700 Gould & Curry	70	800 Sierra Nevada	1 10
500 Best & Belcher	83	400 Utah	27
100 Con Cal & Va	1 65	100 Exchequer	06
100 H. & N	1 20	1400 Overman	30
600 Savage	59	500 Union	67
400 Chollar	73	300 Alta	15
300 Potosi	43	200 Julia	04
1200 Crown Point	46	500 Silver Hill	05
200 Yellow Jacket	53	100 Occidental	2 30
300 Kentuck	08	6100 Con New York	04
600 Alpha	22		

Commercial Paragraphs.

GEO. E. TRUAX of Denver, Colo., has made arrangements with Geo. Woodbury of San Francisco for the local manufacture of his patent ore car.

THE Colorado Iron Works Company report the following shipments: One carload mining machinery to Kilton Ore Purchasing Co., Goldfield, Colo.; one 5-stamp mill, complete, to L. A. Martinez, Guaymas, Mexico; two special mining cars to Creston-Colorado Co., Torres, Mexico; one large elliptical bowl slag truck to Puget Sound Reduction Co., Everett, Wash.

THE General Gold Extraction Company of Denver, Colo., is building four reduction plants, which are expected to be in operation by October 1, 1897. They are located as follows: Poorman mill, Silver City, Idaho; Salmon River mill, near Salmon City, Idaho, and two near Breckenridge, Colo. They all adopt the treatment of the Pelatan-Clerici process.

THE Westinghouse Electric and Manufacturing Company has received from its European company notice of the award to it by the Metropolitan Electrical Supply Company of the contract for a large electric lighting plant to be installed in London. The apparatus will be of the multiphase type, involving the use of the Tesla patents. It is understood that the contract amounts to between $3,500,000 and $4,000,000. All of the electrical apparatus will be made at the works of the company in East Pittsburg, Pa.

THE Albany Lubricating Compound and Cup Company, 313 West street, New York, have many testimonials from users of their "Albany Grease." The following from Fraser & Chalmers, Chicago, is similar to many others. They say: "We beg to state that we have used both your compound and cups for many years, and have had a large account with you. We have never received a complaint from our friends scattered throughout the world, but when we have supplied our trade with your cups and compound once they always ask us for the same cups and compound when increasing their works or building a new plant. We hope you will meet with great success in the further introduction of your goods, and you may depend upon our patronage at all times." Tatum & Bowen, 34-36 Fremont street, are the San Francisco agents.

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Books Received.

"The Money Question." H. V. Poor, 44 Broad St., New York City; pp., 202; 8vo.; paper; price 50 cents. What Is Money? Function of Governments in the Matter of Metallic Money; Metallic Money of the United States; Symbolic Money—Banks of Issue; Savings Banks; Money by Law; Bank of the United States; Overthrow of the Bank and the Inflation of the Currency; Change of Standards—Acts of 1834 and 1837; Debasement of the Silver Currency—Act of 1853; Consequences Resulting from the Abandonment by the Government of Oversight of the Currency; United States Notes; United States Safety Fund Banking System; Gold Certificates; Demonetization of the Silver Dollar—Act of 1873; Remonetization of Silver; Act of 1890; Position of the Late Administration; The Sound Money Wing of the Democracy; The Free Coinage Democracy; Position of Present Administration; Bimetallism; The Remedy, etc., constitute the contents.

Rainfall and Temperature.

The following data for the week ending 5 A. M., September 15, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

CALIFORNIA STATIONS.	Total Rainfall for the Week.	Total Seasonal Rainfall to Date.	Total Seasonal Rainfall Last Year to Same Date.	Average Seasonal Rainfall to Date.	Minimum Temperature for the Week.	Maximum Temperature for the Week.
Eureka	.06	.40	2.16	.87	44	60
Red Bluff	T	.01	.54	.38	56	90
Sacramento						
San Francisco	00	.02	.13	.17	51	74
Fresno	00	T	.22	.17	48	86
San Luis Obispo	00	00	.24		42	80
Los Angeles	00	00	.03	.09	52	78
San Diego	00	.01	.13	.12	58	72
Yuma	00	.58	1.04	.59	62	100

Recently Declared Mining Dividends.

Silver King, Utah, $37,500; Sept. 10.

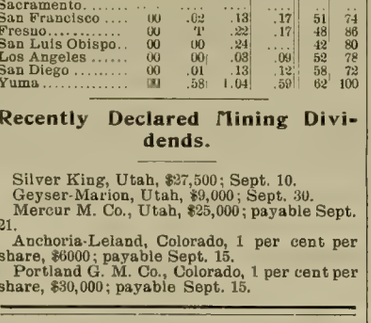
Geyser-Marion, Utah, $9,000; Sept. 30.

Mercur M. Co., Utah, $25,000; payable Sept. 21.

Anchoria-Leland, Colorado, 1 per cent per share, $6000; payable Sept. 15.

Portland G. M. Co., Colorado, 1 per cent per share, $30,000; payable Sept. 15.

PATENTS



DEWEY, STRONG & CO'S

PATENT AGENCY.

Our U. S. and Foreign Patent Agency presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American reports, with full copies of U. S. Patents since 1872. All worthy inventions patented through DEWEY, STRONG & CO.'s Patent Agency will have the benefit of a description in the *Mining and Scientific Press*. We transact every branch of patent business, and obtain patents in all countries which grant protection to inventors. The large majority of U. S. and foreign patents issued to inventors on the Pacific Coast have been obtained through our agency. We can give the best and *most reliable* advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and circulars free.

DEWEY, STRONG & CO.,

PATENT AGENTS,

330 Market Street, San Francisco, Cal.

Assessment Notices.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek Humboldt County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 25th day of August, 1897, an assessment (No. 1) of Nine Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, No. 125 Beale street, City and County of San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of October, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 23d day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

E. deK. TOWNSEND, Secretary.

Office—125 Beale street, City and County of San Francisco, California.

SAVAGE MINING COMPANY. LOCATION OF principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Trustees, held on the 2nd day of September, 1897, an assessment (No. 33), of 20 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, No. 309 Montgomery street, Room 50, Nevada Block, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 5th day of October, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

E. B. HOLMES, Secretary.

Office—No. 309 Montgomery street, Room 50, Nevada Block, San Francisco, California.

ANDES SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia City, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of September, 1897, an assessment (No. 44) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, rooms 20-22 Nevada block, 309 Montgomery street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 4th day of October, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of October, 1897, at 1 o'clock P. M., to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

JOHN W. TWIGGS, Secretary.

Office—Rooms 20-22, Nevada block, 309 Montgomery street, San Francisco, California.

FAIRFAX VILLA COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fairfax, Marin County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 10th day of September, 1897, an assessment (No. 7) of Fifty Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 56, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of October, 1897, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on MONDAY, the 8th day of November, 1897, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

J. STADTFELD, JR., Secretary.

Office—Room 56, No. 309 Montgomery street, San Francisco, California.

ALTA SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Gold Hill, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 3d day of September, 1897, an assessment (No. 57) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to Secretary, at the office of the company, room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of October, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 27th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. E. JACOBUS, Secretary.

Office—Room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

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DELINQUENT SALE NOTICE.

OSBORN HILL GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Grass Valley, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 6) levied on the 4th day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
Albert Allan	71	150	52 50
John deWitt Allen	245	500	175 00
Bessie Baird Archibald	252	100	35 00
William Bowers	219	10	3 50
C. H. Crocker, Trustee	243	1,000	350 00
C. H. Crocker, Trustee	244	700	245 00
C. H. Crocker, Trustee	254	1,300	455 00
C. H. Crocker, Trustee	255	1,000	350 00
Thomas Cole	226	50	17 50
V. C. Driffield	47	500	175 00
W. B. Fegley	168	200	70 00
Sam'l Goldstone	4	100	35 00
Sam'l Goldstone	250	50	17 50
Sam'l Granger	24	250	87 50
William George	33	100	35 00
J. J. Garvin	176	25	8 75
R. R. Grayson, Trustee	60	5,000	1,750 00
R. R. Grayson, Trustee	69	500	175 00
R. R. Grayson, Trustee	77	1,000	350 00
R. R. Grayson, Trustee	90	100	35 00
R. R. Grayson, Trustee	102	50	17 50
R. R. Grayson, Trustee	107	10,000	3,500 00
R. R. Grayson, Trustee	108	10,000	3,500 00
R. R. Grayson, Trustee	109	5,000	1,750 00
R. R. Grayson, Trustee	112	1,000	350 00
R. R. Grayson, Trustee	127	100	35 00
R. R. Grayson, Trustee	128	100	35 00
R. R. Grayson, Trustee	129	100	35 00
R. R. Grayson, Trustee	130	100	35 00
R. R. Grayson, Trustee	131	50	17 50
R. R. Grayson, Trustee	132	50	17 50
R. R. Grayson, Trustee	139	200	70 00
R. R. Grayson, Trustee	140	300	105 00
R. R. Grayson, Trustee	145	500	175 00
R. R. Grayson, Trustee	146	500	175 00
R. R. Grayson, Trustee	147	500	175 00
R. R. Grayson, Trustee	148	500	175 00
R. R. Grayson, Trustee	149	500	175 00
R. R. Grayson, Trustee	217	5,000	1,750 00
R. R. Grayson, Trustee	247	50	17 50
R. R. Grayson, Trustee	248	50	17 50
R. R. Grayson, Trustee	258	2,500	875 00
R. R. Grayson, Trustee	260	500	175 00
I. Haas	23	200	70 00
John Hosking	35	100	35 00
James Hosking	38	100	35 00
K. P. Society	180	20	7 00
A. Lucas	50	33	11 55
Mitchell & Bro	34	100	35 00
Mitchell & Bro	216	100	35 00
D. B. Marwick	46	50	17 50
D. B. Marwick	141	50	17 50
D. M. Murphy	263	2,000	700 00
Wm. McAdams	170	100	35 00
J. C. Morris	178	45	15 75
Richard Noell	31	100	35 00
Wm. S. Pugh	173	100	35 00
M. P. Quinn	169	200	70 00
W. C. Ralston	205	7	2 45
W. C. Ralston	261	500	175 00
W. B. Sharp	259	500	175 00
W. B. Sharp, Trustee	196	500	175 00
H. Silvester	42	100	35 00
S. Solomon	48	500	175 00
J. M. Thomas	36	200	70 00
F. J. Thomas	30	100	35 00
F. J. Thomas	232	100	35 00
Robert J. Tyson	204	100	35 00
Col. Wm. Thompson	167	250	87 50
Mrs. L. C. Thompson	253	25	8 75
Jos. Weisbein	25	250	87 50
Thomas H. Wilhelm	28	100	35 00
T. M. Womelsdorf	172	100	35 00
J. Haydon Womelsdorf	175	50	17 50
H. P. Womelsdorf	174	135	47 25
Lee Womelsdorf	177	50	17 50

And in accordance with law, and an order from the Board of Directors, made on the 4th day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Room 11, No. 331 Pine St., San Francisco, California, on MONDAY, the 27th day of September, 1897, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

R. R. GRAYSON, Secretary.

Office—Room 11, No. 331 Pine street, San Francisco, California.

DELINQUENT SALE NOTICE.

INYO MARBLE COMPANY OF CALIFORNIA.—Location of principal place of business, San Francisco, California; location of works, Inyo County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 30) levied on the 27th day of July, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
Percy Beamish, Trustee	546	500	50 00
Percy Beamish, Trustee	547	225	22 50
Voss, Conrad & Co	545	301	30 10

And in accordance with law, and an order from the Board of Directors, made on the 27th day of July, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at their office, Room 323, Phelan building, San Francisco, California, on MONDAY, the 20th day of September, 1897, at the hour of 3 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

M. A. CAHN, Secretary.

Office—Room 323, Phelan building, San Francisco, California.

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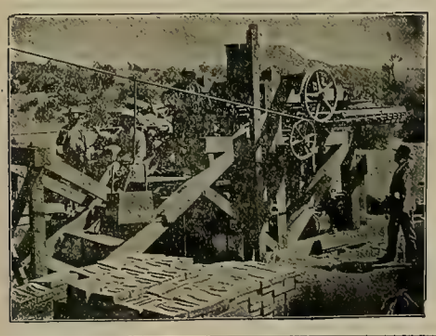

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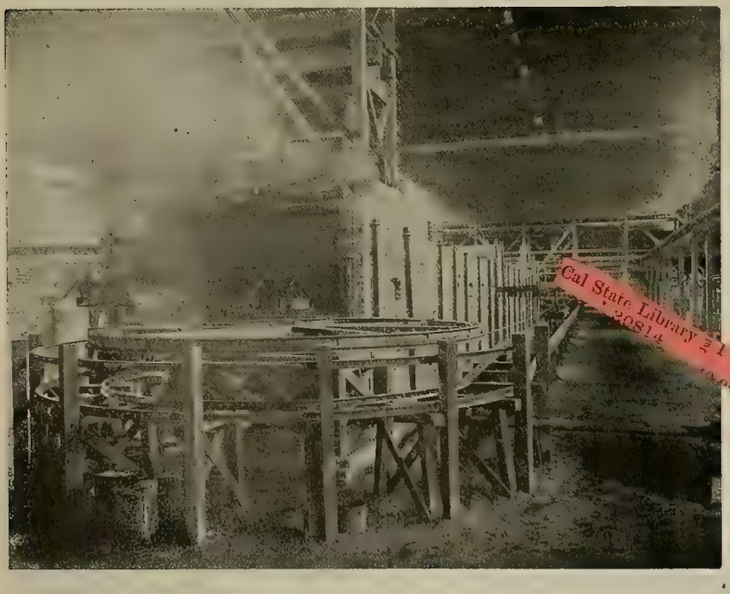

PERSPECTIVE VIEW OF FURNACE.

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Extracts from Letters Received from Mr. Philip Argall, Manager the Metallic Extraction Co., Cyanide, Colorado:

January 2, 1897.

"The roasting is invariably good. We can do 80 tons per day to 0.13% sulphur, when everything runs smooth. Our month record which, of course, includes all delays, is 1700 tons, from 1.94% sulphur to 0.16%."

February 19, 1897.

"Our furnace is now running very nicely indeed, averaging 90 tons per day to 0.10% sulphur, and doing excellent work; in fact, it has improved right along and we are highly pleased with it.

"For 24 hours ending 7 A. M. to-day 102 tons were roasted."

The ROPP FURNACE is now in successful operation at the following reduction works: The Hanauer Smelting Works, Salt Lake City, Utah (one furnace); The Metallic Extraction Co., Cyanide, Colo. (one furnace); The Colorado-Philadelphia Reduction Co., Colorado City, Colo. (three furnaces); The Selby Smelting & Lead Co., Selby, Cal; (one furnace); The Mount Morgan Gold Mining Co., Rockhampton, Queensland (one furnace); and Broken Hill Proprietary Co., Broken Hill, New South Wales (two furnaces).

Catalogue on Application.

MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1942.—VOLUME LXXV. Number 13. SAN FRANCISCO, SATURDAY, SEPTEMBER 25, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

PERHAPS no element of human progress exhibits more striking results than the one that is so familiarized by daily use as to be taken as an ordinary, matter-of-course affair, viz: the telegraph. Puck's "girdle round the earth in forty minutes" is daily duplicated. During the month the dailies here have had considerable telegraphic report of the outbreak among the mountain tribes in India, sent from Simla. At Simla a correspondent of the Reuters agency puts on the wire news of the fight between the tribes and British soldiers. From Simla it goes by land wire direct to Bombay on the Indian ocean; from Bombay it goes by cable to Aden at the entrance of the Red sea; at Aden it is relayed on another cable running the length of the Red sea, through to Port Said, at the mouth of the Suez canal; at Port Said there is another cable running to Alexandria, Egypt, and from Alexandria it can take one of several routes, either going across the Mediterranean sea to Athens, Greece, and then up through Italy, Switzerland and France to Havre and across the channel to London, or it could go the length of the Mediterranean sea from Alexandria, stopping at the island of Malta, then on to Gibraltar, then into Lisbon, Portugal, and from there under the ocean to Penzance, England, and by land wire from there to London. At London it is turned over to the Associated Press agent, who files it either with the Commercial Cable Company, or with the Western Union Cable Company, to New York. From New York it is put on the Associated Press leased wire for Cincinnati or Chicago, according to conditions, and from either one of these points it is relayed to Kansas City. From Kansas City another operator sends it to Denver, from which place it is sent through to San Francisco.

IN the issue of March 13, '97, appeared herein a copy of Assembly Bill No. 454, as passed by the Legislature, amending the act of April 23, 1880, for the further protection of stockholders in mining companies, the opening sentence of which was as follows: "It shall not be lawful for the directors of any mining corporation to sell, lease, mortgage, or otherwise dispose of the whole or any part of the mining ground owned or held by such corporation, nor to purchase or obtain in any way (except by location) any additional mining ground, unless such act be ratified by the holders of at least a majority stock of such corporation then outstanding." As recorded, and published in code form, in place of "a majority stock" appear the words two-thirds of the stock, a distinction hereby noted and corrected.

THE statement in last week's issue that "Where a mining claim is located in this State after November 2nd of this year, it will be possible to do the $50 worth of work required by the California statute and make it a part of the $100 assessment work specified in the Federal statutes," was an exact statement of fact. The new mining law of this State, which as yet has not been declared unconstitutional, says that $50 worth of work shall be done on a claim within sixty days after location. The Federal statute requires an annual amount of work or improvements to the extent of $100, the time for which such work begins being the 1st of January next after the date of location. Then, as stated, where a claim is located November 2nd, the locator has until the 31st of December, 1898, to comply with the requirements of the Federal statute; and as he has until January 1, 1898, to do the $50 worth of work required by the State statute, he can have such $50 in work or improvements apply on the $100 required by the national law.

AT the recent meeting of the Scientific Associatiation Lord Kelvin prophesied that in two generations Niagara Falls will have disappeared, the whole of the water being used for power purposes, which assumption is unlikely. He is not hopeful of long electrical power transmission, and is more in favor of bringing the manufactory to the source of power than taking the power to the manufactory. The success of the California long-distance transmission enterprises somewhat detracts from unqualified acceptance of Lord Kelvin's views on this point also.

GENERAL VIEW OF IDAHO SPRINGS, COLORADO. (See page 288.)

600 H. P. VERTICAL ENGINE, COMPOUND CONDENSING, WITH TWO 200 K. W. DIRECT CONNECTED RAILWAY GENERATORS — SPEED 150 R. P. M.

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J. F. HALLORAN.....General Manager

TO THE PUBLIC.

No one is authorized to solicit business for this paper unless in possession of proper credentials and regularly numbered and stamped blank subscription receipts.

San Francisco, September 25, 1897.

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Proper Placer Locations.

TO THE EDITOR:—Knowing that your paper is authority on all mining questions, will you kindly answer the following questions through your columns: A locates a placer claim on U. S. surveyed land in 1890, marks his location, and, regardless of the legal subdivisions of said land, marks out his claim where he thinks the channel runs. In doing so, he cuts through the quarter sections in a haphazard way, running hither and thither, marking a certain number of claims in a certain direction, a certain number in another direction—all regardless of legal subdivisions—and finally arrives at a point preceding his closing of the limits of his claim or location, leaving 2000 feet, more or less, undescribed in his location notice as carrying his location to the place of beginning. He performs the assessment work every year and records same as the law requires, pays the taxes on the claim, etc. He has not entered the claim for patent.

B comes in 1896, locates a placer claim adjoining A and includes in his location a portion of the territory included in A's location, claiming A's location to be null and void because of it not having been made to conform to legal subdivisions as nearly as practicable. B has his location surveyed and marked to conform to the legal subdivisions of the U. S. survey, records his claim, performs the location work, and in every way complies with the requirements of the Revised Statutes and the rules and regulations of the mining district wherein the claim is situated, and the State laws.

Which is the valid location, A's or B's? A prompt reply through the columns of your paper will be valuable information to many in this locality.

Fourth Crossing, Cal., Sept. 18th, '97.

In California the discoverer or locator of a placer claim must, among other things, post in a conspicuous place at the point of discovery a description of the claim by reference to legal subdivisions of sections, if the location is made in accordance with the public surveys; otherwise a description with reference to some natural object or permanent monument as will identify the claim.

It is not the province of this paper to authoritatively determine such questions, but from consideration of the matter as stated in our correspondent's letter it is apparent that in the strict construction of the Federal statutes A's claim is invalid. It is to be said, in connection with this, that the policy and purpose of the Land Department is to favor, as much as possible, the prior locator, and not to exact with technical rigidity all requirements. It may also be suggested that there are cases, where meandering beds of unnavigable streams ensue, that needless or impossible subdivisions are admissably disregarded. Probably were A to apply for patent, and there be no adverse argument, his application would be favorably acted upon by the Land Department. Of course, were there any opposition to such application, the matter would immediately become a question for determination by the courts; though, ordinarily, mutual concession and arbitration is in such cases preferable.

Recent State Legislation.

TO THE EDITOR:—Has the so-called Powers' Act of the last Legislature been tested in the courts? In one San Francisco paper I saw a statement to the effect that the Powers' Act had been before Judge Virdan's court, in Mono county, and that he had decided against the Act, declaring it unconstitutional. I have watched the papers closely since then, but have been unable to see another word about the matter; it seems strange that no other paper mentions the case. This law, abolishing mining districts and mining recorders, is a useless, uncalled for law; it entails a great deal of unnecessary trouble upon the miner. For instance, here we are, twenty-four miles from the county seat, and we must take all our location notices and proof of labor notices there, or send them for record, which, anyone can see, is costly and inconvenient; and if we want to see if a certain piece of ground is vacant, we must trot off to Placerville to ascertain.

Now, if this law has been declared unconstitutional, I want to know if we cannot go ahead and elect our mining recorders, just as though nothing had occurred? In conclusion, I will say that if this law should stand a test in the courts, it should be repealed by the next Legislature, as no miner wants it. I have never yet seen one who favors it.

Josephine, El Dorado Co., Cal., Sept. 17th, '97.

A great deal of space has been devoted by this paper to the subject referred to by our correspondent. In the issue of August 28th, 1897, the decision by Judge Virden of Mono county, Cal., was published. The subject is interesting and important to the mining industry in general. It may be said that some time before the last Legislature met, at the suggestion of a great many miners in different parts of the State, several bills were prepared by the MINING AND SCIENTIFIC PRESS, meant to apply to the actual present requirements of the mining industry, which, in the main, were endorsed at the November, 1896, convention of the Miners' Association. The gentlemen, however, who originated and championed the mining bills passed in the last Legislature, saw fit—which was doubtless their prerogative—to change a good many proposed forms of legislation; among others this one. While introduced by Mr. Powers, it cannot be said to be "Powers' bill," the honor of its formation being largely due to Mr. Soward of Plumas county.

The law that our correspondent refers to, while not satisfactory to miners, must for the present stand. It has few friends and is almost universally condemned. It may be said that in this, as in other regards, these matters are largely experimental and need revision at the hands of the next Legislature. This bill in particular has been the recipient of almost universal hostile criticism. Section 3 of the same bill (which provides that within sixty days from the date of the discovery of the vein or lode, or of the location of a placer claim, the locator must perform $50 worth of work in developing the property) has been also the subject of a great deal of adverse comment, some of our Sierra, Siskiyou and Shasta correspondents, pointing out that in some altitudes storms would prevent compliance with this law, and in general it is believed that an extension of time would be in the line of better protection all round.

As to the possibility of overturning the law in the courts, this paper is doubtful regarding the feasibility of such a proposition. Without assuming to be at all dictatorial in the matter, or speaking ex cathedra, it may be said that while local district rules govern and are binding, they are abrogated and set aside when State law takes charge, as in this instance. The only way, as it appears to us, that the new law could be upset would be by showing that it was not in consonance with the Federal mining law.

The law in question went into effect on May 26th, 1897. No records made on or after that date in any District Recorder's office in this State are valid. No District Recorder, under the law, could legally refuse to turn over his books to the County Recorder on or before June 26th, 1897. The County Recorder is the only lawful custodian of such books of record. Probably it would have been better had a little more attention been paid on the part of the miners themselves to what was going on in Sacramento last winter. The deficiencies of some of the laws which were passed were pointed out by this journal and urgent appeal was made to the miners to write and influence their representatives; that whatever legislation was effected would be to their interests. That such appeals were disregarded and such efforts not made appears in many quarters now to be a general subject of regret.

This is doubtless one of the questions that will come up before the convention, on the 18th of next month, of the California State Miners' Association. The last Legislature showed only a desire to pass any laws that the miners would agree upon for their own benefit, and whatever hardship is worked by the present law should be remedied by supplementary legislation at the next session; but, as we take it, the only thing that can be done at present is to comply with the law.

The communication above referred to is simply one of several similarly received. In answer to another set of communications regarding the same law and objecting to the provisions of Section 2, it is to be noted that in that section the provisions of the Federal law are omitted; and that, though omitted, they are of course not superseded by any State law and are just as binding as ever. Reference is made to the following:

SECTION 2324. All records of mining claims hereafter made shall contain the name or names of the locators, the date of location and such description of the claim or claims located by reference to some natural object or permanent monument as will identify the claim.

As to the right of the State to make such legislation as that in question, which abolishes the office of District Recorder, such right is absolute. It is believed that if there is any part of the law under discussion that may be held to be in conflict with the Federal law, it is that clause requiring that $50 worth of work must be done within sixty days after date of discovery. Regarding Judge Virden's decision, it is believed that, however just it may be, under the law, were it appealed, it would be reversed.

An Upward Move.

The announcement that the Bank of England is to keep one-fifth of its banking reserve in silver is authenticated, and is of some importance in connection with the future price of that metal. That proportion of the Bank of England's reserve amounts to $36,000,000, representing about 62,000,000 ounces at the present bullion value.

It would seem that a mistaken notion prevails as to the cause of this action, it being the generally accepted idea that the Bank of England has done this to relieve its need for gold as a reserve to the extent mentioned, and in many quarters opposed to silver this is used as a text upon which to argue the absurdity of such a movement. In this regard it is to be noted that the word "silver" means the British silver coin. Such coin is only available for redeeming Bank of England notes to the extent of ten dollars; but for general trade purposes a pound sterling in silver is as good as a pound sterling in gold.

It is believed that the real reason for such action as noted is a desire to arrest the downward movement of silver, so far as government silver and British colonial silver is concerned. The United States and France keep their silver dollars at par with gold by making them a full legal tender. The action of the Bank of England means just the same thing, and is caused by the present situation in India. Simultaneous with such action is noted an advance in the price of silver, not because of it, but in concert with it.

THE recent roster of California mines, their location, present condition, post office address of superintendent, etc., published by this paper, is of lessened present value, and its sale has been withdrawn. Such a list is necessarily transitory. While correct when compiled, the lapse of a year destroys much of its value, by reason of the migratory nature of many miners. About the first thing a miner does when he moves to a new base of operations, or the last thing just before moving is to write ordering a change of address of his MINING AND SCIENTIFIC PRESS. This paper goes to him in all his journeyings, but a State directory, however carefully prepared, ceases to be reliable after a short time for reason mentioned.

Concentrates.

LOS ANGELES men will put in a 50-ton cyanide plant at Mojave, Cal.

IN 1876 California quicksilver mines produced 72,716 flasks of 76½ pounds each.

AT Bisbee, Arizona, the Copper Queen Company pays 1150 employes $85,000 per month.

CALIFORNIA'S petroleum production in 1876 was 12,000 barrels; in 1895, 1,208,482 barrels.

THE Denver *Republican* is doing good work for the gold camps of the Centennial State.

REPORT is made of large deposits of mercury discovered on Noggriga creek, New South Wales.

THE Lyon county, Nevada, *Times* says there were 175 men at work on the Comstock last month.

A RECENT assay in San Francisco demonstrates the fact that some Ainsworth, B. C., ore carries gold.

SUPT. ENZENSPERGER will next March put a 20-stamp mill on the Norwegian mine, Tuolumne Co., Cal.

THE Northwest Mining Association will hold its third annual session at Spokane, Wash., Oct. 7, 8, 9.

NEWSPAPERS all over the country announce preparations everywhere for expeditions to the Klondike next spring.

EUREKA, WASH., is a busy mining town of 500 people, with neither a regularly established postoffice nor an officer of the law.

THE electrical power transmission plant at Portland, Or., was described at length and profusely illustrated in the issue of Nov. 16, '95.

NEVADA levies a tax on the "net output" of its mines. In Lincoln county the De Lamar mine thus pays nearly $50,000 tax per annum.

THE latest obtainable Pittsburg lead quotations are: Carload lots, 4.40c; smaller quantities, 4.55@4.65c; lead pipe, 6c; sheet lead, 6¼c.

THE force of the Austin, Nevada, mine is to be increased from 120 to 130 men. The mine is looking well and the new mill working satisfactorily.

GARLOCK, CAL., reports many prospecting outfits passing through daily, for Goler, El Paso, Black Mountain, Slate Range and Panamint districts.

THE act passed by Congress permitting the entry as placer ground of land valuable for petroleum or other mineral oils, went into effect February 11, 1897.

THE Evans-Van Heet Co., a Chicago corporation, is putting in a 10-stamp gold mill at Clifton, Arizona. A pumping plant is to be put in and fifty men employed.

DR. BECKER has come to the conclusion that the gold of the Rand, South Africa, has a marine placer origin, and is not the result of precipitation or of impregnation.

THE rise in silver from 51¼ to 56¾ has stopped most of the talk of shutting down the few silver-lead properties that are able to keep above water at the latter figure.

PLACER washings at Platina, in New South Wales, continues to carry platinum with the gold. The quantity saved during 1896 was 2900 ounces, valued at $19,575.

AS COMPARED with '94, the report of the U. S. Geological Survey shows an increase of gold production in California of 65,703 ounces during the following calendar year.

NO FIELD WORK is at present being done by the Cal. State Mining Bureau. Mr. Preston is assisting in the delineation of sundry maps in present process of preparation.

THE next convention of the California State Miners' Association will be held in Odd Fellows Hall, 7th and Market streets, San Francisco, beginning Monday, Oct. 18, '97.

ALEXANDER DEL MAR now comes forward with the statement that "The Mother Lode" is "an almost continuous line of hills filled with low-grade ore, stretching from Alaska to Patagonia."

IT was Commissioner of the General Land Office Lamoureaux who about a year ago decided that marble was not a mineral, omitting, however, to state whether it was an animal or a vegetable.

AN aperture 12 inches high by 12¾ inches wide, through a 1½-inch plank, with a head of 6 inches above the top of the opening, will discharge 200 miners' inches, each equal to 1.4994 cubic feet per minute.

LIBBY, MONTANA, which was called a lead camp a short time since, may soon be called a gold camp as well; several of the mines that were silver-lead properties near the surface are developing gold values.

THE *Republican* directs the attention of Arizona miners to the legal necessity of recording district clerks' bonds in the office of the territorial secretary, also of filing articles of incorporation with that official.

THE greatest distance at which long-distance telephone service is operated in this country is believed to be between Boston and St. Louis—1400 miles. The line just opened in this State is 904 miles in length.

INTERIOR California papers are still publishing advertisements of a San Francisco transportation company advising departure for "Coolgardie gold fields," where 300-ounce nuggets, "nearly all pure gold," are found.

ABOUT 2000 men have got over the Chilkoot pass and gone on to Dawson and the Klondike. The jam at Skaguay has been broken and it is thought that before Lake Bennett freezes 2000 prospectors with full outfits will have broken through the trail and started down the river.

AT the Cerro Colorado mill, Sonora, Mexico, the Mexican Gold and Silver Recovery Co. is treating 1000 tons monthly from the Cerro Colorado and El Tiro mines by direct cyaniding. The Colorado-Ures mill dry crushes 700 tons of ore per month, which are also treated by the cyanide process.

ABOUT this time of year a good many holders of mining locations are called upon to decide whether it is best to try to hold on to several locations or develop one at least to the extent of meriting a possible purchaser. Those who adopt the latter course will come out ahead in the long run—or the short run.

ALTHOUGH 733 more men were employed in gold mining in New South Wales in 1896, says the *Financial Times*, than in the previous year, the output showed a decrease of nearly a quarter of a million pounds in value, yielding about £51 13s 3d per man employed, which is much below what is considered a living wage.

THE production and export of copper for August, as compiled by John Stanton, shows: Produced by United States reporting mines, 16,309 tons; produced by outside sources (estimated), 1100 tons; produced by foreign reporting mines, 6963; making total production of 24,372 tons; experts were 10,971 tons.

IN Shoshone Co., Idaho, no matter what a patented mineral claim is worth, for the purposes of taxation it is valued at $5 per acre. Owners of mineral fractions say that the assessor assesses each patented claim at $100, telling the owners that if they have not a full claim of twenty acres it is their misfortune.

P. J. MCGUIRE, employed about the converters in the Anaconda, Montana, Company's smelter, tried to light a torch from an electric light. He was standing on an iron plate in wet shoes. Accidentally he touched the carbon and 6000 volts of electricity passed through him. He fell backward and in a few minutes expired.

THE Trail Creek, B. C., recorder's office shows that since Jan. 1st, '97, assessment work has been done on 1420 claims in the district. It is expected before the year is ended that the total number of claims on which assessment work will be done will reach 1600, representing an expenditure of $160,000—about 400 more than in '96.

THE lead handled in the Colorado smelters during 1896 was as follows: Arkansas Valley smelter, 23,999,702 pounds; Omaha and Grant, 11,276,898; Globe, 18,260,006; Philadelphia, 25,519,502; Pueblo, about 10,000,000; Colorado, 12,690,300; Union, about 2,000,000; Zinc-Lead, 1,228,300; Argentine, 60,138; total, 102,034,846 pounds.

THE Calumet & Hecla Mining Company's 104th dividend, of $10 per share, payable October 1, will make $40 thus far in the calendar year 1897, and carries the total payments of that company across the $50,000,000 mark, $50,850,000 being the total amount thus disbursed, it now being exceeded in this regard only by the Comstock, Nevada.

THE Banner mine, Nevada Co., Cal., is being reopened. It was located the same month in 1860 that this paper was started, and turned out hundreds of thousands. It is a noticeable fact that most of the biggest gold producers of California to-day are "old mines" that have been reopened. It is hoped that the Banner will prove no exception.

IT is thought that in '98 the Seven Devils district of Idaho will be a great copper camp. The Peacock, White Monument and two adjoining claims are leased and bonded to the New York Smelting and Refining Company for three years, the company paying a royalty of 20 per cent on all the ore extracted from the mines, with a purchasing privilege of $2,000,000.

THE Bannack, Montana, gold dredge cleaned up 150 ounces Aug. 25 and 50 ounces Aug. 26. Mr. Rollins writes: "If we ever arrive at that point of perfection where we can keep the boat going steadily without any breaks or interruptions, my candid opinion is that we can make it average $1000 a day during the season which it can run. The other or new boat cleaned up $2500 in July."

IN Inyo county, on the southeastern border of California, are the highest and lowest lands in the United States, and within fifty miles of each other—Mt. Whitney, 15,000 feet above sea level, and Death Valley, 480 feet below sea level. Whitney is the culmination of the southern Sierras; Death Valley, between the Panamint and Amaragosa ranges, the arid bed of an ancient lake.

THE report of the Colorado State Inspector of Mines gives the tonnage of ore extracted from the mines for the first six months of this year as almost double that for the same time in 1896, while in value he gives 26 per cent above that for the same time in 1896. This is accounted for by the larger amount of low-grade ore handled profitably. His report also shows that there are 5124 more men employed in the mines and that the wages remain practically the same per day per man.

THE Golden Cross mines at Hedges, San Diego Co., Cal., could escape paying taxes this year on personal property valued at about $100,000. The assessment was made to the trustees of the Golden Cross Mining and Milling Company and not to W. W. Stewart, at that time receiver. The statute requires that assessment of property shall be made to the receiver of a property when it is in his custody. The trustees, however, have notified the assessor that the taxes will be paid.

GOLD and silver are always to be weighed in Troy—12 ounces to the pound, 480 grains to the ounce. Gold is $20.671824 per ounce and $0.0430663 per grain. One grain gold button from an assay ton of ore, 437½ grains, one ounce avoirdupois, is $1.38712 for the ton of ore, 32,000 ounces and 32,000 grains of gold. One one-hundredth of one grain gold button from same assay ton is $13.7812 for the ton. One-tenth of one one-hundredth of one grain gold button from same assay is $1.37812 for the ton.

THE list of California mines, the name, character and location of mines, name and postoffice address of superintendent, etc., was published in this paper in the issues from April 25 to Sept. 12, '96, inclusive, and afterwards issued in pamphlet form. There were about 3600 names. The list was approximately correct at the time, but the addresses of superintendents, owners, etc., have changed some since the list was compiled. It was the first considerable effort of the kind in the history of the State.

THE mineral galena is a composition of lead and sulphur. The formula is PbS, lead and sulphur combined according to their atomic weights. The atomic weight of lead is 206.4; that of sulphur is 32. The following is the process to ascertain the percentage of each element: The atomic weight of lead is multiplied by 100 and the sum divided by 238.4, the total atomic weight of the two elements is the mineral. This will give the percentage of lead. The percentage of sulphur is obtained in the same way.

IN the Supreme Court of California this week in the case of Hamilton vs. Delhi Mining Company, on appeal, laborers' lien against mining property, the decision of the lower court was affirmed. The court held that where several claims or locations are owned and operated as one mine, as against the parties so uniting them, they may, for the purposes of the lien law, be regarded and treated as a single claim and declared on as such. Machinery and tools not erected upon nor used in the working or the development of a mine cannot be deemed affixed to the mine. They are in their nature "materials" furnished for use in the mine, for the value of which no lien attaches in favor of the material man, unless actually used in the mine or structure.

IN England there is apparently no seigniorage, but this appearance is deceptive. The mint will receive no deposits of bullion under £10,000. This drives all depositors to the bank. The latter sends the depositor to assayers and refiners, who, as a matter of fact, levy a very stiff but variable seigniorage on deposits of bullion, to which the bank adds ¼ of 1 per cent. The seigniorage at the British mints in India used to be 3 per cent on gold and 4 per cent on silver, then 2 per cent on each plus refining charge, then lowered to 1 per cent on gold and in 1893 abolished.

SO SATISFACTORY were the results of recent experimental tests of low grade ore for account of the Con. Cal. & Va. Co., Virginia City, Nevada, with the Kinkead mill, that the Gould & Curry are arranging for a test run of 1000 tons of the same grade. The test referred to is said to have produced a net profit of $2 per ton. As there is practically an unlimited supply there of such ore, the aggregate on a large scale would practically make all the difference between assessments and dividends all along the entire line.

NOTING a statement in the *Lumberman* that "the largest flume in the world is claimed for San Diego, Cal., and that its construction required 250,000 feet of lumber," E. Goughnour of Livingston, Montana, writes that journal: "I sawed lumber for a flume in the Black Hills of South Dakota that required over 4,000,000 feet in its construction. It was built for placer mining purposes and was 18 miles long, 42x48 inches in size, with 6x6 stringers under each side the entire length, sides and bottoms 1½-inch plank, side stays 5x5 inches, bottom same and top ties 3x4 inches."

THE *Cornish Post* says a new world's record in vertical shaft sinking by hand labor has been made at the Clement shaft of the Simmer and Jack, Limited, mine, Elansfontein. The shaft was sunk from 1390 feet to 1546 feet and 130 feet of timber and nine set of bearers put in during the month of July, thus beating the previous record (142 feet 6 inches) by 13 feet 6 inches for the same size shaft and same time (31 working days). The shaft is a five-compartment one, 15x8 feet outside and 25x6 feet inside the timbers. It gives credit to the manager, R. Robertson of California.

STATISTICS of the world's gold production of '96 are almost impossible to procure, three several sets having so far been issued, widely apart. As to California's gold product, the secretary of the Mint has discarded the regularly accepted official report and seems to depend upon carrier pigeons. From the best obtainable sources it is believed that the world's gold output for '96 aggregated $320,000,000; of this the United States contributed $53,000,000; Australia, $44,000,000; South Africa, $42,000,000; Russia, $32,000,000; Mexico, $6,000,000; British India, $6,000,000; China, $5,000,000.

THE Klondike excitement seems to have extended all over Europe as well as this country. Albion W. Tourgee, the well-known writer, who is now visiting at staid old Bordeaux, on the Garonne, writes: "The people in the middle walks of life are much interested in the Klondike gold fields. The impression seems to prevail that these fields are destined to be even more marvelous in their richness than those of California, Australia and South Africa. Men are looking for opportunities to invest in reliable companies, and I am deluged with inquiries in regard to a thousand things of which I know little, and a thousand more of which nobody knows anything."

NEXT year's Klondike travel will be large. The Canadian Pacific Railway Company has already undertaken surveys from Fort Wrangel, the mouth of the Stickeen river, 600 miles from Vancouver; thence by steamer up the Stickeen to Telegraph creek 175 miles; then by railroad to Lake Teslin 150 miles; by Lake Teslin, the Hootalinqua and the Yukon rivers to Dawson City by steamer 600 miles. An expedition is being made up in Chicago which will use the path traversed by the Hudson Bay Company for nearly a century; from Edmonton, N. W. T., by stage coach to Athabasca landing, thence via dog and cayuse along Mackenzie river to Fort McPherson, on the Peel river.

T. HUNTINGTON and F. Heberlein of Pertusola, Italy, have patented the following process: Lead sulphide ores are mixed with calcium oxide in proportion to the amount of sulphur present and heated to about 700° C. The mass, on being allowed to cool to about 500° C., decomposes, giving off oxygen, which attacks the lead, forming a mixture of oxide and sulphur, much heat being developed. If air is then blown into the mass, the reaction becomes continuous, and the heat is maintained sufficiently to ensure the reaction between sulphides and sulphates. At this stage sulphur dioxide is given off, and may be collected. The resulting mass of lead oxide and gangue is treated in the usual way.

REGARDING the entry of land for gravel pits and reservoir purposes, and granting right of way for pipe lines, a bill passed both houses of Congress in December, 1894, authorizing such entry and granting such right of way. Under this law any citizen of the United States, or ditch company, or water company, may buy lands for reservoir purposes not to exceed 160 acres of unoccupied land, at a price not less than $2 per acre. When the purchased lands are in a mining district they are not to be considered mineral lands, but the patents do not authorize the purchasers to extract mineral therefrom, reserving that right to the Government. Non-use of the land so purchased for two years constitutes forfeiture.

THE United States Circuit Court of Appeals has, in the case of the Tyler Mining Company vs. Sweeney, reported in 79 Federal Reporter, page 277, decided that when a vein of mineral-bearing rock, in its course lengthwise, after passing under the surface limits of one location, on which it crops, crosses nearly at right angles the side lines of another, prior location, on which it also outcrops, the side lines of such prior location becoming, by reason of the course of the vein, its end lines, the right to follow the lode in its downward course, between the vertical planes drawn through such end lines, belongs to such prior location, and the extra lateral rights of the other location cease when the vertical plane so drawn between the two locations is reached. The same court, in the case of the Republican Mining Company vs. the Tyler Mining Company, reported on page 733 of the same volume of the Federal Reporter, also finds that when a lode enters an end line of a regularly located mining claim, and runs its course lengthwise, nearly parallel with the side lines of the claim for the greater part of the length of the claim, the owners of the claim are not deprived of their extra lateral rights because the lode crosses a side line before reaching the other end line, but such rights will extend from the end at which the lode enters to the point at which it crosses the side line, whether a new end line is regarded as being drawn at that point or not.

Clear Creek County, Colorado.

Idaho Springs is situated in Clear Creek canyon, thirty-six miles west of Denver, and is on one of the numerous branches of the U. P., Denver & Gulf Railroad, which tap the mining sections of Colorado. This particular branch extends on up the canyon to Georgetown and Silver Plume, the three towns mentioned constituting the mining centers of Clear Creek county. From a point a few miles below Idaho Springs up to Silver Plume and Graymont, on the base of Gray's Peak, is a mining region which gives this county prominence among the mineral producers of the State. From the main canyon there diverges a score or more lesser gulches and canyons within the distance from Idaho Springs to Graymont. Thus, the erosions of nature have exposed the veins and fissures of this interesting region. In such side canyons as Gilson gulch, Virginia canyon, Chicago gulch, Spring gulch and Fall River canyon there are mines and mills which operate with varying results common to all mining camps. Clear creek and its numerous affluents make this a well-watered district. The most important branch is Fall river. In this we have the anomaly of a river running into a creek. But that should disturb no one, for a mining camp without misnomers and anomalies would be out of fashion. Clear creek flows from the perpetual snows and effervescent springs of Gray's Peak; Fall river drains the rocky defiles and pine-clad summits of Yankee hill. The constant washing of these little mountain streams over exposed ledges of ore accounts for the millions which have been taken from the sands of Clear creek, within the last thirty years, by hydraulic methods.

In the vicinities of Georgetown and Silver Plume the mine products are chiefly silver, and at present prices of that metal the mines of those places, while many of them are operating, are not specially prosperous as a whole. Around Idaho Springs, and within the district usually attributed to her, there is a more favorable proposition. Here the ores are generally a sulphide of iron and sulphide of copper, in whose values the gold predominates. Besides gold, the product contains, in many cases, considerable of copper and lead and varying percentages of silver. While a great deal of ore can be, and is being selected from the various mines of the district which may be classed as free milling, the district, as a general proposition, produces a smelting and concentrating ore. The mills here classed as stamp amalgamating mills all run concentrating tables in connection, and save from 30 to 60 per cent of the values in the concentrates.

Of the sixteen mills now operating in the district, at least twelve are purely concentrating or combination mills.

The Idaho Springs district proper is shipping about 2000 tons per month to the smelters, according to the figures furnished by the samplers. And, according to estimates furnished by the mill men, the mills are handling about 10,000 tons per month. A resume of the camp's output is as follows:

SMELTING ORE.

	Tons.
State Ore Sampling Co., per month	500
Dewey Bros.' sampler, per month	400 to 600
Chamberlain & Co. sampler, per month	900

MILL CAPACITY.

	Tons.
Silver Age mill, per month	900
Christianson & Wilkie, per month	700
Roberts-Jackson, per month	900
Anderson, per month	600
Mixsell, per month	900
Allen, per month	600
Stanley, per month	1,200
Lincoln, per month	900
Donaldson, per month	750
Standard, per month	1,500
Kinkaid, per month	450
Humboldt, per month	300
Mayflower, per month	1,200
Osborne, per month	300

The above is the capacity of the mills named when they are running full force; but several of them have thus far this year been operating only about one-half time. But it is safe to estimate that they aggregate about 10,000 tons per month. It is reasonable to estimate that the output will increase from now on.

The Stanley group ores are in sulphide form, but contain several varieties, including crystals of galena, copper pyrites and rubescite. The workings in the Stanley are very extensive and the mine and mill are well equipped with machinery.

The Lamartine, about nine miles above Idaho Springs, at the head of Trail creek, is one of the big producers of the district. It is developed by a tunnel 4600 feet long, which cuts the tenth level at a depth of 900 feet. This property is said to have produced over $3,000,000 in values. Its ores are a refractory, pyritic material, much of them running very high grade in gold, silver and lead.

The Standard group, on Fall river, five miles above Idaho Springs, is an old property, which was recently purchased by Messrs. Fredd, Bickford and others, who have built a concentrating mill at a cost of $30,000, and set the mine and mill to work at the rate of fifty tons per day. A tunnel is in 765 feet, with four drifts therefrom to the extent of 400 to 500 feet each, with numerous minor workings. Their high-grade ore is shipped to the smelters, the last shipment yielding $106 per ton. The mill dirt is said to run from $16 to $30 per ton. Thus the Stanley, Lamartine and Standard are mentioned as representative mines in their respective sections.

I now turn to the mines in Virginia canyon and those along the crest of the mountain which separates Clear Creek from Gilpin county. Among such are the Silver Age, Sun and Moon, Gardner, Gem and Gem Extension, Crown Point and Virginia, Hot Pot, Golden Cloud and Blue Bell.

The Blue Bell, belonging to Philip Mixsell, is in Virginia canyon, produces a milling and concentrating ore of an iron and copper sulphide nature, with rich streaks of lead in places. The chief values are in gold. From running 1000 tons of this ore a clean-up of $14,000 resulted.

The Gardner, at the head of Gibson gulch, on Seaton mountain, recently started up. The shaft to a depth of 350 feet is in sulphide ore, some of which has run as high as $100 per ton.

The Sun and Moon, in the same locality, is being developed from two shafts, which are 400 and 500 feet in depth. The values in this ore are saved in concentrates mainly and are principally gold, silver and lead, with the first named predominating.

The Crown Point and Virginia, well known as having been a large producer, is now working under a receivership. The work is progressing from an incline shaft 700 feet deep, from which ten levels have been run. The ore bodies are large, though rather low grade. The mine has produced as high as 480 tons per month, and is said to have produced $150,000 within the last three years. The ore is the same iron and copper sulphide as characterizes the ores from other mines in the vicinity and carries values in gold, silver and lead.

The Hot Pot is a concentrating proposition in the main, though some ores have been produced of a quartzite nature which were free milling.

The Golden Cloud, at the head of Virginia canyon, produces a characteristic ore, which yields gold and silver values in about the ratio of four to one. This is under lease and bond to the Imperial Mining and Leasing Company.

As a whole, the camp is producing enough lead to make a considerable item in the aggregate.

The Mayflower mine and mill have been sold, it is stated, to New York parties, but both remain under the management of W. R. Renshaw.

A pioneer mill man of the district states that he believes any well-regulated mill of the district is saving from 75 per cent to as high as 90 per cent of the assay values in the ores, which are about as refractory as those found in any district of the State.

M. E. Smith has moved his concentrating mill from Golden to Idaho Springs, and will soon have it operating at the latter place.

The accompanying illustration (see page 285) gives an excellent view of Idaho Springs, Colo., which is one of the neatest mining towns in the State.

Idaho Springs, Colo., Sept. 4, '97. WASCOTT.

Accidents in Mines.

Before a recent Australian Government Mine Commission, Alexander Stewart, general manager of the Broken Hill Proprietary mine, said:

"Of the accidents that have occurred, 60 per cent were due to the men or their mates, the result either of carelessness or of incompetence; 30 per cent were caused by circumstances over which the men only had control; and the remaining 10 per cent were of the non-preventive class. For the twelve months ending June 30, 1896, 24 men were discharged for drunkenness, and for the twelve months ending June 30, 1897, 34; for smoking underground the figures were 39 and 27; for lighting fires, 2 and *nil;* for leaving a charged hole in the face, 0 and 8; for leaving shoots or shaft uncovered, 0 and 4; for sleeping, 2 and 9; for quarreling, 2 and 2. This gave totals of 69 men discharged for the twelve months ending June 30, 1896, and 84 for the last twelve months for offenses that might have led to serious accidents. For incompetency in the same years 210 and 461 men had been discharged, and movements of the men were 2104 and 3138. These latter figures were not for individuals, however, as some men might have passed through the books several times. The amount of open-cut ore removed was 100,000 tons per annum; underground ore, 300,000 tons; open-cut waste, 400,000; filling in material, 150,000 tons; coke, 3500 tons per month; coal, 3000 tons per month; timber, 800 tons; flux, 7500 tons; bullion, 2200 tons; and slag, 22,000 tons. Taking those figures into account, the mine had no reason to be ashamed of the number of accidents that had occurred. The mine was paying £30,000 a month in wages, £4500 a month for stores, £3500 for timber, £11,000 for coke and £4500 for coal. Every month about five tons of high or nitro-glycerine explosives and nearly seven tons of low powders were handled—an average of between ten and twelve tons per month—and the accidents due to explosives were very low; in fact, lower than in any other part of the world, which was very creditable to the intelligence of the men of the Barrier. The number of men employed underground was 1000, in open cuts 350 and on the surface 1050. The figures related to the operations of the company on the hill only. The rate of fatal accidents in mines was 2 in 1000, which is considered very good, as a very favorable rate would be 3 in 1000."

The Broken Hill Proprietary Company handles practically 5000 tons of material per day, of which 4000 tons is dealt with at the mine.

Smelting in the Malay Tin Industry.

By far the greater portion of the smelting is performed in the immediate vicinity of the mines, where quite a number of very small smelting houses are erected. The Chinese smelter judges the ore by panning a small sample in a cocoanut shell, and purchases it accordingly, and, in spite of his aversion to modern ideas, takes care to obtain the latest quotations for the metal, which are telegraphed to nearly all the tin centers every day. The smelting is very simple in practice. Small cylindrical-shaped clay furnaces are used, bound together on the outside with hoop iron or cane. They vary from 3 to 6 feet in height, 2 to 3 feet in diameter; the smaller and more common ones are supported on a tripod, while the larger ones are sometimes enclosed in brickwork. The space inside the furnace is from 10 to 18 inches in diameter, open at the top, and narrowed down at the bottom to a tap-hole with the opening on one side, leaving a good thick bottom to the furnace. Diametrically opposite to the tap-hole, and some 6 or 8 inches above it, is another opening communicating with the exterior of the furnace, which serves to admit the tuyere. Below the tap-hole a cavity is scooped out of the ground, and serves as a "flote," into which the metal and slag constantly drip, and from which, when enough metal has collected, the tin is ladeled out into sand molds. The blast is obtained by means of a wooden air pump, the cylinder being made out of the trunk of a tree, and is set horizontally, the piston being moved backwards and forwards by a coolie. The smelting is started by throwing burning charcoal into the furnace, and, when fairly hot, adding alternate layers of damped ore and charcoal. As the tin and slag are produced, they gradually trickle through the tap-hole, and the charge is made up to its original level by the addition of fresh layers of ore and charcoal. The furnace is usually allowed to run twelve hours, and—according to the size of furnace and quality of the ore and charcoal—from half a ton to two tons of metal are obtained. The slag obtained is but little (in bulk), and usually collects around the tap-hole and flote. According to Prof. Louis, about 60 per cent of the tin is obtained from ore containing 68 per cent of the metal in this operation, and the charcoal consumed may vary from 30 to 100 per cent of the ore smelted. The slag contains from 5 to 7 per cent of tin in the form of prills, and from 8 to 10 per cent of silicate. When enough of it has collected, it is crushed by an arrangement resembling a prospector's dolly stamp, and panned. The prills are either run together in a kettle or added to the bulk of metal in the flote. The remaining slag is re-treated repeatedly, like ore in the same or similar furnaces, until it is considered sufficiently poor to throw away. Beyond skimming the ingots as they are poured, very little refining is done, and the metal is generally of sufficiently good quality to be put on the market direct. At Penang and Singapore, however, some of the merchants who export the metal have refining works, where the ingots are melted down again and re-cast.—American Manufacturer.

An Important Paragraph.

Section 22 of the new Dingley tariff law is a brief and harmless looking paragraph, but nothing in the whole bill has stirred up such a discussion in the United States since the passage of the act. It is as follows:

"SEC. 22. That a discriminating duty of 10 per cent ad valorem, in addition to the duties imposed by law, shall be levied, collected and paid on all goods, wares or merchandise which shall be imported in vessels not of the United States, or which being the production of or manufacture of any foreign country not contiguous to the United States, shall come into the United States from such contiguous country; but this discriminating duty shall not apply to goods, wares or merchandise which shall be imported in vessels not of the United States, entitled at the time of such importation by treaty or convention to be entered into the ports of the United States on payment of the same duties as shall then be payable on goods, wares and merchandise imported in vessels of the United States, nor to such foreign products or manufactures as shall be imported from such contiguous countries in the usual course of strictly retail trade."

It is a matter of considerable interest to the Pacific coast.

Reduction of Zinc Gold Slimes.

In the issue of August 7th appeared some notes on the reduction of zinc-gold slimes by E. H. Johnson. Herewith is appended a discussion of Mr. Johnson's article before a recent meeting of the Chemical and Metallurgical Society of South Africa:

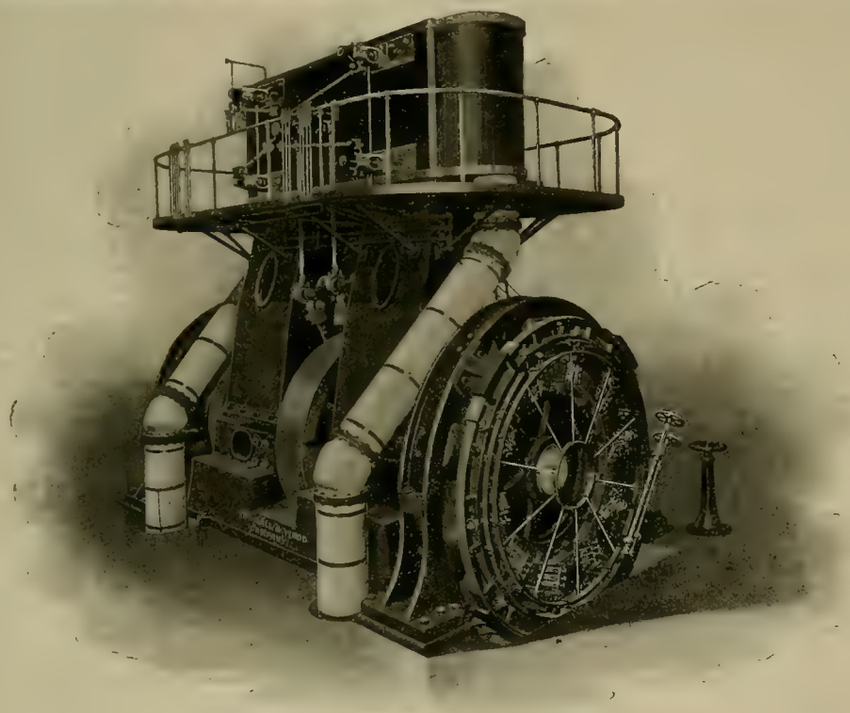
"I heard with very great interest Mr. Johnson's paper, and it seems to me a very important paper to have brought forward. The acid treatment of gold slimes is gradually replacing the niter method, because it gives finer bullion with less chance of loss from fumes. There is one thing which I saw mentioned some time ago: I think it was in the proceedings of the Institute of Mining and Metallurgy. Instead of sulphuric acid, acid sulphate of soda or potash ($NaHSO_4$ or $KHSO_4$) was used. It is cheaper, more easily transported and handled, and it performs its work most efficiently. I have experimented myself with this method, and I have obtained very satisfactory results on a working scale."

Mr. McBride said: It is with great pleasure I have read Mr. Johnson's paper on "The Reduction of Zinc Gold Slimes." Such a subject is one most useful to many members of this Society, and to Mr. Johnson is due our thanks for the interesting details he has given us of his work at the Princess. I agree with him when he says the methods of clean-up and reduction are varied on the Rand. This is due, I think, to the fact that the economical working of the process has never really been watched and advanced by the originators, and consequently the improvement of this department of the work has been left to the individual managers of cyanide plants. I touched on the importance of this work some months ago in the discussion on Mr. Yates' paper on "Zinc versus Electricity," and I am very pleased Mr. Johnson has brought the subject before us in this practical manner. It is of such importance in my estimation that I beg to be excused in reiterating and emphasizing his statements of the advantages to be derived in the sulphuric acid method of reduction and in giving a few details of his work at the Glencairn Gold Mining Company. By having proper appliances the risk of loss is reduced to zero. With regard to time, I am able to say that I have done an ordinary fortnightly clean-up from tailings from a 100-stamp mill and had the ingots in the safe at mid-day on the day after starting the clean-up. I differ from Mr. Johnson in his remark that "the cost of acid renders this method a little more expensive." Taking the clean-up costs of which Mr. Johnson has given us, I reckon that the additional fluxes, coke, crucibles and labor would bring the total cost of reducing and smelting the 504 pounds of dry slimes without acid treatment to over £25 sterling, instead of £19 9s 9d by the acid treatment; and in addition to this we have to consider the loss in selling a large bulk of slags and in the price obtained for low-grade bullion. With regard to the quantity of acid used, I have found three-quarters of a pound of acid enough for one pound of moist zinc-gold chips. This proportion usually leaves sufficient excess of acid to dissolve the zinc in the fine gold slimes, but I always examine it to make certain that the zinc has been reduced.

The quantity of zinc-gold chips and slimes naturally varies according to the strength of cyanide solution used, and consequently a greater or less amount of sulphuric acid is consumed. Some time since, when using 0.12 per cent KCy as my strongest solution, I got very good precipitation in the zinc boxes, but the gold did not go into slimes. It remained coated on the zinc. I washed the zinc over a screen with ¼-inch mesh; and, after treating the resultant chips, I got 10½ per cent of their weight in bullion of over 800 fine. The consumption of zinc at this time was only 0.16 pound per ton of tailings treated. When sufficient time is allowed for treatment, I advocate the use of weak cyanide solutions, as the little extra cost for acid is more than recouped by the saving in zinc alone, not to speak of the greater saving in cyanide. In arranging the different apparatus for the clean-up and subsequent reduction of slimes at the Glencairn, I have aimed at saving time both at the clean-up and reduction process, also at avoiding handling of the slimes as much as possible, and at minimizing any risk of loss in any department of the work. All the floors are cemented and graded towards gutters which lead to collecting wells. A 2-inch Cameron pump with suction hose delivers the supernatant solution from the extractor boxes to a settling vat placed above the level of the boxes. This solution is, after settling, returned to the extractors through a series of valves placed down the side of the vat. The compartments of the extractor boxes are connected by holes in the baffle boards or partitions. Plugs are withdrawn, and the slimes, being stirred with the remaining solution, gravitates to the bottom compartment, whence it is pumped to the filter-press vat. For this purpose I have fixed a 1½-inch hose to the suction pipe of the small filter-press pump, and I have provided a special delivery to the vat, where the slimes pass through a 900-mesh screen. In turn, the discolored solution only is pumped through the press, as I prefer to treat the zinc-gold slimes together with the chips with acid before putting it into the filter press. The corroded zinc is washed, and the chips collected in a small vat of similar dimensions to the press suction vat, viz., 5 feet 6 inches in diameter by 2 feet 6 inches in depth. The acid treatment vat is 6 feet 6 inches in diameter by 5 feet 6 inches in depth, and is provided with a revolving agitator, lid, fumes funnel and feed-box, very similar to Mr. Johnson's arrangement. It has also water and steam service led into it, and the waste solutions are decanted through a series of holes down the side of the vat into another vat of 10 feet diameter directly underneath it. This latter vat rests on a cement floor 2 feet 9 inches below the main floor of the extractor house; and the solutions, after prolonged settling, escape through an aperture in the foundation wall. I find this vat of great use in accelerating the final treatment, for it is not necessary that the gold should completely settle after each wash in the upper vat before starting to decant the water. I only put on two washes, or three if found necessary, before transferring the precipitate to the 900-mesh tray suspended in the filter-press vat. As the acid vat is above the level of this, the gold slimes gravitate through a pipe fixed to the bottom. A wooden plug, of course, protects this pipe from the acid during treatment. I have given a few details of my system of clean-up, as it is so intimately connected with the acid treatment as to be almost inseparable in a description of this kind. It will be observed that there is no handling of the slimes until they are taken from the filter press in hard cakes. These, again, do not require to be disturbed in the calcining furnace, and, as Mr. Johnson pointed out, loss in smelting is avoided owing to the absence of zinc. All gold-bearing solutions are allowed to stand sufficiently long to settle the precious metal before they are returned to the extractor boxes and thence to the storage sumps. I deprecate the system still adopted in some plants of bailing the solution from one compartment to another, as it is certain to dislodge some fine gold slime and deposit it in the storage sumps. With regard to the filter press, I am a very strong advocate of it, and I had great pleasure in visiting Mr. Johnson's plant some time since. Mr. Starr of the Consolidated Investment Company says he was thinking of patenting a press which he was adopting at the Buffelsdoorn. They put the slimes into a canvas bag and screw the neck of it, and thus you can get a very good filter out of a common bag. One of the great benefits of a filter press, I find, is that you can get through a large quantity of solution carrying a very small quantity of gold. What we call black solution at the clean-up, it puts through very rapidly, and it enables you to clean up with great speed.

Mr. Crosse: I quite agree with the former speaker as regards the very great importance of treating zinc precipitates in a thorough manner. I am very sorry Mr. Johnson in his very interesting paper did not give a few analyses of the various products. It would have been of very great interest and also of great value. I would have been most happy to have made the analyses for him, and I will do so at any time. I am not myself engaged in the process of treating gold slimes, but I have a great deal to do with cyanide gold. I believe as much passes through my hands as through any one's in Johannesburg. I notice in some cases bars are much more difficult to melt and obtain satisfactory assays than others, and this does not always depend on the fineness of the bars. Sometimes the bars go as high as 820 or 825 fine, and they are very unsatisfactory to melt and to assay. The only possible method to arrive at any conclusion of what is in these bars is by a careful analysis. The other day I made some rough tests. I found nickel and cobalt; sometimes there is iron and very often lead. Nickel, cobalt and lead are not removed by sulphuric acid. The nickel and other oxidizable metals are inclined to stick to the pot and should be eliminated in some way. We have made a very great improvement in the treatment of gold slimes, and I do not see why we should not go still further and turn out as good gold from zinc precipitates as from the battery process. Unfortunately, we do lose some gold; it is not always a case of driving gold up the chimney, but gold is lost; and, as Mr. Butters so ably pointed out, every grain of gold in zinc precipitates ought to be considered.

President Chas. Butters: I think Mr. McBride's criticism is almost a paper in itself, for which we have to thank him. There is one thing I might say in addition to Mr. Caldecott's remarks about the use of acid sulphate of potash in the cleaning up of zinc boxes. We have used, experimentally, something approximating twenty tons of this material, which is a by-product of the dynamite factory, for cleaning up and for making sulphate of iron, and we find it most effectual. I feel almost certain that sulphuric acid will be displaced and that this acid sulphate (containing 38 per cent of H_2SO_4) will be largely used here. It is a matter of information to the Society that such an article exists in the country.



450 H. P. VERTICAL ENGINE, COMPOUND CONDENSING, WITH TWO 100 K. W. DIRECT CONNECTED INCANDESCENT DYNAMOS—SPEED 180 R. P. M.

The Turkish Mining Industry.

Mining in Turkey is regulated by a law of August 26, 1887, which is administered by the ministry of agriculture, forestry and mining. To obtain a mining grant, application has to be made first to the governor of the respective province, stating what mineral it is intended to mine, on what scale and in what manner. The applicant must furnish a bond and proof that he is able to make good all damages that may be caused by his operations; the permit is then issued free of charge, that is for one year. Before its expiration, however, report must be made to the department of mining in Constantinople regarding results, accompanied by samples of the minerals found and an application for the prolongation of the concession. The application is announced in the official organ of the government, and, no protest being raised, the application is granted by a firman bearing the Sultan's signature. Now, an annual tax of about $1000 has to be paid. Concessions for mining chrome ore, emery, borate of lime, and meerschaum are issued for sixty years; for all other minerals, for ninety-nine years. Beside the license of $1000 there has to be paid a ground tax of 32 cents per hectar (2.47 acres) and a royalty of 5 per cent of the value of the mineral raised, the latter tax amounting to 10 per cent in the case of the minerals mentioned above.

From 1892 to 1896 concessions were granted as

follows: Five for mining argentiferous lead ore; one for silver, lead and antimony; one for antimony alone; four for chrome ore; one for emery; four for manganese ore; one for lignite, and two for borate of lime. The Anyhana copper mines, located at the headwaters of the Tigris river in Asia Minor, are operated by the State, but yield no revenue. The Turkish government also operates the silver-lead mines at Bulgarclagh, which yield 1500 kilograms of fine silver annually. The litharge, which is still highly argentiferous, is sold to foreign parties. The only coal mines of importance are found in the basin of the Heraclea, on the coast of the Black sea. The annual production aggregates about 150,000 tons, and is almost exclusively consumed by the Turkish navy. All other coal is imported from England, the imports in 1895 aggregating about 461,100 tons, of which 9500 tons were consumed by Constantinople. The best meerschaum diggings, too, namely those at Eskishehir, a station on the Angora railway, are owned by the government. These mines produced formerly about 8000 boxes (sixty-five pounds each) per year, but the production has declined to about one-half since the best pits have been flooded. The present production of asphaltum is insignificant, and hardly worth mentioning.

Of the mines operated by private parties, the most important ones are the lead-silver mines of Hodshah Gurnish, near Edremid, owned by a French company—the Societe des Mines de Balia-Kara-Aidin—producing about 4000 tons of ore annually, and the British Asia Minor Mining Company, whose mines at Lidshesi produce 3000 tons.

Turkey possesses a great wealth of chrome ore, enough to cover the requirements of the whole world. The annual production amounts to about 20,000 tons, the ore containing from 48 to 50 per cent of chrome. The entire export trade in this mineral is in the hands of a firm at Smyrna. The emery export is also controlled by a Smyrna house. There are still about 7000 tons of emery exported from Smyrna, but the trade is gradually declining, as the Smyrna emery is not able to compete with the emery from Naxos, which, although a monopoly of the Greek government, and of better quality, can be produced much cheaper than its Turkish rival. Borate of lime with from 40 to 60 per cent boric acid is produced by several companies, whose pits are located near Panderma. The annual production amounts to about 5000 to 7000 tons.

The production of salt is a State monopoly, and aggregates 231,000 tons, of which some 15,000 tons are exported. Drilling for petroleum, which was carried on at Alexandrette in Syria and other places, was unsuccessful.

Telluride in "Mustard Gold."

The following is from a paper read by Arthur G. Holroyd before the members of the Australian Institute Mining Engineers. Speaking of the recent finding of telluride of gold in Kalgoorlie, he says regarding "mustard gold:"

"This peculiar form of gold, resembling clay, was first brought under my notice in 1894, while acting as manager of the Austral Otis Metallurgical Works in South Melbourne. It came from the Hannans Star G. M. Co., and I was told it occurred in a vein varying in width from a pencil line to half an inch. Upon examining this clay-like gold under the microscope I found it consisted of the minutest particles, rounded globules, and filigreed, conglomerated together, resembling a sponge filling up similar shaped cavities and veins to those occupied by the telluride of gold in the sulphide ores. If this sponge gold is pressed with the blade of a knife (being exceedingly soft and malleable) its metallic luster is at once apparent. This mustard or clay-like gold can be artificially obtained in the laboratory by dissolving a piece of telluride of gold with sulphuric acid very slowly. The tellurium is leached out, and leaves the gold in an exactly similar form to that which is found in nature here upon this field. This, among other reasons, led me to conclude that the mustard gold in a mine here is an indication of the presence of telluride of gold at a depth. The greater quantity of the gold ores on the Kalgoorlie field carry mustard gold, and in most cases telluride of gold has already been found, in many cases very rich and in solid, hard country. I mention those mines in which I have already proved the presence of tellurium and those in which my experiments have proved to me that it will occur, and from the names mentioned it shows that telluride of gold is generally distributed throughout the field, and will be the eventual mainstay of the field.

"Another class of gold, 'sponge gold,' resembling mustard gold, but more spongy in appearance, having also a beautiful metallic luster, occurs upon this field. It resembles the most beautiful filigree work. This gold was found in large quantities in stoping from the 200 foot level to the 150 foot in the Great Boulder, and as much as seventy pounds of pure gold was obtained in one bunch of ore. This gold is also due to the oxidation of the tellurium, and at a depth large quantities of telluride of gold should be found. Under the microscope this gold presents the appearance of a mass of gold crystals (octohedron and dodecahedron), with brilliant faces and gold in filiform and arborescent shapes. There are evidently several other forms of tellurium besides calverite—sylvanite, krennerite and native tellurium are among the number."

Metallurgy of South Dakota Gold Fields.

At the Lake Superior July, '97, meeting of the American Institute of Mining Engineers, F. C. Smith, of Rapid City, S. D., read a paper on "The Potsdam Gold Ores of the Black Hills of South Dakota," in which he says:

"In describing a certain class of ores, of ever-increasing importance in the Black Hills, they are variously called 'refractory,' 'siliceous,' or 'Potsdam;' the first name serving to distinguish them from the other important class—the free milling ores; the second name being obviously applied on account of their mineral character, and the third name being taken from their more frequent geological habitat—the Potsdam series of the Cambrian. For various reasons I have used the latter name in heading this article, and have further classed these ores as gold ores, when, to speak strictly, it might be unadvisable to adopt a classification based upon either geological habitat or economic character; as a matter of fact, neither qualifying adjective is strictly correct in universal application to the ores in question, since they are, in certain cases, found in rocks later than the Potsdam, and in a few notable cases, are ores of silver. However, the above designation may be allowed to pass, since it will serve as a *quasi* distinction from the more general refractory and quartzose ores, and since these ores have been most largely mined in the Potsdam series, the further designation, as gold ores, may be allowable since, in the light of present knowledge, such are largely in the majority.

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"From the first disastrous attempts at the treatment of the Potsdam ores, until more skillful experiment had firmly established the Deadwood and Delaware, and the Golden Reward plants, although considerable amounts of ore were shipped outside of the Black Hills for treatment, the fact that ores of less value than about $30 per ton could not be mined and shipped with any profit, together with a superstitious feeling that there was something 'uncanny' about these ores, and that they could not be treated successfully, prevented an active development of the Potsdam ore bodies. Only within the last three years have the old conditions been changed; and miners can now generally obtain a profit from ores carrying $15 per ton.

"Mining is not expensive; a large amount of it being carried on by means of tunnels, and the shafts being of relatively small depth. Little timbering is necessary, but water, in some cases, causes some annoyance; the ores are usually very hard and tough; and the eccentricity of the ore chutes, with local faulting, add to the expense of dead-work.

"Although many years ago the fire-assay of the Potsdam ores showed that they contained gold and silver in notable quantities, it seems to be the fact that until very lately no sufficient comprehensive chemical analyses were ever made to determine in what condition the precious metals existed. As already remarked, pyrite occurs plentiful in some of the blue ores; and doubtless that mineral was supposed to render them refractory; or, from the fact that only in very rare cases, and by the closest examination can any free gold be detected, it may have been supposed that the gold existed in particles too minute to be saved by ordinary processes. Screen analyses show that the precious metals are distributed throughout the ores with great uniformity, and chemical analyses of a large number of samples show that they are associated with tellurium. In addition to the early lack of metallurgical knowledge it would seem that too profuse litigation as well as the clashing of personal interests finally terminated the history of some of the early metallurgical plants, even after they had operated profitably, and greatly retarded the mining and metallurgical development of the Black Hills. Naming them in the order of their initiation, chlorination, matte smelting and cyanide lixiviation have (operating almost exclusively upon Potsdam ores) developed into remarkable industries in the Black Hills, particularly the first two. Chlorination, as exemplified at the Golden Reward and Kildonan mills, is carried on in the following manner: The ore is first put through the rock breakers, from which it passes to a drier; from the drier it passes into fine crushers, and thence to a series of crushing rolls, where it is crushed to eight or twelve mesh. It is next roasted in Howell-White continuous-discharge cylinders in the case of red ores, or in Bruckner cylinders in the case of blue ores. After roasting, the product is spread on cooling floors, from which it is elevated to bins to be discharged by hoppers into the chlorination barrels. The barrels are of iron, lead-lined, and have a capacity of about five tons. About four tons of ore are charged, along with about twelve pounds of bleaching powder, and from eighteen to twenty pounds of sulphuric acid per ton; the barrels are slowly revolved for about one and one-half hours, water being admitted under pressure after chlorination is complete, and leaching the chlorinated ore through a filter contained in the barrel. The gold-bearing solution is treated with hydro-sulphuric acid gas, and in some cases, after a preliminary treatment, with sulphurous acid to reduce chlorine. In this treatment, gold, along with various amounts of other metals, is precipitated; the solution is filtered through filter presses; the collected sulphides are dried, roasted in muffles, and smelted to bullion. Any silver contained in the ore chlorinated is, of course, lost, and a discrimination is usually made with reference to the ores treated by this process, whereby all ores carrying over three ounces of silver per ton are resereved for other treatment. At the Golden Reward mill a cyanide plant has been added for the treatment of this class of ores, making use of similar revolving barrels to those used in clorination. At the same mill additional roasting capacity has been secured by the erection of a Brown Horseshoe roasting furnace, which is said to give great satisfaction. The Golden Reward mill has a maximum capacity of about 150 tons per day of red ores, or about 100 tons per day of blue ores. The blue ores are roasted in Bruckner cylinders, while the red ores are in part treated in the Brown roaster, which has a capacity of sixty-five tons in twenty-four hours. The Kildonan mill has a capacity of about 100 tons per day, crushing to about eight mesh. Neither mill treats any custom ores, but each operates exclusively upon the product of its own mines.

"While the efficiency of these mills is satistory to their owners, their saving in precious metals is not so good as might be desired or as will be obtained in the future. Finer crushing would undoubtedly insure a better extraction, but would also add to the expense as well as interfere with filtration. It is to be supposed that those operating these mills have experimented along various possible lines with a view to secure the most economic method for the treatment of these ores, both with respect to a better saving of gold and the saving at least a part of the silver; it is also to be supposed that, with the present arrangement of the respective plants, they are producing relatively good results. The Golden Reward has trebled in its initial capacity, while that of the Kildonan has been nearly doubled during its existence of about one year.

"From various points of view the Deadwood and Delaware Smelting works constitute the most important metallurgical industry in the Black Hills, and its existence is of special value from the fact that it furnishes the only local market for Potsdam ores. Commencing in a comparatively small way, in its life of about seven years it has developed a daily capacity of about 400 tons, of which about 180 tons are Potsdam ores. The process, as developed by Dr. Carpenter, is one of matte concentration, wherein the blast furnaces are charged with the following burden:

	Tons.
Siliceous ore	180
Copper ore	60
Pyrite	100
Limestone	180

"This mixture is smelted with from 10 to 12 per cent by weight of Eastern coke or about 16 per cent of Newcastle coke. Slags carrying ten to twenty cents per ton in gold, 0.2 to 0.4 ounces of silver per ton and traces only of copper, are separated in the fore-hearth, and a matte is formed carrying all of the gold and 90 per cent of the silver, as calculated from the assays of the ores charged, and constituting about 5 per cent by weight of the original charge. The magnesian limestone is obtained from the Carboniferous outcrop, but a short distance from the smelter, at a cost of fifty cents per ton; the pyrite is obtained in the form of concentrates from the Homestake mine; copper ores are brought from Montana and are added according to the supply, the charge containing from 2 to 10 per cent of copper, with a probable average of about 5 per cent.

"Matte smelting, under the special form used in the plant just mentioned, indicates a great advance in metallurgical progress; as compared with the other processes mentioned, the saving of the precious matals by this process is much better. Compared with lead smelting, for which either lead or copper must be brought in from beyond the hills, its efficiency is much greater, owing to the highly siliceous charges possible. In lead smelting slags are calculated having an extreme upper limit in silica of about 37 per cent, while at the Deadwood and Delaware works the ordinary slag carries about 52 per cent of silica. The charge for treatment of Potsdam ores at these works is $10 per ton, allowing 95 per cent of the gold and paying for 90 per cent of the siver over one ounce per ton.

"The figures given above, indicating a daily treatment of 520 tons of material, represent the capacity of three blast furnaces. The plant consists of five, of which three are continuously in blast. There are also two reverberatory furnaces for the preliminary treatment or slag roasting of fine ores and concentrates.

"The cyanide process is represented in the Black Hills by the plant of the Black Hills Gold and Extraction Company at Deadwood, which has a capacity of

about thirty tons per day, but which has not been constantly in operation. In this plant, which seems to be rather badly arranged, only red or oxidized Potsdam ores are treated, being fed to the crushers along with sufficient lime to counteract the acidity; thence the ore goes to the drier, then through another crusher and three sets of rolls, with the intention of crushing to thirty mesh. The crushed ore is leached in tanks in the ordinary manner, the tailings being removed by hand and reserved for future treatment. The gold is precipitated from the solution by zinc shavings, and the handling of the precipitate does not differ from the usual practice.

"The tonnage of Potsdam ores treated is being constantly increased, and the area in which these ores are mined is ever extending. The recent discovery of pay ore at Ragged Top has caused a typical mining "boom," and will result in the development of a section of country in which, heretofore, little has been done in the way of mining. The smelter, with a view both to the treatment of the product of its own mines, and to increased custom work, is continually enlarging its capacity; and this is also true, to a lesser degree, of the chlorination mills. The following may be considered a conservative estimate of the tonnage of Potsdam ores treated during the year 1896:

	Tons.
D. & D. Smelting Co.	65,700
Golden Reward Co. (Chlorination)	39,000
Kildonan Milling Co. (Chlorination)	36,000
Black Hills G. & E. Co. (Cyanide)	6,500
Shipped outside, about	4,800
Total	152,000

"In consideration of the northern connected district but little mention has been made of the more or less disconnected areas of Potsdam ores in the neighborhood of Lead City and Deadwood, yet there are many valuable producing mines among them, and large tracts are yet undeveloped; the ores are similar to those already described."

Economical Paint.

The methods adopted by painters to reduce the cost to them of materials are many, but the most simple one, and one used on almost any job, is the adulteration of their paint with soft soap. Any color, from the yellow ocher to carmine, may be augmented by mixing with it common soft soap. For common work they mix the paint as ordinarily; that is, with oil, turpentine, and japan; then to a quart of the paint add one pint of the soft soap, and stirring it thoroughly the paint spreads under the brush; and as it is difficult to immediately discover any defect, the apparent expense of painting such work is reduced to nearly one-half. The soap assimilates with the oils of the paint, and is sometimes added by the contractor or boss without the knowledge of the workman.

Another means of cheaping paint is in the use of kerosene oil. Often a common job is painted with paint mixed with japan or furniture varnish as a binding material, and thinned to a working consistency with common kerosene oil. It seems to answer as well as turpentine in the working of the paint, and dries equally as well, the only bad feature being its smell. However, the difference between sixty cents a gallon for turpentine, and twelve cents a gallon for kerosene will give relief for the deficiency. Benzine was once used almost exclusively for a paint vehicle, owing to the scarcity of the turpentine, but as quickly as turpentine became a marketable product the benzine was thrown out, principally owing to its odor, yet it is used to some extent on house work. Crude petroleum is frequently employed for mixing paint for barns and common outbuildings, and for roofs it answers a very good purpose. The roofs of most buildings in California, where the long dry season from May to October occurs, are painted, and generally with Venetian red mixed with petroleum. This, too, is often adulterated with soap.

To paint a building cheaply take whiting, for three cents a pound, mix it with kerosene or crude petroleum to a paintlike consistency, then add Venetian red to form a light red or pink, the whiting having very little coloring power, but making bulk, or add yellow ocher to form a yellowish clay color, the ocher being fully as inexpensive as the Venetian red; then put into the mixture some cheap furniture varnish say, a pint to a gallon of mixed paint, the varnish costing about $1 per gallon. This gives the binding or adhesive property. Other cheap pigments may be used where other colors are desired, using the whiting to form the bulk of the paint. Lampblack in a very small quantity will make a lead or slate color. Burnt sienna added to the whiting mixture will form a salmon color, and thus a variety of tints or colors may be made. For fences and like work there is a still cheaper paint, and of more value as a preservative of the wood than lime whitewash. Take the common road dust, pass it through a sieve to remove stones and coarse particles. Mix it with petroleum or kerosene, as before mentioned; then add some cheap pigment to color it, the road dust forming the bulk of the paint. This paint may have a goodly share of soft soap mixed with it without detriment, and it will be found to spread much easier under the brush. If a more durable piece of work is desired than those above mentioned, white lead and linseed oil are given the place of whiting, road dust and petroleum, but what has been said above is for those who wish to improve the appearance of their belongings at a very small cost, and at the same time make a fairly durable job.

A Negative Opinion.

The Klondike placers are believed by many to indicate an even larger probability of gold wealth in quartz ledges. Upon the existence of such probable quartz mines largely depends the permanence of that region as a gold producer.

On this subject Ross E. Browne, of San Francisco, holds a different opinion from several arguments recently advanced, and, in the *Chronicle*, says:

"It is a well established fact that our placer gold is derived from quartz veins by the natural processess of erosion, disintegration, transportation and assortment by running water. The transportation of the rock fragments may be either by glaciers or by running water, but the assortment and concentration of the gold is necessarily due to running water only, and concentration is always essential to make a valuable placer. It sometimes happens that the transportation is mainly by glaciers forming lateral and terminal moraines of unassorted materials. These are subsequently washed by running water which rounds and assorts the bowlders and pebbles, concentrates the coarse gold and ultimately forms the placers. The gold particles occurring in the quartz veins, though most commonly minute, are often coarse enough to be conspicuous to the naked eye, and sometimes large enough to weigh several ounces. It is this coarse gold which accumulates in the placers by natural concentration. The minute particles are scattered in the main masses of gravel and sand and are carried off by the current.

"The quartz veins, therefore, to produce valuable placers, must contain coarse gold. So-called pocket veins and seam deposits are especially favorable. These need not contain gold enough to pay the great expense of quartz mining in order to produce rich placers. The product of a single placer claim often represents the natural concentration from millions of tons of material derived from quartz veins and seam deposits. The whole mass of original material might not average more than a small fraction of a dollar a ton, and yet produce a valuable result in placer concentration. Our notably productivequartz mining districts are characterized by veins containing large continuous shoots of ore with the gold finely disseminated, associated with sulphurets, et The product from these is mainly in gold particles too small to collect and become available in the placer concentrations. Take, for example, the Nevada City and Grass Valley district, and the mother lode districts of Amador, Calaveras and neighboring counties. These are our most productive quartz-mining sections, but have not been the feeders to our most important placers. There are isolated cases in these districts where rich placers of limited extent have resulted from the disintegration of paying quartz veins, but in this statement the matter is regarded in too general a way to take note of detail.

"In California's great placer districts their value has not been derived from correspondingly valuable quartz veins. The most important of them appear to be derived from veins hopelessly poor from a quartz-mining standpoint. Take, for example, the gravel deposits of Placer county draining into the forks of the American river, which have produced about $100,000,000. Important discoveries in the quartz veins of that section are notably scarce, though the county is seamed with veins. The important placer sections of Nevada county are not connected with the more permanently valuable quartz-mining sections. The same might be said, in a general way, of Sierra county, though perhaps with less force. The great Plumas county gravel district, with its large yield, has disclosed no corresponding values in its quartz mines. The same may be said of the Butte county placer district. The Cariboo placers of British Columbia have yielded $60,000,000 or $70,000,000, and, so far as explored during thirty odd years, no valuable quartz mines have ever been found. It may be said, further, that in our Central California placers the coarse gold, once liberated from the quartz, has not, as a rule, been transported very far. We often hear vague theories about the distant sources of our gold nuggets. As a rule such theories are based upon a misconception. Coarse gold may be carried long distances by glaciers, but not by running water on ordinary slopes.

"It may be said in a general way that while it is well known that many of California's important quartz veins were originally discovered by following up small gulch placers tailing out from them the attempts to discover valuable quartz veins by following up our most important placers has generally proved futile. Quartz mines should always be looked for, however, and in the case of a rich find as the Klondike it might well be that the placers are partly derived from profitable pocket veins and seam deposits. They should generally be looked for near at hand, unless there is very special evidence of the gravel having been derived by glacial transportation from distant sources. It should, however, be borne in mind that the concentrations in such placers are the aggregate results of the degradation and disintegration by natural processes and without expense to the miner of millions and millions of tons of material. The placer product obtained in a few years could not have been obtained by mining the veins from which it was derived for a whole century. The gold product of the world has been mainly from placers. California's placer product during the first four or five years of activity exceeded its total quartz mining product in forty-five years, and of the total gold product of our State probably four-fifths were taken from the placers. The South African Reefs, to be sure, are yielding a great product right along, but it is by no means certain that these are veins. In fact, it is now asserted and by excellent authority, that these reefs are nothing more than ancient shallow placers interstratified with the sandstone and quartzite sheets, and tilted into positions that give them a vein-like appearance.

"It is of course possible that this rich Klondike find may lead to the discovery of quartz veins carrying greater percentages of coarse gold than we are accustomed to encounter, but so far the prediction of a correspondingly great discovery in quartz veins does not seem to be warranted by the histories of similar finds in the past."

Anaconda Copper Mining Company.

The profit and loss account of the Anaconda Copper Mining Company for the year ended June 30, 1897, shows:

Receipts by Sales.	*1897.*	*1896.*
Copper	$13,003,955	$8,578,177
Silver	3,081,552	3,055,184
Gold	382,259	296,542
Total	$17,267,766	$11,929,903
Royalties, etc.	151,595	127,774
Copper, silver and gold on hand	5,521,032	4,888,020
Total receipts	$22,940,393	$16,945,697
Deductions—		
Value of matter on hand	$4,888,320	$748,294
Mining—all expenses	5,726,009	5,071,677
Reduction works	5,812,518	5,616,517
Total	$16,426,538	$11,436,488
Operation subsidiary departments	556,505	829,485
Balance	$15,879,033	$10,607,003
Freights	681,692	586,922
Refining charges	1,058,825	1,248,214
Interest on advances	116,116	135,974
General expenses at New York & Anaconda	$17,804,345	$12,687,182
Profit	$5,136,048	$4,258 515
Dividends	3,000,000	750,000
Surplus	$2,136,048	$3,508,515

President J. B. Haggin in the report says:

During the year 132,364,198 pounds of fine copper were shipped from Anaconda in the form of electrolytic cathodes and converter bars; the shipments of silver, either in bullion or converter bars, amounted to about 6,200,000 fine ounces and of gold 20,380 fine ounces. The sales in same period amounted to 120,864,097 pounds of fine copper, 6,057,067 ounces of fine silver, and 18,511 ounces of the fine gold. The stocks of copper, silver and gold on hand June 30, 1897, have been valued at $5,521,031. The copper at Anaconda has been taken at cost of production, while that shipped was valued at current prices of June 30, 1897, the present quotations being about the same. The silver on hand has been valued at 52 cents per fine ounce, except that since sold. The shipments from Anaconda during the month of June were much above the average product, which accounts for the increase of stocks on hand June 30, 1897, compared with those of June 30, 1896.

The costs at the mines and reduction works amounted to $11,538,517, less profits of $556,505 from the subsidiary departments, leaving a net expenditure of $10,982,012 in Montana. The expenditure for entirely new plant, all of which has been charged to operation, amounted to $606,843, and, as the property throughout has been kept in the highest state of efficiency, the trustees are of the opinion that no charge for depreciation of plant should be made in the accounts.

The profit and loss account of the year shows a credit balance of $5,136,048. Of this, $166,639 was absorbed in fresh capital charges, leaving a liquid gain of $4,969,408. On June 30, 1897, the indebtedness of the company for advances, less cash resources on hand, was about $700,000, showing a decrease of about $1,500,000 compared with June 30, 1896; dividends of $3,000,000 were paid during the year; these two sums, together with large stocks of metals on hand on June 30, 1897, practically account for the profit for the year.

Should the operations of the present year, 1897–8, result in profits approaching those of 1896–7, the company will before long have ample working capital in hand, and the trustees would then be in a position to deal with the surplus remaining after the payment of the regular dividend.

The price of silver has in the past few months fallen greatly, thus reducing considerably the profits of the past year, and promising to still further reduce the profits of the present year, 1897–8. Against this, the costs of refining will be considerably smaller for 1897–8, and the superintendent is hopeful that costs in other respects will also be diminished.

The output of the Anaconda in 1895 was: Copper, 99,775,294 pounds fine; silver, 5,470,860 ounces; gold, 20,229 ounces. The output in 1896 was as follows: Copper, 125,350,693 pounds fine; silver, 5,433,876 ounces; gold, 17,411 ounces.

Scientific Progress.

Newspaper Science.

The *Literary Digest* deals "Newspaper Science" a sharp rap in the statement that, while Tesla has made some remarkable discoveries, and in his proposed wireless telegraphy has entered a realm of wonder, the manner in which his claims have been presented by many newspapers with sensational fancyings and exaggerated statements of what such achievement means, has made Tesla appear ridiculous and his scheme absurd.

As the *Record-Union* says, there can be no doubt of that. The trouble is that the sensational press is not content with recording the cold facts of discovery and the exact claims of scientists, but invariably attempts to adorn a tale and garnish an achievement with the ornaments of fancy, born of the speculation of writers who hold to the doctrine that nothing is worth printing that will not stand sensational headlines and padding by the imaginings of men who are not scientists, and who are paid only for that which in print reads sensationally.

The *Electrical World* has its shaft aimed at this same order of journalism and wittily says: "These papers have indulged in spasms of large type and staring headlines concerning the remarkable labors of an inventor who, some may begin to think, prefers such mediums for his communications to the scientific world." It is stated upon the authority of the New York *Herald*, under a caption 10 inches high, that Nikola Tesla is about to discharge upon the suffering world an electrical disturbance which, in the language of our esteemed contemporary, "travels on the alternating currents with which the earth and air are charged, at the rate of several million miles a second." It is also stated that "the disturbance from the machine is felt instantly all over the globe."

While we are not told whether the feeling accompanying the disturbance is pleasant or otherwise, it is to be inferred from the lurid language in which these remarkable results are made public that the cataclysmic forces of nature are to be unchained and go careering through the realms of the air at the will of the inventor. The solid earth is to be shaken to its foundations, and the very atoms of its rocky frame are to be jolted and jarred by the tremendous vibrations emanating from his laboratory. There should be some limit set to this sort of thing. A new danger lurks in the electrical charge of the earth. From time immemorial the old planet has gone along carrying its charge of electricity undisturbed, except by such minor manifestations as thunder storms and the like, but now all this is to be changed. The placid quiescence of the earth's charge is not pleasing to Mr. Tesla. He wants to shake it. He proposes to send his vibrations careering through the very frame of the globe. The long repose of its electrical charge is to be rudely disturbed.

This does not seem right. A solemn warning should be givin to all experimenters who propose to do those revolutionary things. If any disturbance is to be created which will be instantly felt over the globe, it seems at least reasonable to enjoin the disturber until proper assurances are given that the nature of the feelings to which we are to be subjected is pleasant. * * * Lest some one should make the mistake of taking this too seriously, it seems necessary to say that Mr. Tesla is probably more amused by the newspaper accounts of his work than any one else.

There is a great deal of this sort of thing in the flash journals of the day, papers claiming to be leaders among the public. We can name three that come to our desk daily that at least once a week indulge in the most ridiculous and outrageous illustrations of alleged discoveries, scientific achievements, or astounding revelations in natural history. Sometimes these pictures are absolutely startling in their character, and the text accompanying is monstrously exaggerated and ridiculous.

There would not be so much to concern oneself about in this, but for the unhappy fact that they do infinite injury, since, unfortunately a great body of readers take these fairy tales and lurid accounts to be truth. They form, therefore, wholly incorrect ideas and entertain harmful notions concerning progress, discovery and scientific research.

If the newspaper press wishes to serve its clientage well and to its benefit, it will perform the office best by setting forth the claims of scientific workers, experimentalists and students of natural history precisely as made, and without attempts to embellish, or indulgence in any speculation as to possible results. Such a policy will prevent misconception, invite to honest inquiry and cultivate love and respect for scientific truth. The plan now pursued, however, by the lurid press is opposed to all reason, stocks the reader's mind with harmful notions of what is to be expected, and unfits it for the reception of the truth in practice.

Boring for Steam.

The deepest well in the world will soon be completed near Pittsburg, Pa. It is now more than one mile deep, and when it is finished it is expected to reach two miles down into the earth. It is being bored in the interest of science. The object in penetrating so deeply is to determine just what the interior of the human footstool is like. From a commercial point of view the well was a success long ago. A comparatively few feet below the surface both gas and oil were struck in paying quantities, but the company owning the plant determined to dedicate it to science, and invited Prof. William Hallock of Columbia College to carry on a series of temperature investigations as the hole is carried deeper and deeper into the earth. The result of these investigations is interesting, and it is the opinion of several scientists that the ultimate result of the boring will prove to be of economic as well as of scientific value. It is the intention of the company to continue the boring process until something entirely new and original is developed. This may seem a crude way of putting the statement, but it has long been a theory among well men that if it is possible to go deep enough some new geologic condition or economic feature would be found to exist. At the very lead they claim natural steam would be encountered, or the well walls would finally become so hot that water could be pumped down cold and pumped up in the form of steam, and thus the natural power of the future be obtained. There is material for much speculation, and the interest becomes greater in increased ratio as the drill descends. One remarkable feature of the well is that the gas found near the surface is now used to operate the engines which do the drilling. Thus the natural power already issuing from the well is utilized for the purpose of deepening it.

Professor Hallock estimates that at 10,000 feet—the proposed depth of the well—the temperature will be 228 degrees. As at a temperature of 212 degrees water is converted into vapor, he expects that his well will afford an ample supply of natural steam that will prove to be the cheapest power available to man.

It is generally believed by scientific men that the temperature of the earth increases one degree for every 60 feet of depth; and it is upon this basis that Professor Hallock has made his estimate. But, like all general rules, it is subject to exceptions, and in this case to very material ones, because the increase of temperature is not uniform.

Comparatively little has been ascertained regarding the interior of the earth, and the conditions that prevail there; yet it is known that the crust of the earth is exposed to quite as various conditions as its surface. Granite, for instance—especially if it carries much feldspar—gives off more heat than slate or other rock containing a high percentage of hornblende Lime gives off still more heat, at any time and in almost any condition, but especially when "slacked" or decomposed by sudden contact with air or water, or both.

These varying conditions cause widely diverging effects, yet Professor Hallock claims a temperature at 10,000 feet depth of 228 degrees; he is correct according to theoretical knowledge. If the increase of temperature were uniform, it could be depended upon that at 600 feet the heat would, the surface temperature being neutralized, be about 10 degrees. At 6000 feet it would be 100 degrees; at 10,000 feet about 166⅔ degrees.

Practice, however, has demonstrated that the increase in temperature is governed by conditions such as mentioned above, and instances of exceptionally high temperatures at comparatively shallow depths are not wanting.

On the Comstock, in Nevada, when the Savage and Gould & Curry mine workings were connected at their 2600 level, about twenty years ago, the temperature of the connecting drifts—that from the north in the Gould & Curry and that from the south in the Savage—was, respectively, 145 degrees in the former and 137 degrees in the latter. The temperature in the Gould & Curry mine would have indicated an increase of one degree for about every 18 feet of depth. Other workings in the Comstock lode, technically referred to as "hot ends," and at shallower depths were still hotter.

Instances of the effects of local conditions upon temperature might be multiplied; but these will suffice to demonstrate the soundness of the allegation that the temperature varies greatly with depth. This will not, however, detract from the value of the work Professor Hallock is doing. If he obtains vapor or "steam" in commercial quantities by his hole in the ground he will render a benefit to the world that will be of inestimable value.

Music Heard 860 Miles away.

A novel test of the long-distance telephone line conecting San Diego with San Francisco was made one night last week when the San Diego City Guard band played to an audience of several hundred persons in the Mechanics' Pavilion, San Francisco, and Bennett's band, stationed in the Pavilion furnished music to over 200 persons in that city, 860 miles distant from San Francisco, as the wire runs. The *Union* says the music was distinctly heard at both ends of the long line.

The arrangements at the San Diego end of the line consisted of a transmitter stationed on the bandstand on the plaza, a wire leading to the Schaefer building directly opposite, where connection was made through the local office of the Sunset Company with the long-distance line. The City Guard band rendered three selections over the wire, all were heard distinctly in San Francisco, where six instruments on the bandstand in the Mechanics' Pavilion afforded as many persons an opportunity to hear the music at the same time. Those in charge of the San Francisco end said that the music in San Diego was plainly heard and evidently much enjoyed by the listeners.

In San Diego six instruments had been arranged where a crowd surged about while the concert was in progress. While the music at the Mechanics' Pavilion was at times heard with great distinctness, the breaking in of listeners at small towns along the line frequently had bad effect.

The Age of Gold.

Mr. MacArthur, one of the inventors of the cyanide process for the extraction of gold, has been giving his views with respect to the future supply of that metal. He points out that true mining for gold only commenced about the year 1860, and that up to that time we had only been gathering up the detritus, as it were, alluvial deposits being merely what had crumbled down from the reefs. Now we are going to the sources and attacking the auriferous rock, of the extent of which we know very little, while of the depth to which they may descend beneath the earth's surface we know still less. They have been traced for 3000 feet downward, and geology confesses its ignorance of what may lie below. "There seems no limit," observes Mr. MacArthur, "to possible discoveries. Some years ago the proportion of the precious metal obtained from alluvial workings was as four to one compared with what was won from its rocky matrix. Now these figures are reversed. In Russia, including Siberia, the West Coast of Africa, British, Dutch, and French Guiana, some of the South American States and Borneo, the alluvial output is overwhelmingly greater than that from reefs, which is only a thing of yesterday. How great an increase in the yield may be expected to take place, therefore, in all these countries when the steam engine and machinery for crushing are brought to bear upon the reefs, of which the alluvial gold is the mere debris? "Gold mining," concludes Mr. MacArthur, "is just beginning to take the place that copper or lead mining has occupied for centuries. One has no more reason to doubt the continuance of gold reefs than one has to doubt the continuance of other metalliferous mines. No one can say what quantities of gold may be concealed in the more central parts of the earth, nor what improved means science may find for extracting it from great depths."

Mechanical Progress.

A Revision of the Patent Laws.

Several months ago, at a meeting of the National Association of Manufacturers, a committee was appointed to consider the desirability of changing the patent laws of the country in various particulars. The committee sent out a set of questions to a large number of inventors, manufacturers and other persons who might be supposed to have valuable opinions on the subject. The *Engineering News* recently discussed this topic at considerable length.

Regarding the suggestion that an international patent system might be arranged our contemporary says that the thing is desirable, perhaps, but not practicable. To reach a common standard, each country would need to make concessions; and the United States might be compelled to give up more than it would gain in the trade.

There are some Governments, that of Great Britain, for instance, which impose an annual tax or annuity on patents; and Americans taking out patents abroad must submit to these exactions. Retaliation, in the shape of a tax in this country on patents taken out by foreigners only, has been proposed. Great Britain would not change her policy because of such legislation.

The committee referred to asks for advice on having patent litigation conducted before a separate and special court, in order to facilitate the disposition of cases. Our contemporary is in sympathy with the suggestion, but believes that the reform most needed in this connection is a prohibition of the appeal and second trial, which so often delay a final decision of patent suits for years. The opinion is expressed that the first tribunal is usually quite as competent to get at the merits of these cases as the subsequent one. It frequently happens when one inventor applies for a patent that he finds some other patent covering a part of his idea already on record. The earlier patent may be four or five years old, and may not be doing the patentee any good. And it blocks the way for other inventors. If a tax, or annuity, were assessed on all patents the holders would pay it gladly if any business was being done in consequence of such grant of exclusive rights; but if no sale was effected nine men out of ten would probably surrender their patents altogether rather than pay the tax. An assessment intended to invalidate all sleeping patents in this manner and to leave the way clear for other inventors is one of the schemes

lately brought forward for consideration.

Another obstacle which is often encountered by the applicant for a patent is the discovery that there was an old-time patent which not only has expired, but has never been turned to account at all. The later inventor finds a better way to carry the idea into practice, and perhaps enlists capital in support of it, but a new patent is denied under our present laws. There are many improved processes and devices which would be brought into use to the vast benefit of the public if the patent system were so amended that expired patents on inventions which have never been put into commercial use should be made no bar to the granting of a new application for the same thing under proper restrictions.

The World to Be "Revolutionized."

The following New York dispatch of the 22nd inst. is a good example of newspaper statements regarding those matters:

"D. O. Mills, Vice-President Hobart, Pierrepont Morgan, ex-Governor Flower and other great financiers have organized a company to use the inventions of Nikola Tesla, and it is understood that the world will soon be revolutionized by the creations of his genius. Tesla shops and laboratories will be located in Brooklyn, where extensive property has been purchased. There has been talk of war between Edison and Tesla, but as to this Tesla says:

"'I must correct any erroneous impressions which may have been created. Whatever work I have done has not been inimical to the established Edison system, but, on the contrary, excellently adapted to go hand in hand with it. The interests of local companies may, to a certain extent, be opposed to each other, but that is an unavoidable condition to every step in advance.'

"As nearly as can be learned, the scheme contemplates the distribution of energy from one or more central stations, which will be effected by alternating currents. 'Lots of money' has always been Tesla's cry when talking of his ideas. Now he has capital and carte blanche to make all arrangements in the scientific matter of a plant that will not alone rival the Schenectady shops, but the workrooms of Wizard Edison himself.

"The possibilities of Tesla are enormous. The company will build its own power-house, with the end in view of supplying currents to the electric and elevated railroads of the greater city. When the first power-house is finished, over 150 miles of subway will have been laid under Brooklyn's streets and the battle of industry and science between the companies of Edison and Tesla will be fairly on.

"Tesla's ideas of the high potential will, it is said, be used in the supply of light and power, in conjunction with the transformer system. It is expected to get the price down to such a low figure that even railroads owning their own power plants will find it cheaper to buy current rather than to produce it."

The last two paragraphs are particularly delicious.

MUCH has been said and written about improved machinery, and its tendency to displace labor, but had it not been available for copper mining it is believed the true wealth of some mines would never be known, and the Tamarack mine and famous Red Jacket shaft of the Calumet & Hecla would probably never have been put down. The sinking of shafts to a depth of a mile has been made practicable by the use of drilling machines and high explosives. To sink a shaft similar to those above mentioned by hammer and drill would be almost impossible. With hand labor not more than 25 feet a month could be sunk, at which rate it would take about sixteen years to sink the Tamarack No. 5, and it is unlikely that the project would have been undertaken under such conditions. So that while the drilling machines have displaced a number of men, it has been the means of developing properties which otherwise would likely be left untouched, and thereby giving employment to more men than could have found work in our mines had the old system of mining by hand labor been continued.

THE current number of the *Scientific American* has an illustrated article on the removal of Arch Rock in San Francisco bay, the points being furnished by O. Von Geldern. As heretofore stated, the plan is to drill holes to the required depth and charge with dynamite. Drills can be operated either from boats or stationary platforms resting upon the face of the rock, and adjustable for all depths and contour and easily operated at all stages of the tide or conditions of the weather. The softness of the rock will permit rapid progress when the work is begun. Not more than two seasons will be required for preparation, and one blast, it is calculated, will utterly obliterate the rock as it now stands. Mr. Von Geldern calculates that 40,000 cubic yards of rock must be removed in order to attain the required depth of 30 feet at low tide. The plan pursued in blowing up the rocks at Hell Gate, New York harbor, was considered, but he believes that the work can be quite as efficiently performed, and much more cheaply, by drilling from the exterior. It is believed that the whole expense will not exceed $100,000.

THE power of ocean waves has recently been measured by a dynamometer invented by Thomas Stevenson. The apparatus consists of a vertical surface of a given size, which rests upon springs, the resisting power of which has been exactly measured. The force exerted upon the springs is recorded by a registering apparatus upon a roll of paper, and can be read off by means of a scale. The apparatus is fastened to an outlying rock at ebb tide, being exposed to the flood. Experiments made with this dynamometer have shown during a storm a pressure exceeding 7500 pounds per square foot. This, however, is not considered the full extent of the power of the waves, for it is known that rocks weighing from six to fifteen tons have been displaced almost 70 feet in a horizontal direction by the power of the waves, and the power mentioned above would not be sufficient to exert that strength.

Electrical Progress.

Electric Development in Southern California.

To the Editor of the Electrical Review:

Your correspondent has just returned from a trip to the headwaters of the San Gabriel river, the purpose of which was to gain definite information regarding the various electric power schemes, projected or under way, on that stream. We find that the Crystal Lake Company, which takes up the waters shed from the mountains about Pine Flat, turns them into Crystal lake, and thence by tunnels and pipes to power house on Sycamore flat, some nineteen miles from mouth of canyon via North and Laguna Forks, has completed surveys, built diverting dams, and completed a wagon road to site of power house. Their further plans have not yet been made public.

The Electric Power Company of Los Angeles, successor to the San Bernardino Power Company, has completed its surveys of pipe and tunnel lines and is now locating a pole line down the river. One canal will start at the mouth of Fish creek, twenty-five miles from mouth of canyon as the river runs, pick up the waters of Iron Fork and the main river and deliver them through three miles of ditch and pipe and two and one-half miles of tunnel at the head of Suzanne canyon. Cold water and Cattle creeks will be delivered into the main canal by a three-mile lateral. The second canal will run from Bear creek, by way of Sycamore Flat, in two miles of tunnel and six miles of pipe and canal to the same place at the head of Suzanne canyon, where the waters will unite and drop through a steel pipe 1950 feet to the power house, thirteen miles from the mouth of the canyon. The drop here is 650 feet, and is expected to furnish 4000 H. P. From here the waters are carried about three miles below and dropped 300 feet, developing 300 H. P. The Electric Power Company has sold $500,000 worth of bonds with which to do this work, and has contracted to deliver one-half the power needed by the Los Angeles street railways by the first of July next, which will necessitate the immediate beginning of the work. Bids will be asked for just as soon as the specifications can be drawn from the surveys. This company has unlimited capital, both in its membership and through personal connections, and will make things move lively. The rights of way have been granted over the reservation and the papers will be here in a few days.

The San Gabriel Power Co., whose plans have been published in detail in the *Electrical Review*, takes up the water where dropped by the Electric Power Co., and conducts it to the mouth of the canyon, dropping it into the irrigating ditches. This company has 150 men employed on tunnel work alone, nearly all of their many tunnels, the longest of which is 1600 feet, being worked from both ends, night and day in eight-hour shifts. The California Construction Co., which has the contract for the work, will complete it some time during the month of March next.

When these enterprises are carried through, and everything looks favorable now to their early completion, and with the Redlands Power Company's plant in operation, what more reasonable to expect than that the so-called kite-shaped track from Los Angeles through Pasadena, Azusa, N. Pomona, San Bernardino, Redlands, Riverside, Santa Ana and to Los Angeles again, comprising 150 miles of heavy steel track, be "electrized?" There has been more than one conference between the leading spirits of the power company and the Santa Fe officials on this subject. G. W. T.

Azusa, Cal., Aug. 30th, '97.

Electric Grain Elevators.

There are now nearly 700 vessels engaged for a part of the season in carrying wheat on the great lakes. This is more than are employed in moving the export crop across the Atlantic, and the largest lake vessels are considerably larger than the ordinary ocean craft engaged in the same line of work.

At Buffalo, N. Y., the grain that is brought down the lakes again passes through the elevators for reshipment to New York and Boston. Two new elevators, which are now in process of completion there, are the largest in the world, and embody some new and interesting arrangements for the handling and storage of grain. The largest of these will have a capacity when completed of 3,000,000 bushels. The other is being built for a capacity of 1,000,000 bushels, with the probability of enlargement to 2,000,000.

The unique feature of these new elevators is that in them the old-fashioned wooden bins have been abandoned. Their place has been taken by a series of gigantic cylindrical steel tanks. In the largest elevator there will be three rows of these, with ten tanks in each row, each with a capacity of 100,000 bushels. The steel bins will be 84 feet high, and will be so arranged that they can be hermetically sealed in order to protect the grain from moisture. Between the rows of lofty steel bins will be smaller storage bins, into which the grain will first be moved from the vessel and afterward elevated to the larger bins by the usual cup method. The method of discharging the grain is interesting. The huge steel cylinders are raised above the floor and rest on square steel columns. Their lower ends are bowl-shaped with a valve at the lowest point so that by simply moving a lever the grain will run out and can be conveyed by steel tubes to cars or boats without the use of hoisting machinery. Every bit of machinery in the new elevators will be run by electricity from Niagara Falls, and 1000 H. P. dynamos are now being built for the purpose. The silent ease and resistless power with which these tons upon tons of grain are to be moved by Niagara's mighty arm, when compared with the old cumbersome methods of lifting and shoveling, afford a striking testimonial to the wonders of modern industrial development.

The Modern Dry Battery.

For certain classes of work, like telegraphing and electroplating a battery that will yield a continuous current for hours at a time is desirable, although dynamos have now superseded such batteries to a great extent. For another kind of service, like the occasional momentary ringing of a door-bell or an office call bell, a different sort of cell may be employed. The former are closed circuit batteries and the latter open circuit. The connecting wires of the latter variety are not allowed to touch and complete the circuit, except for brief intervals, whereas in the former there is a constant contact, demand and supply.

Dry batteries have come into extensive use of late years for open circuit work. A number of them are on the market, and they resemble each other in most particulars, although there are differences in their excellence. If, by accident, a cell of this kind is kicked over or broken, there is nothing to spill out on the floor. This peculiarity, as well as their cheapness, commends these devices strongly to popular favor. Only an electrician, though, can fully appreciate the difference between the composition of a dry battery and a wet one. To the latter class, for instance, belongs the so-called Leclanche cell. In this, packed in a porous cup and surrounded by powdered graphite and peroxide of manganese, stands a carbon rod, that forms one pole, and just outside of the porous cup, immersed with the cup in a glass jar containing a sal-ammoniac solution, in a rod of zinc, constituting the other pole. The so-called dry battery consists of an outer shell of zinc, a lining of porous plaster of paris, a central rod of carbon and a packing of pulverized graphite and peroxide of manganese between the rod and the plaster of paris. The spongelike filling is moistened with sal-ammoniac, and the top of the cup or jar is carefully sealed to prevent evaporation. But there is no free liquid to be spilled in case of breakage. That which constitutes the most important novelty in the construction of this apparatus is the addition of depolarizing agents to the mixture around the carbon rod. Chloride of zinc is one of them. After a battery has been in operation for a time there is a tendency on the part of certain gas bubbles to gather about and clog the action of one of the poles. This is polarization. Anything which tends to correct it would be a depolarizing agent. The effect of such an addition to the contents is seen in the recovery from fatigue which is observed in using a dry battery. If one should tax it for more than a few minutes continuously its action would grow perceptibly feebler. But after a period of rest its energy would be found to be restored.

In discussing the application of electric motors in machine shops before the American Society of Mechanical Engineers at the Hartford meeting, W. B. Whaley said that in two cotton mills containing the same amount of machinery, one driven by shafting and the other by electricity, the former required 530 and the latter 450 H. P. to drive them.

IN Chicago it is claimed that the trolley car has the advantage over the cable car in that it is always under the control of the motorman, hence is a much safer means of transit, but it would be difficult to get a motormon on the Mission street line in San Francisco to believe that.

Mining Summary.

CALIFORNIA.

Amador.

W. Dennis cleaned up last week at the American mine, after less than two weeks' run with five stamps, about $2000. A new pump was put in a few weeks ago at a cost of $1000, and the work of sinking is going right ahead. In a short time another level will be opened up and the entire ten stamps will be kept running steadily. Twenty men are employed.

At the meeting of the creditors of the Bay State mine, held in the office of Wm. J. McGee in Jackson last week, an agreement was made between the lien holders, whose claims aggregate about $5000, and the creditors who have no security. The common creditors are not to antagonize the lien holders and are to have until June 1st, '98, to pay the claims of the lien holders, who will have the property insured and pay the keeper. The creditors will try to bond the property for $20,000, which will pay all claims in full.

An Amador *Ledger* correspondent, writing from Antelope, says: "A mining boom seems to have struck the eastern part of this county and it is reported that quite a number of claims were recently staked off on Round Top, the well-known peak and landmark near the summit. Messrs. Cory McKenzie and William Leslie report having struck a 3-foot ledge of ore that assays $100 per ton."

Calaveras.

In the Meserve mine at Carson Hill the Oakland *Enquirer* notes a peculiar development. A 200-foot shaft has been sunk on the vein, from the bottom of which drifts were run on the foot wall for some distance, prospecting the ledge. As it appeared barren a crosscut was started to tap a parallel vein. After cutting a few feet the drift came unexpectedly into a body of ore which gave fine assay returns. The drift was continued in the ore, and at last accounts was in it for a distance of 26 feet, with quartz in the face of the drift. A careful test of the ore made by W. C. Ralston, shows that it will make about $10 to the ton. The indications are that a blind vein has been cut for there are no outcroppings.

At the Esperanza the *Prospect* reports work steadily going on with good results. The new three compartment shaft has now reached below the 700-foot level. At that level a station is being made and a drift is to be run south. The drift which is now being run on the 500-foot level along the footwall is 100 feet in length in good ore and will be continued right along. The ore in this drift is a great improvement on that in the 300-foot level and is increasing in richness as it goes south. The rock in the shaft at the 700-foot level shows up well, and a still further improvement is confidently expected in the drift which is to be run at that level. The shaft will be continued on to the depth of 1000 feet. The pitch of the vein is now about 60° instead of 45.

Doe & Jackson, on Esperanza creek near Railroad flat, last week out of twenty-five pounds of gravel, which they crushed in a hand mortar, secured $30. They have about seventy tons of the same in sight.

At Angels the proposed trustees' sale of the Carson Creek Mining Company claims, in default of the payment of a promissory note for $20,117, secured by a deed of trust covering the entire property, has been restricted by a San Francisco lawyer with an injunction on behalf of P. Phillips, a shareholder who alleges irregularity in issuing the deed of trust. The sale had been advertised thoroughly for a long time.

Prospect: At the Bund mine near Hawkeye the work of running levels and crosscutting is in progress. The old cable has been replaced by one 600 feet in length.

The water in the Thorpe mine at Fourth Crossing is pumped out.

An air compressor has been put up on the Santa Ana mine at Albany flat, and operations will be resumed.

Active operations will soon begin on the Keystone mine near Altaville.

The Dora group of mines on Indian creek, near Murphys, has passed into the hands of W. Lewis, I. Rosenthal and E. Wœne of San Francisco, and active operations will be resumed under the superintendency of W. G. Drown of Angels Camp.

El Dorado.

Under the superintendency of C. W. Teeney drifting is being done on the 300-foot level of the Ohio mine, one mile from Greenwood, with good prospects.

Republican: The mill at the Starlight has been shut down temporarily. Work still continues in the mine.

An air compressor weighing 11,250 pounds was received last week for the Pocahontas Mining Syndicate. Work was commenced on the new mill this week. The contract was let to the Union Iron Works and sublet to Culver & Ferguson. The mill will have a capacity of twenty stamps although only ten will be placed in position at present. An order for 80,000 feet of lumber and heavy timber has been placed with Bryant & Co. of Diamond Spring.

Fresno.

F. C. Burnett of the King Alfred Con. M. Co. of Mount Goddard represents nine claims, which are to be worked next season.

Inyo.

A group of five free-milling gold mines belonging to Taylor, Mathes and Hayt, in the Death Valley mining district, are reported sold to an English syndicate for $105,000. These mines are near Anvil springs, between Panamint and Death valleys.

Kern.

An artesian well is to be sunk 500 feet at Garlock.

D. N. Coffin, superintendent of the Visalia mill, has gone to Grass Valley to take charge of a mining property and mill.

The Meteor mine, Randsburg district, is reported sold for $20,000.

The Rand Mining and Milling Company has leased the Visalia stamp mill. A. D. Marchand is the new superintendent.

Mariposa.

The London Improvement Co., at Coulterville, have twenty-eight men at work on the Virginia mine.

The following is a Boston version of local matters. It is, of course, unnecessary to state that the Pioneer is a Placer Co. property and that the Santa Ysabel is in Tuolumne Co.:

The three gold mining properties now quoted on the Boston Stock Exchange have many similarities. They have no origin or ownership in common, yet they each have 100,000 shares of fully issued capital and are all mining the famous mother lode of California. Their cost price, including the $2 assessment paid upon Merced, and their mill property may be stated as follows in the order of their introduction to the Boston public:

	Shares Issued.	Sub'n Price.	Present Price.	No. Stamps.
1. Merced	100,000	12	9	40
2. Pioneer	100,000	5	6	20
3. Santa Ysabel	100,000	5	16	20

The Santa Ysabel is a comparatively new mine near some of the richest mines on the mother lode. It is now making its first regular mill run and good results are expected. The yield should be, except from the very rich stringers, above $8 per ton, and the expense of mining and milling under $4 per ton.

The returns of the Pioneer mine have been published intermittently. Such published returns have shown above $12 per ton, but this is above the average of the mother lode. This company has about $100,000 in its treasury, and the company may be resold abroad.

The Merced mine spent more than $500,000 in machinery, shafts and tunnels upon a very extensive group of claims (some four miles), known as the Boyd properties, but which, for some reason never yet clearly explained, failed to give mill runs of one-half the value per ton shown by the more than 1000 assays. All that can now be said is that the assayer was one of the most experienced men in his line, and his assays in copper, gold and silver have for years been unchallenged the world over and have measured the value in many million dollars' worth of mine products.

All the men responsible in the direction of the above expenditure are now "out." Work has ceased at the new openings, and the old shaft which made the reputation of the property has been reopened, sunk a few hundred feet, and levels opened out in good ore, with the bottom or sixth level showing some very rich ore. Meanwhile the new management is paying all expenses from the gold product from under the stamps without regard to any other accumulations in the mill. A few months more of such a record and Merced will be assured of a future, though it may never grind up mountains of gold-bearing rock or approach the expectations of one of the original owners, who declared that he expected to draw good returns upon a market valuation of $300 per share.

There has been some recent buying of Merced stock by original subscribers, who have declared to their friends that it was a "gamble," but they were willing to increase their holdings and see it through. Present officers of the company still have their original holdings.

Merced may or may not be a good speculative purchase at less than its cost price of $12, but it is inconceivable that there should be no considerable value in this extensive group of claims, whose value had been sufficiently demonstrated twenty-five years ago to warrant the drawing of contracts involving $2,500,000 to bring the river water power to the property, which contracts were to have been signed by competent parties at noon of a certain day. That forenoon the owner died.

Boston's interest in the above mother lode properties warrants the presentation of the following facts concerning the mother lode taken from reports of engineers and mining men reporting of late upon properties in no way connected with the above save that they are upon the same lode:

The leading mines of the mother lode have yielded profits to their owners of from $3,000,000 to $14,000,000.

They have paid proportionately more from the 500 to the 2000-foot level than they have from the surface to the 500-foot level.

All the great mines on the mother lode which are now paying millions have at some stage been shut down, many of them for years, by reason of inadequate machinery, or the encountering of poor streaks without the reserve to go through them.

Not one of the more than fifty mother lode mines that have been abandoned on encountering a poor streak has failed to respond on reopening and further sinking, or to increase in the volume and value of its ore at increased depth.

It was formerly contended that gold could not be found in fissures at great depth. Now it is known that the mother lode mines continue to such a depth as to baffle the skill and endurance of man to follow them.

Napa.

On the 13th inst. the Napa Con. Quicksilver Mining Co. declared dividends Nos. 82 and 83 of 10 cents each, amounting to $20,000, payable Oct. 1st, to stock of record Sept. 17th. The financial exhibit for the three months from June 1st to Sept. 1st, '97, is as follows:

Gross	$63,000
Expenses	30,987
Net	$32,013
Dividends	20,000
Surplus	$12,013

Nevada.

(Special Correspondence).—There is much activity in prospecting over in the Graniteville district, in the northeastern part of the country about twenty-five miles from Nevada City.

The success attained at the Gaston Ridge has given a new impetus to mining in that section. This property only a few years ago was abandoned at a depth of 219 feet. It had a pay chute over 1000 feet long, and produced nearly $500,000. The present company began a prospect tunnel two years ago and at about 1900 feet they have a strong ore body at a depth of 650 feet. They have 1800 tons of ore on the dump. The company is moving the mill and boarding house down into the canyon, and adding a rock breaker and concentrators to their machinery. Mr. Harmon expects to have the plant in operation by the 15th of October.

The South Fork Company near Graniteville is making advances in the development of their mine. A 5-stamp mill is in operation.

At Grass Valley the White brothers are developing their property adjoining the Osborne Hill mine on the south. They have a tunnel 400 feet tapping the ledge (which is from 1 to 4 feet) at a depth of 250 feet. They have taken 300 tons of ore from the shaft, 100 feet deep, which netted them $10 per ton.

Work on the Widbur, formerly the Diamond mine, is progressing favorably. The new shaft is down about 75 feet.

At the Maryland forty men have been temporarily dropped from the pay-roll for the present.

Placer.

Sentinel: Horse Shoe Bar Consolidated mine has resumed work after a shut down of one week employing a large force of men.

The Glen mine has incorporated. The holdings consist of 540 acres. The main tunnel at the mine is in 700 feet.

At the Goldie May quartz mine, above Forest Hill, the shaft is down 45 feet on the ledge. The width of the ledge is about three feet. Tests show a value of $20 per ton.

At the Bear River hydraulic mine, two and a half miles north of Colfax, the company with the hydraulic elevator will work the tailings in the river. Laying 4500 feet of pipe and building 4700 feet of flume is in progress. The pipe line will give a pressure of 430 feet. The company expect to make a trial run in October, and have a contract with the South Yuba for 500 inches of water for use next season.

The Three Star mine, six miles from Auburn, will be reopened by San Francisco men under the supervision of E. W. Chapmen. T. F. Chapman has sold his interest in the Zantgraf mine to his brother, E. W. Chapman.

The Bacarrat mine near Lincoln has been reopened, and renamed the Placer Klondike. D. Nelson is superintendent.

L. Balliett, superintendent Alder Mining Company, at the Van Avery mine, Blue canyon, has the first tunnel in 300 feet. The mill will be completed and in working order before winter.

The Blue Canyon Mining and Developing Company are running a bedrock tunnel to tap the old river channel two miles west of Blue canyon. The tunnel will strike the channel about 150 feet lower than any of those run heretofore.

Plumas.

In the vicinity of La Porte the Upper Dutch Company has men cleaning and widening their Feather river ditch that they may have more water for their next season's run.

The Thistle Shaft Company has ordered to be cut and delivered at the mine without delay 1000 cords of wood, which is an indication that this valuable mine will soon be operated again.

Work has been resumed at the Claybank. Two shifts are repairing the main tunnel. When the repairs are completed the company will run ahead 1200 feet towards the shaft on the ridge.

A. D. McMillan is opening up a gravel channel near the head of Curtis ravine, parts of an ancient channel running through that country.

E. Shinn, east of Quincy, has built a ditch and dam, and the mine is being opened.

Shasta.

A rich quartz ledge has been discovered at Castle creek, near Echo lake, about eleven miles from Castella, Shasta county, near the Siskiyou line. The ledge is supposed to be about 14 feet wide, and is very rich, carrying free gold. The strike has created much excitement in that locality and at Castella.

Carr & McCall, who recently bought the Boulder mine, will put twelve men driving a 650-foot tunnel to tap the ledge at a depth of 275 feet.

Democrat: H. B. Gaston, representing San Francisco men, has a bond on the Kosk creek mining properties for $70,000. The property is near Pit river.

The New quartz discoveries on Castle creek are turning out richer than at first was supposed.

On Soda creek new discoveries in placer are being made. Prospectors have flocked into the Castle creek district in such numbers that now about every available claim has been located.

Free Press: J. V. Motherwell has gone to French Gulch to assume the management of the Brunswick mine. The property is owned by Frank Rossi, who recently bonded it to M. D. Howell, a mining man of San Francisco, for the sum of $10,000. The time given on the bond is ninety days. Mr. Howell will employ six miners to work eight hour shifts in extending the tunnel which was run by Lane & Haywards when they held an option on the property. They failed to find the ledge, but Mr. Howell and Mr. Motherwell believe that they will succeed in the undertaking in which Lane & Haywards failed.

S. W. Cheney, manager of the Mammoth-Garfield mines in Old Diggings, is up from San Francisco to look after his property interests. H. L. Shannon, superintendent of the property, contemplates resigning his position in order to operate his own property, the Peach Orchard mine near Copley. Mr. Cheney will employ a new superintendent. He is now shipping from thirty to forty tons of ore per day to the smelter at Keswick.

Sierra.

The Lewis brothers of Loyalton, operating the Carman mine, near Gold lake, have pay dirt yielding $85 to a carload. Nuggets ranging from $10 to $100 have been found.

Supt. Copeland will move his quartz mill from Loganville to Slug Canyon.

A hitherto undiscovered body of gravel was struck last week in that portion of the Garnett Consolidated Company's property known as the Bunker Hill mine. The former owners of this mine had for years previous to their sale of it to the Garnett Company been of the opinion that a body of gravel lay in that portion of the claim in which it was found. The Garnett Company, presumably acting on the suggestion of their predecessors, started a tunnel and kept it going until the gravel was struck. A candle box of the gravel yielded 60 cents in gold, which, though far short of Klondike and Coffee Creek, is good for $10 a day to the pick.

The No. 9 mill and tunnel belonging to the Sierra Buttes Company have been rented to the Bigelow Mining Company for two years.

Enterprise: Moore & Bradv have found the deep channel it the Wah Hoo ridge near the Golden Era ground. The ground worked pays from $6 to $8 to the man per day, worked through an incline where the gravel and water is hoisted by hand.

A fire at the Young America mine, Sierra City, last week burned the company's buildings.

Siskiyou.

At a meeting of the executive committee of the Siskiyou County Miners' Association, at Fort Jones, September 13th, the following were appointed delegates to the convention of the State Miners' Association to be held in San Francisco on October 18th: John Daggett, Black Bear; A. G. Myers, Quartz Valley; M. C. Beem, Fort Jones; R. J. Nixon, Yreka; G. H. Vogan, Happy Camp.

Spangler Bros. have suspended pumping out and hoisting in their claim at the mouth of Humbug creek, owing to the low water in the Klamath rendering it impossible to run their current wheel.

At Happy Camp, Day & Co. are getting ready to commence operations. The Minetta B mine at Happy Camp is being worked with good success.

Morrison & Coburn are crushing rich rock at their ledge in Quartz valley.

Gentry, Herr & Collar, on Greenhorn creek, had five tons of quartz crushed, which yielded $15 a ton—$9 a ton clear, as it costs $6 a ton for hauling and milling. The Greenhorn blue gravel mine is still worked with very good success, notwithstanding the small supply of water realized from pumping out of the shaft. A rich body of pay gravel has been struck, and as long as good pay can be realized, work will be continued. When the winter rains commence to afford a good supply of water in the creek, the owners will be able to do much better.

At the American mine at Deadwood, thirty tons a month are crushed in an arrastra, average yield $20 per ton.

Messrs. Maguire and Hackathorn found a pocket on Greenhorn last week and on Monday last they took out over a $100. They are still following the stringer, which continues to yield gold in small amounts.

The Distlehorst and Barton dredger in the Klamath river is making a profitable run.

A 10-stamp mill will be erected this fall by the Aurora Mining Company, near the Schroeder, to be running by November 1st, next season. The ore mills about $21 per ton.

San Diego.

The Yuma *Sentinel* says J. C. Beatty of the Senator mine, in the Picacho district, has men at work doing development work and erecting a 20-stamp mill, and expects to have the mill in operation within sixty days.

The Los Angeles *Mining News* says that Senator Dorsey has succeeded in raising $300,000 for the development of his property in the Picacho district, and will soon begin the erection of a 100-stamp mill.

Fifty men are at work on the mines an San Mateo canyon, on the northern line of the county. The ore averages $16 per ton, and a live camp will propably be established there.

Tuolumne.

In the Rawhide mine a strike on the 600 level shows an ore body 18 feet wide in the face which works from $30 to $40 per ton in the mill. There are rich streaks in which the ore yields thousands of dollars to the ton. A station is being cut out at the 1200 level. When completed the shaft will be carried down to the 1300 level, where sinking will be stopped until next season.

At Tuttletown, says the *Independent*, strikes and encouraging reports are daily received.

On the Bluett and Thienes property they are down 130 feet, have passed through the country rock and again found slate a feature that surprises may of the old-time miners who had never heard or seen before a like formation under country rock in that locality.

The Arbona mine near Tuttletown is down 160 feet. A new and moderately equipped hoist will be erected.

The lowest level in the Gagnere mine is down 300 feet. Ground is being broken for a 20-stamp mill which the contractors have agreed shall be up and in working order by December 15. W. G. Long is superintendent.

The Patterson 20-stamp mill is to be taken down and supplanted by a 40-stamp mill.

At the Golden Star, Superintendent Park, on the 350-foot level a crosscut is being driven to tap the ledge.

At the Dutch mine sinking the main shaft

and drifting on the 300-foot level is the principal present work.

At the Grizzly the new main shaft is down 160 feet. When down 250 feet a drift will be run 100 feet on the vein to tap the old workings.

The Landers ranch has been bonded to Mr. Shanklin, who will prospect with a diamond drill for the Black Oak vein.

McLean & Leslie have bonded the Gladstone to a Stockton company.

Sonora *Banner*: The Fisher Gold Development Company are crushing forty tons per day through their mill. Lumber has been hauled to the Patterson mine below Tuttletown and a mill will shortly be erected. Drifting work goes on night and day at the Marvatt at Tuttletown under the supervision of Wm. Long. The Soulsby mine, at Soulsbyville, will soon resume operations under new management. Sinking continues in the Lady Washington and is under the supervision of D. Fisher. The Dead Horse twenty stamps are still running.

The App has about one-fourth of the regular force at work for the present due to lack of water. The additional ten stamps at the Black Oak are ready. It is reported that last Monday the company paid up all arrears.

The Wilson & Means pocket mine, being worked by Bluett & Thienes, is now down to a depth of 150 feet. When at about 120 feet from the surface porphyry was encountered which cut the vein and slate, 30 feet deeper the slate was again found. This is a new experiment and if it works satisfactorily it will be the cause of great many mines reopening.

Yuba.

R. H. Postlethwaite of Smartsville has his new dredger completed. It will be illustrated in next week's issue.

NEVADA.

The De Lamar townsite case has been decided in favor of the occupants of the townside by Judge Hawley of the United States Court at Carson, Nev. J. R. De Lamar and his associates had applied for a patent to the land under a mineral location, and the occupants instituted proceedings in opposition.

Silver City *Times*: A carload of ore and tailings was shipped to Chicago Sunday. The ore was from the Logan and Hully mine in Como, and the tailings from the Douglass reservoir. The material will be tested by the Peck process to see what can be done in the way of working it.

Capt. De Lamar has purchased the Reeves interest in the April Fool mine at De Lamar, and it is thought there that he will buy the Wilson and Dooly interest, which will give him entire control of the property.

The Austin *Reveille* says the company that recently purchased the Ione mines from Gage & Bradley and the Knickerbocker mill from Thomas Mitchell will be known in the future as The Nevada Company, with J. G. Phelps Stokes as president, who is making arrangements to develop the property on a large scale.

OREGON.

At Galice creek the Sugar Pine quartz mine, known as the Bolt or Green ledge, is to be worked after a long suspension. This mine has produced nearly $70,000.

Bronson and Loomis have bonded a tract of placer ground along Bear creek, below the Golden Fleece mine, near Ashland

Caldwell and Ingalls have bonded the dump of the old Ashland mine and say they will put in a cyanide plant.

Ruble Bros. are working the old Anaconda quartz mine on Coyote creek. They have shipped 2500 pounds of ore to San Francisco for treatment.

The Baisley-Elkhorn mine, fifteen miles northwest of Baker City, will pass into the hands of a New York syndicate, with a prospect of being better developed with ample capital. It is stated that the purchase price is $30,000.

J. C. Franks of Alameda has bought of Woodcock & Taylor their mining ground on Briggs creek for $3000.

The Yank ledge, 250 feet wide and one of the largest in southern Oregon, is being sampled with a view of putting in a cyanide plant.

WASHINGTON.

A special from New Whatcom says there is a veritable stampede from there to the new gold mining discovery in the mountains north of the State road to Hannigan pass. Some go on foot, some on horseback and some in wagons.

BRITISH COLUMBIA.

(Special Correspondence).—The Smuggler Co. cleaned up $7 per ton off their plates for last month's run. This mill could be run without concentrators, as it concentrates 50 to 1, and then only makes $60 concentrates. When their lease on the Strathyrn Company's mill expires next month they will put in a new 20-stamp mill. They have 8 feet of ore in the shaft, of which 18 inches on the foot wall is shipping ore averaging $15 per ton, the remainder going about $8.50 per ton. They are running a tunnel to tap the shaft at a depth of 350 feet.

The Joe Dandy is still doing development work, opening up the mine. They have good ore bodies, which they are blocking out. They have lately put up a steam hoist on one of their shafts, and are almost immediately going to put up a 20-stamp mill, which has already been ordered.

Work on the Tin Horn is progressing rapidly, they having at least 1500 feet of tunnels. Their ore body is 12 feet wide. Their 16-stamp mill, in eight 2-stamp batteries, will be running by Oct. 15th at the latest.

Capt. Duncan and Mr. Milbourne of the Montreal & British Columbia Development Company were in town last week, examining properties. Also Mr. Fowler of the London Gold Fields Company, with what results we could not learn.

Fairview, Sept. 13, '97.

The Wilcox mine, eight miles up Wild Horse creek, has been rebonded by Supt. White, representing the Canadian Pacific Exploration Company. The amount of the bond remains the same as in the first instance, namely, $40,000.

Journal: By B. C. Express there arrived in Ashcroft last night a gold brick from the Cariboo mine, the value of which was $61,987, the second washup of the celebrated mine for the season. The mine is still working, and were the water supply not short would make a remarkably good showing yet this season. The total output will be something over $150,000 for the season. Next year it is expected there will be a better water supply by extending the water system of the mine.

Ashcroft *Journal*: Around Quesnelle Forks the Golden River Quesnelle Company are hard at work on their mammoth undertaking of damming the waters of Quesnelle lake at the head of the South Fork.

ALASKA.

And now it is claimed that the new Klondike of the Northwest will be in Alaska Territory, on Copper river and its tributaries. The few prospectors in that country are reported to have been taking out from $10 to $100 per man. Next season the Copper River Transportation & Mining Company will run a line of vessels from Port Townsend, Wash., to Prince William's sound and Copper river points.

THE KLONDIKE.

Writing from Lake Linderman, August 31, C. H. Clark says:

"We have at last reached the sunny side of our trip, after a long month of the hardest kind of work. Many a good, strong man has broken down completely under the strain of overwork. Some are sick and some are hurt from straining themselves. Six men that I know of have been drowned and two were shot at Skaguay for stealing. We have had miserable weather, with hard rains and strong winds. Already it freezes here in the mornings. It snowed on the summit the day after we crossed, and has snowed all around this lake. The trail has been wet most of the time, and I have been packing 150 pounds. Have had several duckings in the rivers. This trail is a corker. If you decide to come in, by all means go by way of St. Michaels. There are 1000 people on this trail that can't get through this winter, and between 3000 and 3500 at Skaguay. The mounted police are still at Skaguay. It cost us from 40 to 50 cents a pound to get our stuff over. Meals are 75 cents, and the bill of fare is bacon and beans."

L. Relfe, in a letter from the Skaguay trail, written September 6, says:

"We have our stuff within thirteen miles of the lake, whence we can easily take it to the starting point in two trips. We are far ahead of the crowd. For five miles before reaching the summit the trail is simply terrible. On the sides of the hill the liquid mud stands 2 feet deep, and in some places it runs like a stream. There are sharp rocks and round rocks, and great slabs of granite, down which the horses have to slide into mud holes. There are fully sixty dead horses between Skaguay and the summit, and forty beyond the summit. You can imagine what a delightful odor permeates the atmosphere during our day's trip. Many men are selling out. One man offered 1000 pounds of grub for $50, and he had packed it seventeen miles. Of the 600 people who landed at Skaguay, only two besides ourselves are yet over the summit."

A Dawson City letter under date of August 18 says: "This morning there was many a smiling face as a boat and scow came into Dawson with at least 400 tons of provisions. For the last few days the people that had no supplies for the winter began to feel gloomy at the outlook, but the steamer's cargo cheered them up. The Trading Company had agreed not to sell more than two sacks of flour and ten pounds of sugar, and other articles in proportion, to any one person, so as to enable all to secure something. Business is carried on altogether with gold dust."

A Seattle, Wash., dispatch of the 22nd inst. says: The steamer Queen arrived from Juneau at 3:30 o'clock this afternoon. She brought down a number of gold-seekers who realize that it will be impossible to reach Dawson this winter. Winter has begun in earnest with the travelers on the Dyea and Skaguay trails, and all who do not intend to winter in Alaska are hastening out. The peaks of the mountains flanking the passes are blanketed 4 feet deep with snow, and the smaller streams are encrusted with films of ice. When the Queen left Skaguay, on Sept. 14th, there were many parties straggling in from the mountains, and it is stated that a majority will return to Seattle and await the return of spring. Preparations are being made to winter a number in both Juneau and Skaguay.

UTAH.

The Telluride Power Transmission Company are putting in a large plant in Provo canyon, and are transporting 400,000 pounds of machinery and 400,000 pounds of lumber from the railroad depot at Provo to their site in Provo canyon.

The *Tribune* says: A movement is organizing among mining men in Utah to secure the repeal of the law providing for a tax upon the net output of the mines, those who are advocating it urging that the average assessor has no knowledge of what constitutes a "net" output, in that he has no knowledge of what it cost to produce what is apparently to him a net output. "Take for example," says a Park City mining man, "the case of the Golden Gate at Mercur. Tell me where you are going to begin on that proposition to approximate the 'net output.' I have been assured by a number of Capt. De Lamar's staff that before he markets an ounce of gold he will have expended $1,225,000, this including the purchase of the ground, which was then but a prospect, its exploration and the blocking out of almost measureless bodies of ore, the acquirement of new ground, and finally the erection of a mill which promises to be the greatest that has been attempted in the West. These expenditures having been made, suppose that from the Golden Gate $500,000 of gold bullion was produced next year, at what point would the intelligent assessor begin the approximation of his net output? The proposition of a net output tax is a hideous thing as I view it, and I am informed that before the next meeting of the Nevada Legislature the inhabitants of its diggings will prepare a memorial in which it will be asked to repeal the law exacting a tax on the net output of the mines of that State. It has been found that there are other ways of reaching the end the law has in view, and mining men wherever the law exists are organizing to attack it on the ground that no one except the owner of the property is capable of determining its net output, and again that it is prejudicial to the industry upon which the West is mainly dependent."

The attack upon the law promises to be a very vigorous one, and that it will succeed is believed by a number of the most prominent men engaged in mining and smelting in the State. Should this fail, however, the Supreme Court will be asked to establish a point at which the "net output" begins, as was done in the State of Colorado. It is very likely that a meeting of mining men for the purpose of perfecting plans for the attack on the law will be called before the expiration of the year, as several producers have expressed a determination to fight the tax.

Mercur *Miner*: The Chloride Point mill will be 77 feet long; the tank room, which forms the ground floor, 212x52 feet. From the floor of the tank room to the top of the ore bin is a distance of 87 feet. A chute will bring the ore from the tunnel to the ore bin, and from the other parts of the works tramways will bring it to the same point. From the bin the ore descends to the crusher, capable of crushing 500 tons of rock per day, and from there passes through three sets of Cornish rolls before reaching the pulp bin on the third floor. On one side of the pulp bin will be located the precipitating tanks; on the other, the 70-horse power electric dynamo which will furnish the motive power. Ten tanks will be put in place now, each 20 feet in diameter and 6 feet deep. Later on ten more tanks will be added. Water will be brought 3000 feet and pumped 500 feet. The mill will be ready January 1st, '98.

IDAHO.

Near Silver City at the Cumberland, S. A. Easton of Spokane, Wash., will superintend future work.

Frederic Irwin, Supt. Idaho and Pittsburg M. & M. Co., is now consulting engineer at the Poorman property.

The Italian mine at Salmon City has been sold to W. E. Hubbard of Salt Lake City, Utah, for $50,000. The mine had been under bond for several months to R. W. McBride. Mr. Hubbard has started the mill and will add more machinery, putting in concentrators, more stamps, etc.

James Wilson and Chas. Stiller of Warrens say 600 men are employed in the district. Mr. Rebold's Little Giant, which is ten years old, has been averaging $140 to the ton. It is an arrastra property, and by this means only 75 or 80 per cent of the mineral is saved. He employs twelve men. The Keystone mine is giving good returns, and its owners talk of putting in a mill. The Ruth mine, owned by Mackintosh, has 10,000 tons of ore on the dump, which runs from $70 to $250 in gold to the ton and will average $100.

The Wallace *Tribune* says that never before was there such activity in the Cœur d'Alene country as at present. Between 1200 and 1300 men are working for wages in mines that are producing ore, besides 200 or 300 more who are doing assessment or development work—some for wages and others on their own account. Over 15,000 tons of concentrates are turned out every month.

The Arlington claim of the Canadian King group, on the North Fork of the Salmon river, has been bonded for $35,000 to the Hastings British Columbia Exploration Company. The property is gold-bearing, partly free milling.

At Pierce City it is the intention of both the Golden Gate and Golden Bar companies to go down on their ore bodies 200 feet depth, putting ore on the dump preparatory to milling the same. From the top of the Gold Bar ledge $1800 in coarse gold and nuggets was taken by the hydraulic process. It was found in cleaning up this gold from a mountain stream 300 feet higher than the water level of the main creek that the bottom of this small stream was really the top of the ledge. Its footwall is granite and hanging wall porphyry dike.

MONTANA.

Manager Kelley's report to the New Elkhorn Mining Co., of London, for July shows that the mine was operated at an expense of $26,455.65 and that the recipts were $27,493.77, making a profit of $1,038.12.

The Boston & Montana Mining Company have let a contract for the enlargement of their concentrator at Great Falls. The new addition will add fifty per cent to their concentrating capacity.

Montana's coal production in 1896 was 1,543,445 short tons; spot value, $2,279,672. The annual coal product of Montana has shown an uninterrupted increase each year since 1887, and the output in 1895 showed a phenomenal increase of over 62 per cent or 576,796 short tons over that of 1894. The value increased from $1,887,390 to $2,850,906, a gain of $963,516, or a little more than 50 per cent. The increase in production in 1896 was only 39,252 short tons, and this was accompanied by a short decline in value of the bituminous product in the United States. The value per ton declined from $1.69 in 1885 to $1.47 in 1896. The value per ton in 1892 was $2.36, indicating a decline of 89 cents, or about 35 per cent in four years. The development of the Montana coal fields on a commercial scale dates from 1889. Previous to that year the largest output was in 1885, when the product was 86,440 short tons.

Work on the Spotted Horse mine, in Fergus county, is being pushed on an enlarged scale.

In the Amazon district, in Jefferson county, Homes Bros. are about to begin development work on the Gift, recently bonded by them. The Great Northern is being worked, with a good showing of copper ore.

During the summer now drawing to a close a party of placer miners has been working the Missouri south of Great Falls by means of a dredge boat.

Placer workers are making fair wages in the Diamond Range, in Meagher county.

The Elkhorn mine, according to all reports, will continue to run if silver does not go below the present price.

At the Hawkeye mine, in Dry Georgia, Madison county, the work of development is going on with N. Trauffer as superintendent. He expects to turn out fifty tons of ore per day. The property is under lease and bond to the Montana Mining and Smelting Company.

The Butte and Yellowstone Coal and Coke Company, under direction of Manager A. O. Newton, are taking preliminary steps to increase their output of coal and erect ovens for the manufacture of coke. Engineer Crookes is engaged in surveying a route for a spur railway from the mines to Cannibar.

Ex-Gov. Houser, who has returned from New York, announces that while in the East he made arrangements for putting up at East Helena a Peck machine similar to the one recently put up at Corbin to work over the Carbon tailings.

There is considerable surprise in mining circles that the Eva May, in Cataract district, Jefferson county, is closed down. The miners were laid off on the 24th and the mill closed on the following Saturday. About forty men were let out. Shipments of concentrates had been made regularly of late and it was generally supposed that the ore was getting better all the time. No reason was given for the shutdown and no time set for the resumption of work. A special meeting of the stockholders is called to increase the capital stock of the company from 200,500 to 250,000 shares, at a par value of $10 per share.

The Clancy *Miner*, published in the Lump Gulch district, referred to the hard lines into which that high-grade silver section has fallen, as follows: Lump gulch, as a factor in the mineralogical world, is fast being regarded as one of the "has beens"—a conspicuous example of a silver-mining camp legislated off the face of the earth.

SOUTH DAKATA.

At Galena the Union Hill Company is building a 180-stamp mill, to cost $200,000. It is to be a double mill, with one large ore bin in the center, 150 feet in length, and on each side of this ore bin and running parallel with it a row of ninety stamps. The bin is 22 feet wide, 25 feet high, with a capacity of 1000 tons of crushed ore, which will pass automatically into the self-feeders, one feeder for each battery of five stamps. The crushing capacity of each stamp is about four tons of hard ore every twenty-four hour hours. The pulp will pass from the mortars onto copper plates, electro silver plated, one ounce of pure silver to each square foot of surface, amalgamated with quicksilver. There will be one concentrator for each five stamps. The concentrates will be shipped to the Edgemont smelter for treatment.

The Homestake Mining Company on the 2nd inst. made the largest cleanup in its history for a like period of time, viz., fifteen days. The shipment to the sub-treasury at New York aggregated $190,000. At this rate the output would be $380,000 per month.

The Highland mill will soon be remodeled and enlarged to 200 stamps, an addition of sixty stamps, and will be practically rebuilt. Superintendent Grier in his last report estimates that there is a twenty-year supply of ore in sight.

COLORADO.

The reorganization of the Ni Wot Mining Company, says a Denver paper, will mean an additional expenditure of over $500,000 in Ward. N. C. Merrill is secretary and treasurer.

A Denver dispatch says Frank Gardener of London has bought in that city the patents for all the world outside of the United States for the manufacture and sale of the Wilfley concentrator table for $250,000.

At Telluride A. G. Kirby, formerly of California, put in a plant just below the Smuggler-Union 50-stamp mill at Pandora, to treat the tailings coming from that mill. The feature that is principally patterned after consists of a large table covered with canvas, some 8x16 feet and others 12x14 and 12x16 feet, but the latter are usually divided into two sections. Mr. Kirby has a long row of these tables in his Pandora plant. After running the tailings over a couple of vanners, they are conducted in a trough along the head of the tables. There are little gates at intervals along the trough, one for each table, through which a graduated amount of the tailings flow. At the head of the table is an arrangement something like a palmetto fan, although many times larger, which distributes the tailings evenly along the upper end of the tables. In running over the tables, set an angle of from 10° to 15°, the mineral part settles on the canvas and the silica and lighter stuff passes over. Some of the parties that have adopted these tables contemplate covering them with burlap, believing that it would effect a closer saving than canvas. Notwithstanding that the Smuggler-Union mill is now effecting a closer saving of values than at any time in the history of the company, the tailings being reground after they leave the large vanner room, and run over a second set of vanners, Mr. Kirby is said to be realizing a net profit of $200 a day from the gold, silver and lead values saved by his plant.

The Summit County *Journal* points out that 60 per cent lead ore contains 1200 pounds of

lead to the ton which, at $4 per 100 pounds, is worth $48, but which at 40 cents per unit gives the miner $24 for his lead, or half what it is worth on a $4 basis.

In Gunnison the Taylor Park Mining Company has been steadily at work for two years and has expended $300,000 without taking out a cent. This preparatory work is finished. The officers are J. Preston, T. Goodale, secretary, and H. A. Watson, superintendent. The ditch brings the water of Taylor river and several other small streams 17⅓ miles, discharging the same at a height of 775 feet above the highest point on the placer ground. This ditch is completed and in use for 13½ miles. It is 6½ feet wide at the bottom, falls 15 feet to the mile and will carry about 36 inches in depth of water. At present a depth of about 14 inches is maintained. In one place a tunnel has been run through a hill to save distance. An average of 100 men have been kept busy on its construction. All labor is paid at the rate of $3 per day of eight hours. The company owns 3000 acres of placer ground.

NEW MEXICO.

The Pinos Altos Gold Mining Company has about 100 men employed upon the various properties recently purchased. The Hearst shaft on the Pacific vein, formerly known as the Pacific Gold shaft, has been sunk 200 feet in the past three months. A new steam hoist has been placed upon the Gillette shaft on the Pacific vein, formerly known as No. 3 shaft of the Bell and Stevens properties. This new hoist has a capacity to hoist a ton of ore 1000 feet per minute. On the Mina Grande the company has let a contract to run an adit level from the outcrop of the vein on the south part of the claim, running north 1100 feet. The first practical mining on an extensive scale ever carried on in New Mexico is now under headway upon these properties.

ARIZONA.

In the Bradshaw range, the Phoenix *Herald* reports at the Crown King for the past eleven months 6426 tons of ore have been handled at the mill, yielding $186,200.13, an average of $28.84 per ton. A cyanide plant is nearly ready for operation. The tailings will be roasted before treatment. The main tunnel of the Crown King mine is driven 1901 feet into the mountain. The apex of this elevation is 1000 feet, vertically. From entrance to face this tunnel was driven on the vein. It will require 400 feet of an extension to reach the apex of the mountain. The steam hoist is located 211 feet above the main tunnel and on the surface. The levels below the main tunnel are four in number. The first is driven 1626 feet, equally divided north and south on the lode. The 200-foot level shows 1373 feet. The 300 level has 1088 feet. The 400 is driven 683 feet. Reports say the richest ore is coming from the 400 level. Pumps are stationed at the third and fourth levels. The supply of water continues to increase on the lower levels.

The Maganetta Gold Mining Company, capital stock $500,000, has been formed in Yuma. The Page Gold Mining Company, capital stock $3,000,000, has incorporated at Prescott.

Prescott *Journal-Miner*: At the head of the Hassayampa, the Chicago Company's mill is in operation day and night. Superintendent J. S. Douglass of the Senator Company is getting the Senator mill in readiness to start up soon. Superintendent Tullgreen, of the Storm Cloud, is building a mill to treat the ores from that property. The latter will have a capacity of from ten to fifteen tons per day.

Republican: Twenty-seven miles south of Willcox in the hills in Sulphur Springs valley, and in the big Dragoon range, a few miles further south, are a number of gold, silver and copper propositions being developed and prospected, those attracting most attention being the Commonwealth group and Gold Cliff. At Pearce the Commonwealth company is shipping ores to El Paso and Colorado points; getting out four carloads daily. Stoping shows ore 40 feet wide; easily worked; free milling gold and silver rock. One hundred men are employed in and out of the mine; paid $3 and $2.50 per day. R. A. F. Penrose is president, John Brockman the general manager and superintendent.

MEXICO.

Under date Dos Cabezos, Arizona, Sept. 17, a correspondent writes: "Mexico has always had an export duty upon gold heretofore about 7 per cent. What the new regulation is I do not exactly understand, but I think it prohibits the exportation of gold. The idea, as I understand, is to accumulate gold so as the nation can adopt the gold standard. It would hardly seem feasible but the federal authorities of Mexico think so."

Our correspondent is partially right as to the gold export duty. The new law which went into effect July 1, '97, provides an interior stamp tax of 3 per cent on the value of the metals, coinage charges at the rate of 2 per cent on the value of the metals and assaying charges, and charges for smelting, refining and separating are to be levied in accordance with the tariff which the Department of Finance may publish. The basis for estimating the value for gold and silver is fixed at $40.915 for a kilogram of silver and $675.446 for a kilogram of gold. In addition to gold and silver in mixed bars, or pure sulphides of silver, argentiferous copper and lead, mineral in a natural state or concentrated, or which may have been to a certain extent treated, and generally any other ore or substance which contains silver or gold, are subject to these taxes and charges. Foreign money is not liable to the tax, except when introduced to a mint for the purpose of recoining. The Department of Finance is authorized to grant special concessions to concerns which are in the habit of exporting ores in large quantities, provided they satisfactorily prove by means of their books and other documents the weight and proportion of metal of the ores which they wish to export, and that they admit for this purpose the unconditional investigation of the fiscal inspectors. This concession may be extended to arranging with the exporters for the payment of a fixed sum as remuneration of the Government for the cost of the assay and inspection of said mineral substances. In no other case shall it allow an exemption from or rebate on the stamp tax and coinage charges established by law.

In Sonora the *Oasis* reports that the Mexican Venture Syndicate—a sub-company of the Mexican Gold and Silver Recovery Co.—have acquired property adjoining the Esperanza mine and are sinking a three-compartment shaft now down 250 feet. The Carmen mine, in the same district, owned by the Gold Mines Consolidated (another sub to the parent company) is sinking a three-compartment shaft now down 470 feet and has developed gold-bearing quartz. A 12-stamp mill, which will use the direct cyanide process, is in course of erection.

The La Compania Minera Esperanza y Annexes, in Mineral del Oro, district of Ixtlahuaca, State of Mexico, on what is claimed to be an extension of the San Rafael vein, has opened the mine, built a 40-stamp mill, an electric-light plant and telephone line. The *Oasis* says the ledge reaches a width of 150 feet with a pay streak on the hanging wall 25 feet in width, the ore from which yields $25 to $30 gold per ton, and that the property is bonded to Chas. D. Lane and associates of California for $6,000,000, Mexican money.

City of Mexico *Herald*: C. D. Lane, the well-known California capitalist, accompanied by his family, has returned from El Oro district. He has taken some people to look at the Esperanza. He says he could not tell whether the deal for it would go or not; that the mine was everything that had been said of it, he said, there was no question, but that in nearly every mining deal some objection or other was naturally raised. He said nothing about the forfeiture of the $100,000 guarantee, which it is said he put up, and its prospective loss did not seem to worry him. While it was reported he had gone to Europe, he said he had gone only as far as New York City, but that his negotiations were with European capitalists.

PERU.

(Special Correspondence).—The Santo Domingo mine of Peru, South America, is one of the richest old mines of that country, and was purchased by Messrs. Collins and Emery of Bradford, Pa., about two years ago for the Inca Mining Company of Bradford. Extensive machinery is on the way there and during the coming year this mine is likely to become a large producer, as the ore is very rich, running gold into the hundreds of dollars per ton. This property is owned by a few wealthy oil men and will not be put on the market. Vivian K. Spear and James W. Caldwell leave New York city, as manager and metallurgist, on the 20th instant to take charge of the mine.

New York, Sept. 14th, '97.

NICARAGUA.

A decree published August 15th, and taking effect immediately, established an export duty of $1 gold per ounce on gold ingots and $2 per ounce on gold dust. The information comes to the State Department from Consul Clancey at Bluefields. He says the old duty was 35.44 cents per ounce on gold. The mining interests have united in petitioning the Government to revoke the decree, which, they assert, would be ruinous to a new industry. Last year the gold exports from Bluefields amounted to $169,565, an increase of $31,636 over the preceding year's shipments.

Recent California Mining Incorporations.

Tipton Hill G. M. & D. Co., San Francisco; L. Barringer, T. D. Gaman, W. J. Gwynn, J. H. Smith, F. S. Williams; capital stock, $500,000; subscribed, $25,000.

Glen Con. M. Co., Auburn, Cal.; P. G. Halligan, J. A. Shields, D. A. McDonald, G. R. Cowan, F. G. Hoffman; capital stock, $75,000; subscribed, $60,000.

Unity G. and S. M. Co., Grass Valley; J. Terrill, J. B. Richard, H. Green, E. Audren, W. Martin; capital stock, $1,000,000; subscribed $760,000.

Kellogg Creek G. M. Co.; W. Bogen, R. Herold Jr., T. M. Schumaker, E. A. Hansing; capital stock, $100,000; subscribed $20.

Last Chance M. Co., San Francisco; W. F. Barnes, C. W. Porterfield, P. S. Platt, A. D. West, E. L. Hawk, G. F. Maydwell, C. H. Hubbard; capital stock, $500,000; subscribed $200.

Recently Declared Mining Dividends.

Champion M. Co., Cal., 41st dividend of 25 cents per share, $8500, paid Sept. 21.

Napa Con. Q. S. M. Co., Cal., regular dividend 10 cents per share and extra same amount, payable Oct. 1st, $20,000.

Coast Industrial Notes.

—G. W. McNear will build a 2000-barrel flour mill on the south side of Carquinez straits, Cal.

—At Stockton, Cal., the combined harvester works were destroyed by fire last Monday; loss, $100,000; insurance, $60,000.

—O. F. Place, from San Jose de Guatemala, Central America, writes that it takes $3 of Guatemalan money to buy $1 of Uncle Sam's money.

—The roller mills at Pendleton, Or., with a capacity of 500 barrels, owned by W. S. Byers, were destroyed by fire on the 20th inst.; loss, $150,000; insurance, $50,000.

—San Francisco men have taken the entire $6,000,000 of bonds of the San Francisco & S. J. V. R. R., which ensures its extension to Bakersfield and the connecting line from Stockton to San Francisco.

—Of California deciduous fruits up to Sept. 1st there were sent to Eastern points 88,750,000 pounds—3550 carloads. Two thousand carloads of grapes will be sent East before the season closes in November. It is thought that before the end of the season 187,500,000 pounds of green fruit, or 700 carloads, will have been sent from California to Colorado points further East. The season is the best in the history of the fruit industry of California.

—The steamship Moana from Sydney brings to San Francisco $4,000,000 in English sovereigns, in payment for wheat shipped from here to England, the second payment from the same source for this season's wheat crop. The Mariposa brought $2,250,000 in sovereigns last month as a first installment. The *Call* says: "A conservative estimate places the total amount for the season to be received from that source at $25,000,000."

—The Sierra Co.'s mill, Chico, Cal., cuts 80,000 feet a day, and this season will supply about 8,000,000 feet of lumber. The logs are brought six miles by a chute. There are three engines employed and five donkey engines are used in the woods. In the chute 36,000 feet of cable is used and 18 logs at a drive are brought. This lumber is sent to Chico by a flume, the total cost of putting the lumber in, sending it down and taking it out and piling it in the yard at Chico being 85 cents a thousand. There are 155 men employed in the woods, the mill and on the flume. The flume is twenty-five miles long.

—The Los Angeles *Times* notes the talk about railroads to Randsburg. The Santa Fe is supposed to be building one from Kramer, and the Southern Pacific is to run a rival line from Mojave and thinks that the Santa Fe, now that it owns the old Atlantic and Pacific road, is not going to start at Barstow with a tap line to Randsburg. The Santa Fe people have intimated that, if they build any extension to their lines, they will build through Tejon Pass into Bakersfield and there connect with the Valley road, getting an outlet to the sea. So far as the Southern Pacific is concerned, they will build nothing just at present. All the money they have to expend in railroad building will be devoted to their line via Santa Barbara and the coast to San Francisco.

—The annual report of Governor Otero of New Mexico says the population of the Territory has increased by 100,000 since the census of 1890, and calls attention to the fact that New Mexico is a gold-bearing country, and that within the past few years there has been a great renewal of activity in the mines. He says that several districts have been found and new placer beds have been worked by new men who have taken out thousands of dollars, and he adds: "Information which is reliable, from gold camps throughout the Territory, strengthens the hope that New Mexico will soon reap the benefit of a genuine mining boom. Never has there been such interest since the advent of the railroads in the mining development of the Territory, especially near the Colorado line." Governor Otero says there are 5,000,000 sheep in the Territory, that fully 15,000 of the people are supported by the wool industry and that last year was the most advantageous ever known in the business.

—Wm. Price of McKeesport, Pa., represents a company of Pennsylvanians who, he says, are to erect and operate a plant at Port Angeles, Wash., for the manufacture of tinplates. "The process will be started in a blast furnace and ended with the shipment of high-class tinplates to their destination. From the conversion of the ore into pig iron the product will be sent to the open hearth steel plant, where it will be turned into bars. The rolling mill will reduce the bars to plates of the requisite thickness and the plates in turn will pass through several baths to remove the oxide of iron. The next step toward turning out a finished plate is to dip the plates in melted tin and the finishing process is to pass the plates through cold rollers, which polish the deposit of tin. The tin that will be used will be imported from Tasmania, and can be laid down on the Sound for much less than in the Eastern manufacturing towns of the United States." The Pacific coast uses 27,000 tons of tinplate annually.

Personal.

H. A. KELLAR is now manager of the Siskiyou copper mines, Illinois river, southern Oregon.

GEO. DAVIDSON would be an excellent successor to Prof. Holden at the Lick Observatory.

H. BRATNOBER writes that he expects to return from the Klondike overland via Juneau next spring.

H. VISCHER, Assistant Debris Commissioner, is inspecting restraining dams in southern Plumas and northern Sierra, Cal.

J. S. WALLACE is superintendent of the Rachel mine, Baker City, Or., and thinks of building a 10-stamp mill this season.

COMMISSIONER WM. OGILVIE says he does not think the Canadian Government will attempt to enforce the 20 per cent royalty in the Klondike.

GEO. W. MCCOY, manager White Rock G. M. Co., Baker City, Or., is about to put up a 10-stamp mill and two concentrators at the Perry mine.

SENATORS CANNON AND PETTIGREW and ex-Senator Dubois have arrived in Tokio, Japan, and arrangements have been made for an interview with the Emperor on the silver question—the principal purpose of the senatorial visit to the Orient.

PRINCE PONIATOWSKI and T. S. Bullock, who are spending about $800,000 in the construction of the Sierra Pacific railroad from Oakdale, Cal., to Jamestown, Tuolumne Co., Cal., expect to have the road completed by October 7th. It will be forty-two miles long and reaches an elevation of 1600 feet from Jamestown, three miles from Sonora. Thirty miles of road are now in successful operation.

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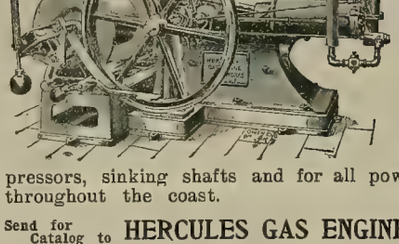

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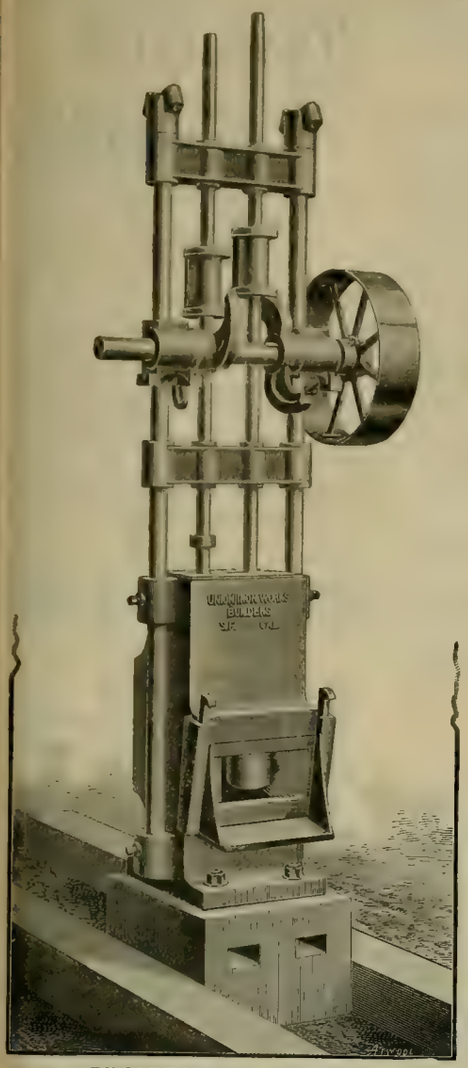

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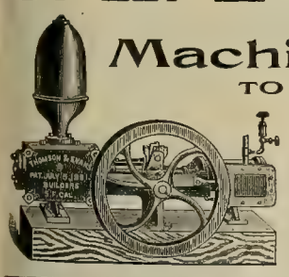

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING SEPT. 14, 1897.

589,922.—REFRIGERATOR—J. C. Ayers, San Francisco.
589,806.—SYRINGE CUT OFF—C. Bard, Ventura, Cal.
589,890.—HAND LEVER—G. S. Binckley, San Francisco.
589,955.—WRITING PAD—Edith F. Black, San Antonio, Cal.
589,927.—AIR VALVE—T. W. Brooks, San Francisco.
590,187.—CAR FENDER—M. Fernandez, Los Angeles, Cal.
590,072.—WAVE POWER PUMP—O. W. Parker, Oakland, Cal.
589,862.—MUSIC HOLDER—R. Schumacher, San Francisco.
590,118.—DITCHING MACHINE—D. K. Smith, Pico Heights, Cal.
590,026.—VIOLIN—G. W. Swalley, Prinville, Or.
590,027.—BOTTLE—L. S. Travis, Kiona, Wash.
590,178.—WATER WHEEL—M. H. White, Wenatchee, Wash.
27,640.—DESIGN, KNIFEBLADE—J. Almeter, Los Angeles, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

WAVE POWER PUMP.—Orrin W. Parker, Oakland, Cal. No. 590,072. Dated Sept 14, 1897. This invention relates to an apparatus which is especially designed to utilize the constant motion of the waves and the storing up of the power generated thereby. It consists essentially of a float resting upon the surface of the water at a sufficient distance from the land, a frame extending from the float to a suitable point where it is fulcrumed and connections between the frame and a series of pumps by which the pumps are actuated from the float so as to continually throw water into an elevated reservoir or receptacle, and in connection with this are means for adjusting the apparatus to the variation in the tide and the throw or stroke which it is desired to give the pump.

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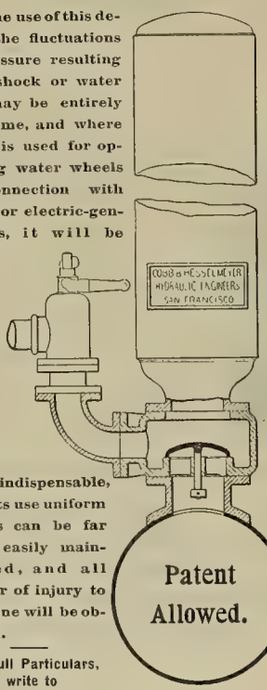

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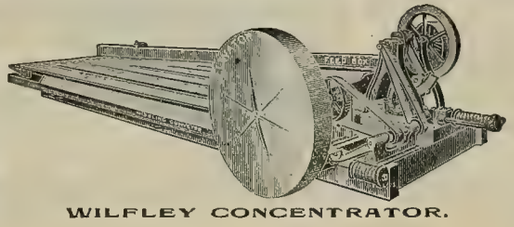

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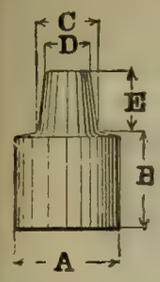

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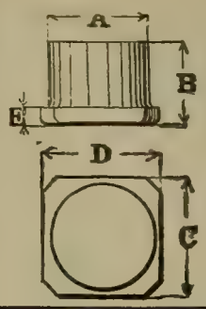

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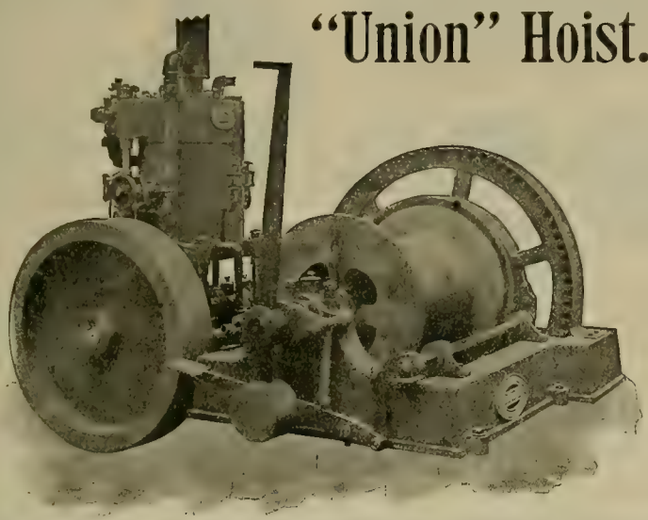

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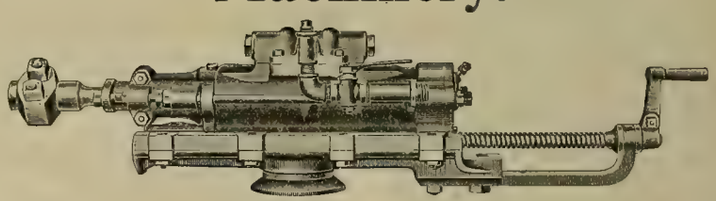

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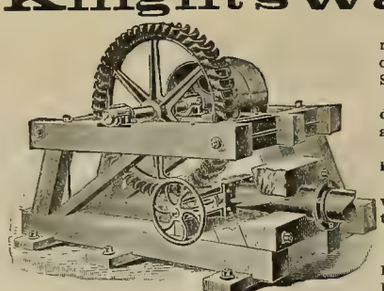

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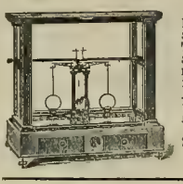
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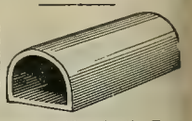
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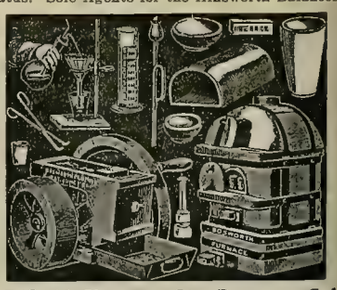
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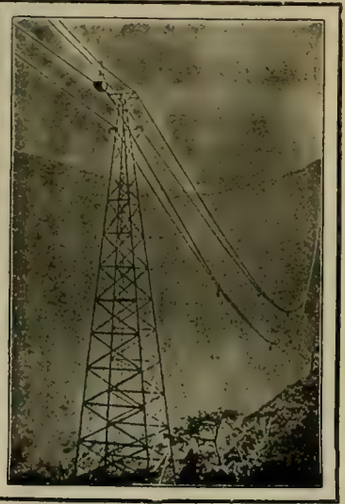

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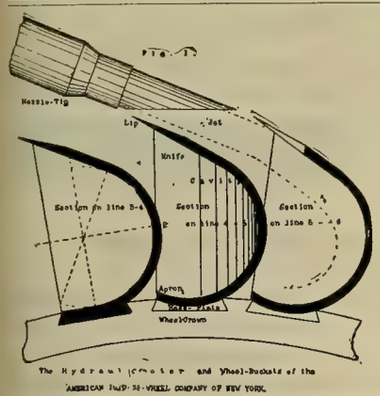

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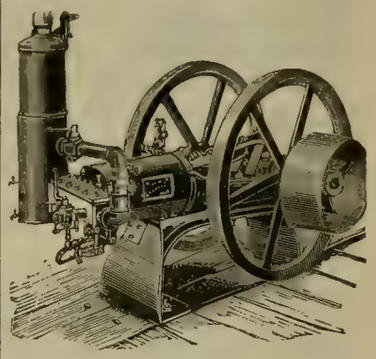

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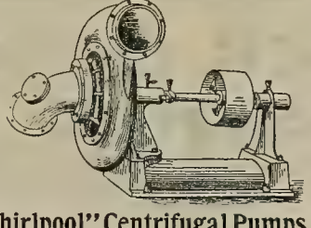

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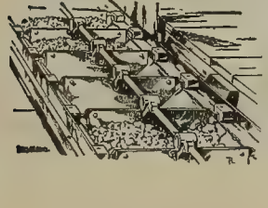

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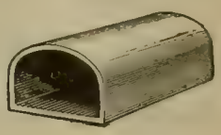

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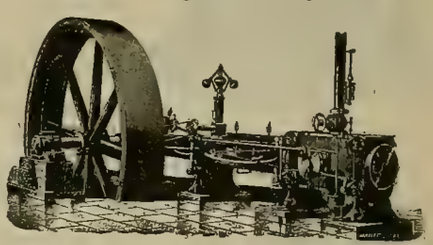

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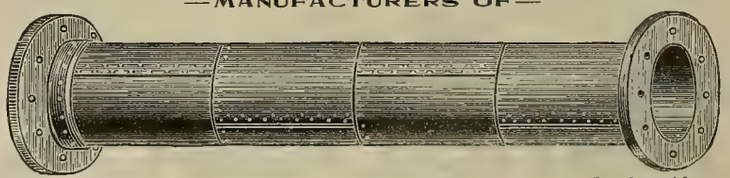

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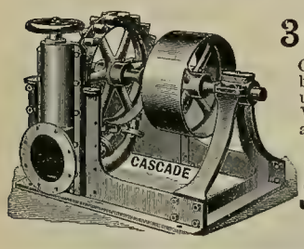

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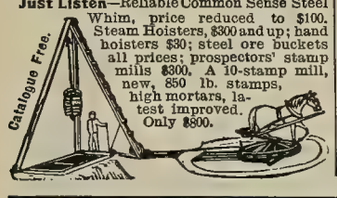

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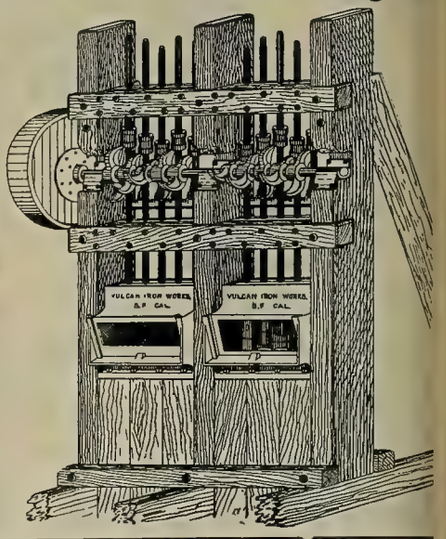

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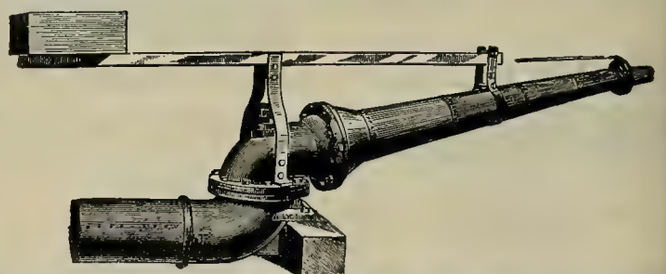

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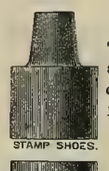

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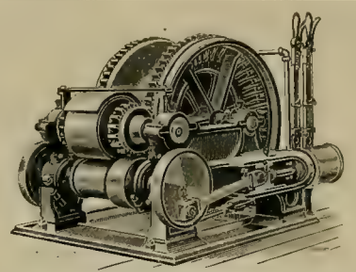

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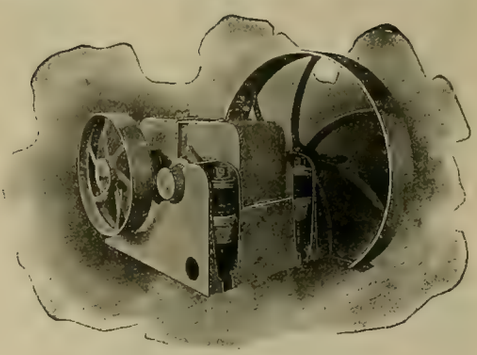

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FINLAYSON PATENT WIRE ROPE TRAMWAY.

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far ahead of all other systems of aerial ropeways. It is unsurpassed in tonnage capacity. It is on the principle of "You push the button and the machine does the rest." If interested send for special catalogue.

Our Line of Manufactures includes all kinds of Modern Equipments for the Successful Milling and Smelting of Metalliferous Ores. Special Catalogues on Application.

Market Reports.

The Markets.

SAN FRANCISCO, Sept. 23, 1897.

General trade in all lines is fairly active with a steadily increasing volume of goods going out. The market on nearly all lines continues to firm up. The gold mining industry promises to make rapid progress in 1898, particularly if the production of the new found El Dorado in Alaska and the northern central part of British Columbia is large next spring, and from the general tone of advices it looks now as if it will. Foundry and machine men are quite confident that a larger business will be done in 1898 than has been done in the current year. They look for increased orders for mining machinery, structural material and railroad rolling stock and other material. It is the belief with farm implement manufacturers that orders in their line will show quite an increase on those received the past few years.

We dare venture the opinion that never before were the banking institutions in this city so well fortified with funds. This is evidenced by the taking of the $6,000,000 bond issue of the San Francisco and San Joaquin Valley Railway, the placing of $500,000 shares by the Spring Valley Water Co. and other investments calling for a large sum of money in the aggregate. It is stated that there is a good inquiry for first-class bonds for persons seeking good and safe investment. The call for money for crop-moving purposes is hardly felt, owing to the quickness with which it returns to the general reservoir. The large increase in clearing-house returns shows, more than all else, trade conditions. The East reports a strong movement of currency—gold and silver for crop moving. The large increase over former seasons is making itself felt by stiffening the rate of interest. It is quite generally stated by financial writers at the East that gold imports from Europe are among the certainties. This in the face of heavy imports of raw material and finished products before the Tariff bill became law looks well for the general financial condition of the country.

The British steamer Gaelic, hence September 21st, took out the following treasure: For China, 285,429 Mexican dollars; silver bullion, $132,000; gold, $2215. For Japan, 1948 Mexican dollars. For Bombay, $2200 silver bullion.

New York Silver Prices.

NEW YORK, Sept. 23.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	26⅛	56¾
Saturday	26¼	57¼
Monday	27¼	59⅛
Tuesday	27¼	59⅛
Wednesday	27	58½
Thursday	26⅝	56¾

	Copper.	Lead.	Iron.	Tin.
Fri.	11 25 @11 35	4 30	9 50@12 25	13 75
Sat.	11 25 @11 35	4 27½	9 50@12 25	13 75
Mon.	11 15 @11 30	4 27½	9 50@12 25	13 70
Tue.	11 10 @11 25	4 30	9 50@12 25	13 67½
Wed.	11 10 @11 25	4 32½	9 50@12 25	13 65
Thur.	11 10 @11 25	4 32½	9 50@12 25	13 65

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	2½@5c Prem
New York Telegraphic Transfer	5@7½c Prem
London Bankers' 60 days	$4.84
London Merchants	$4.83
London Sight Bankers	$4.86
Refined Silver, per oz.. 1000 fine	56¾
Mexican Dollars nominal	45@46

SILVER.—The market the forepart of the week under review advanced until it sold at 59¼ cents per ounce firm at New York and 27¼d at London. Then it began to set back breaking in two days 2⅛ cents. The advance was due somewhat to a speculative call in Europe with the prospect that India will take more and the Latin countries buy to increase their silver currency. The discussion regarding a strong probability that France would open her mints to silver and the Bank of England would keep one-fifth of its reserve in silver had much to do with the improvement. The decline has been brought about by strong opposition on the part of English bankers to the Bank of England proposition. This opposition seems to have created the impression that it would thwart the move. Aside from this it seems quite likely that the higher price for silver had stimulated the demand for goods from silver-using countries which made a better feeling with manufacturers, for the decline had made exceedingly dull times at Manchester and Lanchester causing a strong plea for international bimetalism. It looks as if the seed has been sowed and sooner or later silver will come to the front.

It is stated by the Japanese newspapers that the Chinese have formed a syndicate and are buying in all the silver obtainable, in anticipation of the adoption of the gold standard after October 1st. It is feared that sufficient silver may be collected, when Hongkong and Singapore are taken into consideration, to purchase all the gold coins minted. The Government is alarmed at this prospect, and is studying to avert the catastrophe. Some advise it to stop the exchange altogether, while others suggest that a restriction should be placed on the aggregate amount of the exchange, and this should not exceed 50,000 yen daily.

MEXICAN DOLLARS.—The market sold up to 46 cents, but with a decline in silver and the China steamer just sailed, there is no demand, making quotations entirely nominal.

COPPER.—The market stiffened slightly for spot at the East, but with no response by futures, it eased off. The demand for the moment is quiet. In reviewing the September market, James Lewis & Son, Liverpool, write: "Trade continues to expand in the United States, and promises to be very active for some months to come. With large shipments of wheat and cotton, freights to Europe have advanced and room for copper is difficult to obtain. The exports of copper are expected to show a considerable decrease during the present month. During July, American production decreased over 5000 tons, the falling off being chiefly in the output of the Arizona mines, though both Montana and the lakes produced less than during the previous month. Imports are 9218 tons greater, and deliveries 2555 tons less, to date than during the same period last year. The total arrivals in England and France for the month have been 9640 tons, and the deliveries 9777 tons fine; stocks have decreased 137 tons, and the visible supply 522 tons. The arrivals in England from Chile during the month have been 1045 and the deliveries 1396 tons fine, and from other countries 6895 and 7897 tons fine respectively. The arrivals here and in Swansea from the United States have been 555 tons bars, 525 tons ingots and 371 tons matte, equal to about 1245 tons fine copper, in London 295, and in France 815 tons fine.

Our market is quoted as follows:

Ingot casting, jobbing..... 13 @—
Ingot " wholesale..... 12½@—
Sheet copper..... — @16½
Bolt.....¼ and 5-16, 20c; ⅜ and larger, 16½

QUICKSILVER.—There were exported the past week 125 flasks to Central America and 10 to New Zealand.

Our market is quoted at $38 for domestic consumption.

LEAD.—The market eased slightly with silver strengthening, but with that easing off it is stiffening again, closing stronger at the East.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	5 00	@	5 25
Sheet	6 25	@	6 50
Pipe	5 50	@	6 00

TIN.—The market is practically unchanged. Light weight plate is stronger at the East, owing to manufacturers having light supplies.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing..... —@ 15
Plate, I C coke, heavy, per box..... $4 10@4 25
" " " light, " ..... 4 00@—

SHOT.—The market is firm.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs...$1 40
Drop, B and larger sizes, " " ... 1 65
Buck, Balls and Chilled, do, " " ... 1 65

POWDER.—The market is firm and active.

The market is quoted as follows for Hercules: No. 1, from 11⅞c to 17½c, according to strength and quantity; No. 2, from 9c to 11c, according to strength and quantity.

COAL.—The market is quite active, with a free consumption. Seattle is weaker, but several kinds of Eastern and foreign are stiffer.

IRON.—The market is fairly firm with a continued free consumption. The east reports irregular but fairly firm markets. The consumption is increasing quite fast.

ANTIMONY.—The market is steady.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 7¾c for Cookson's, 7¼c for Hallett's and 7c for Japanese.

NAILS.—The market is firm.

Wire, carloads, basis per keg..... ....
" jobbing, " " $2 45
Cut, carloads, " " ....
" jobbing, " " 2 35

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4½

PLATINUM.—The market is steady.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is firm.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

Chemicals.

While our market does not show any changes worthy of mention, at the East there seems to be a general stiffening in nearly all kinds affected by the tariff. Our New York mail advices report: Crude saltpetre, while in large stock here, was rather more firmly held at 3½c on spot, to arrive or for future shipment in round lots. Nitrate of soda has been sold very recently at as low as 1.60c on spot, but 1.65c is now considered a strictly inside price, and most sellers quote 1.67½@1.70c. Copperas is decidedly stronger. All manufacturers, or nearly all, have raised their prices to 57½c for carloads and correspondingly for smaller quantities, while outside lots seem to be virtually cleaned out. Blue vitriol is stronger on the basis of 3⅝@3¾c for prime quality and in quite good demand. Other chemicals remain steady to firm in price and are meeting with fair movement.

SULPHURIC ACID.—The demand is fair.

We quote in a jobbing way at 1½c per lb for 66°.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported firm from store at 6¼@7c per pound in carboys.

BLUE VITRIOL.—Our market is easier.

We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is steady.

Our market is quoted in a jobbing way at $1.40 a pound.

BONEASH.—The demand is fair.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is firm.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firm at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is steady at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—The market is quiet at 2½c a pound from stores.

NITRATE OF SODA.—The market is steady.

Our market is quoted from store at 4c for 95%.

Mining Share Market.

SAN FRANCISCO, Sept. 23, 1897.

The market has fluctuated to lower figures, unless we except Occidental, which holds to strong figures. In Sierra Nevada and Hale & Norcross there is a latent strength, which is accepted as evidence that the shares are being picked up; yet to better concentrate, the market is often sent to quite low figures, with slight rallies in the interim. A sick, declining market, with quite a line of assessments to collect, invariably causes outside selling, which is taken advantage of by insiders to buy. Although at this writing the market is made to look disgustingly sick, with the blame attempted to be thrown on brokers, yet the better-informed look for much better prices before long. While they are confident higher figures will rule, still they seem to think that to bring it about lower prices must obtain. The general business and financial condition of the United States never pointed to a more prosperous year than is held out for 1898. If this is realized then we can with reasonable certainty look for quite a boom in mining shares. This is also indicated by companies forming at the East and in England to operate in shares of mines located on the Yukon river and its tributaries. Any gamble in them will unquestionably be promotive of larger dealing in the Comstock shares. An attempt is making to attract public attention to a low-grade ore proposition on the Comstock, probably with the view of strengthening reports put out by the inside through their tools, that there is no body of high-grade ore. It is to be hoped that the managements will turn their attention to extracting and milling the low-grade ore, for there are millions of tons, and to go into extensively will call for many hundred miners and mill men and cause a revival in the Comstock, the like of which has not been seen for fully two decades. It must not be understood that low-grade ore mining means a big mining share deal, for this cannot be done unless a body of high grade gold is shown up.

From the Comstock the mines reports continue to come to hand of active work going on from one end to the other of the lode. Some dealers express the hope that with so much activity a body of ore is liable to be found any day particularly in the mines whose shares are well concentrated. It is conceded that milling tests of the low grade ore in Con. Virginia have been quite satisfactory. This, it is said, will cause the Gould & Curry management to follow in the same line with a strong probability that others will fall in line, provided that milling facilities can be had. While extracting and milling low grade ore it is stated that exploiting will not be neglected, but the expense of the latter will be lightened very materially. Official letters on file at the company's office in this city report no change in the work or material encountered in Utah. Rumors are afloat of an improvement cut in Sierra Nevada, but judging from the work it looks as if it is too early for much of an improvement. The work is confined to the Layton tunnel and 900-foot level with no change in the directions reported last week.

In Union they are still drifting south, with porphyry reported in the face. In Mexican the only work reported is in the east crosscrift on the 1000-foot level. On the 1000-foot level in Ophir the west crossdrift is out about 500 feet, with no change reported. On the old Central tunnel level they are still drifting south. No ore was extracted last week from Con. Virginia. Work is being done on the 1550-foot, 1650-foot and 1750-foot levels, but with nothing reported calculated to enthuse shareholders. The work on all these levels is being actively prosecuted. In Andes they are still drifting north on the 175 foot level. The joint work by Best & Belcher and Gould & Curry is confined to the east crossdrift on the 800-foot Bonner shaft level. No work is reported in Hale & Norcross and none expected so long as one set of litigants control the mine and another the office and books in this city. The joint work reported by Chollar and Potosi is confined to repairs in the station and main incline on the 1100-foot level and to the west crossdrift on the 450-foot level. The work by Potosi is confined to the 100-foot level, with no change reported since our last issue. Nothing comes to hand from Bullion. They are still pushing the east crossdrift on the 500-foot level. From Con. Imperial, Challenge and Confidence nothing new comes to hand. The work is on the same levels and in the same directions before reported. Yellow Jacket is a sealed book so far as the public is concerned. The official letters from Crown Point, Belcher, Seg Belcher and Overman are practically the same as reported last week. In the latter mine they are still cleaning out the drift on the 1100-foot level. This, it is said, is the cause of Caledonia advancing. Active work is reported in Alta.

From the Brunswick lode our advices continue to report active work, with expected big things still ahead. It is one of the best rainbow-chasing schemes yet reported to keep interest alive. In Occidental the ore found on the 650-foot level is sufficiently encouraging to renew work on the 750-foot level so as to take the downward continuation. It will take from eight to twelve days yet before a crossdrift can be started. Reports are afloat that the ore in crossdrift No. 1 on the 650-foot level is about $10 and 14 feet wide; in the other it is wider and richer. In about ten days they will start another crossdrift farther south. In Chollar work is confined to the 300-foot, 400-foot, 500-foot and 600-foot levels. Connection has been made between the two last, which will admit of active and more en-

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Alta S M Co, Nev	57	10c	Sept 3.	Oct 6..Oct 27	J E Jacobus, 309 Montgomery
Altoona Q M Co, Cal	1	75c	Aug 3.	Sept 6 .Oct 11	C Allenberg, 308 Sansome
Andes, S M Co, Nev	44	10c	Sept 1.	Oct 4 .Oct 25	J W Twiggs, 309 Montgomery
Belcher S M Co, Nev	56	20c	Sept 18.	Oct 21..Nov 11	C L Perkins, Mills Building
Chollar M Co, Nev	44	25c	Sept 1.	Oct 7..Oct 28	C E Elliott, 309 Montgomery
Con Cal & Va M Co, Nev	9	25c	Aug 3.	Sept 8..Sept 29	A W Havens, 309 Montgomery
Eureka Con D M Co, Cal	10	3c	Sept 14.	Oct 16..Nov 6	D M Kent, 330 Pine
Gold Ridge Con M & M Co, Cal.	5	4c	Aug 3.	Sept 18..Oct 9	H Sylvester, 43 Sixth
Hale & Norcross S M Co, Nev.	112	10c	Aug 18.	Sept 22..Oct 13	R U Collins, 331 Pine
Marguerite G M & M Co, Cal.	7	10c	July 28.	Sept 10..Oct 11	F Mettman, 237 Twelfth
North San Juan G M Co, Cal.	3	7c	July 16.	Sept 8..Oct 4	H W Morris, 141 First St
Occidental Con M Co, Nev	28	10c	Aug 3.	Sept 7..Sept 30	A K Durbrow, 309 Montgomery
Osborn Hill G M & M Co, Cal.	6	35c	Aug 4.	Sept 6..Sept 27	R R Grayson, 331 Pine
Potosi M Co, Nev	48	25c	Sept 8.	Oct 12..Nov 4	C E Elliott, 309 Montgomery
Red Cap M Co, Cal	1	$9	Aug 25.	Oct 1..Oct 23	E deK Townsend, 125 Beale
Savage M Co, Nev	93	20c	Sept 2.	Oct 5..Oct 25	E B Holmes, 309 Montgomery
Sierra Nevada S M Co, Nev.	113	20c	Aug 18.	Sept 22..Oct 12	E L Parker, 309 Montgomery
Silver Hill M Co, Nev	35	5c	Sept 7.	Oct 12..Nov 5	D C Bates, 309 Montgomery

WILL NEGOTIATE with owners or their duly authorized agents only.

WILL INVESTIGATE only thoroughly bona-fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

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Marquette, Mich., U. S. A.

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Weekly Market Letter on Application. Quotations by Wire or Mail.

JAMES A. POLLOCK, Mining Stock Broker,
SALT LAKE CITY, UTAH

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from N. B. Willits, et als., in the Willow Placer Extension, near Howard's Station, Sierra Co., to deposit tailings in Little Deer creek; from G. A. Rosenthal, et als., in the California Mine, near Sierra City, Sierra Co., to deposit tailings in east fork of North Fork of Yuba river; from Jacob Yager, in the Schneider Diggings, near Spanish Ranch, Plumas Co., to deposit tailings in Spanish creek; and from Henry A. Hallsted, in the Hallsted placer mine, near Spanish Ranch, Plumas Co., to deposit tailings in a ravine, gives notice that a meeting will be held at room 59, Flood building, San Francisco, Cal., on September 27, 1897, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from Horace Taber, in the Taber Gold Mining Claim near Gibsonville, Sierra Co., to deposit tailings in Gibson Creek; from Fred Smith, in the Black Oak Mine near Yankee Jim's, Placer Co., to deposit tailings in Owl Creek; from W. H. Leek et als., in the Miocene Mine near Crescent Mills, Plumas Co., to deposit tailings in Rush Creek; from Henry Conbrough, in the Ellrig Mine near Carbondale, Amador Co., to deposit tailings on a flat; from John C. Murphy, in the Slate Creek Placer Mine near Kelsey, El Dorado Co., to deposit tailings in Dutch Creek; from John M. Jackson, in the Jamison Placer Mine near Johnsville, Plumas Co., to deposit tailings on a flat; from Sook Hung Lung, in the Barnard's Diggings near La Porte, Plumas Co., to deposit tailings in Slate Creek; and from the Jupiter Gravel Mining & Water Co., in the Jupiter Gravel Mine near Dogtown, Calaveras Co., to deposit tailings in San Domingo Creek, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on October 11, 1897, at 1:30 P. M.

Skeleton Mining Report.

NEEDED BY EVERY MINING MAN.

FIFTY CENTS POSTPAID.

Mining and Scientific Press, 330 Market St., S. F.

ergetic exploiting work. Nothing new has come to hand regarding the two crossdrifts in the 600-foot level, and nothing is expected for a few days yet. They are shipping ore to the mill. From the other levels nothing of an important character is reported. Considerable interest is taken in the joint work being done by Gould & Curry, Best & Belcher and Con. Virginia, but it looks as if more time will be required to show up something than is expected at present. From Savage nothing new is reported in the official letter.

The following illustrates the changes of the week:

MINES.	Sept. 16.	Sept. 23.
Alpha	$ 22	$ 17
Alta Consolidated	15	11
Andes	23	17
Belcher	45	29
Best & Belcher	83	71
Bodie		
Bullion	11	09
Challenge		
Chollar	73	56
Confidence	1 20	1 00
Consolidated California and Virginia	1 65	1 45
Consolidated New York	04	
Crown Point	46	33
Exchequer	06	05
Gould & Curry	70	63
Hale & Norcross	1 20	1 20
Justice		
Mexican	62	53
Ophir	1 05	1 00
Overman	39	20
Potosi	43	33
Savage	59	37
Sierra Nevada	1 10	1 10
Union	67	54
Utah	27	22
Yellow Jacket	53	37

San Francisco Stock Board Sales.

SAN FRANCISCO, Sept 23, 1897.

9:30 A. M. SESSION.

300 Alta	11	100 H. & N	1 20
500 Andes	15	300 Mexican	51
800 Belcher	29	50 Occidental	2 65
1000 Best & Belcher	67	150 Ophir	1 00
200 Bullion	09	1100 Overman	18
300 Caledonia	51	400 Potosi	33
400 Chollar	56	300 Savage	37
700 Con Cal & Va	1 45	800 Seg Belcher	10
50 Confidence	1 00	200 Sierra Nevada	1 05
600 Con Imperial	03	100 Standard	1 85
100 Crown Point	33	1000 Union	53
200 Exchequer	05	1000 Utah	19
800 Gould & Curry	61	1500 Yellow Jacket	35

SECOND SESSION—2:30 P. M.

200 Mexican	53	300 Belcher	29
400 Gould & Curry	63	100 Confidence	1 00
550 Best & Belcher	71	350 Sierra Nevada	1 10
850 Savage	36	300 Utah	22
800 Chollar	52	500 Overman	20
50 H. & N	1 10	1000 Union	54
100 Crown Point	33	100 Alta	08
200 Yellow Jacket	37	400 Occidental	2 65
200 Con Imperial	03	500 Andes	17
300 Alpha	17	5000 St. Louis	13

Commercial Paragraphs.

THE Colorado Iron Works Company, Denver, Colo., report the shipment of two carloads mining machinery to Kilton Gold Reduction Co., Florence, Colo.

THE Paraffine Paint Co., 116 Battery street, San Francisco, R. S. Shainwald, secretary, has declared a dividend, No. 25, twenty-five cents per share, payable Sept. 29th.

WM. AINSWORTH of Denver, Colo., is now offering for sale a weight, as shown above, of 294.6 milligrammes, which was suggested and first put into use by Mr. Chas. F. Shelby, assistant chemist at the Globe Smelting & Refining Co.'s Works at Globeville, Colo., and which is coming into general use very rapidly. Its use is to facilitate the present volumetric method of manganese determinations, where the titration is done with the standard 1% permanganate solution for iron. By taking this amount of ore, the final results read from the burette, 1 c. c. equals 1%, thereby saving all further calcinations and reducing the liability of mistakes to a minimum. Made of platinum and weight guaranteed. For further particulars regarding this weight address Wm. Ainsworth, maker, Denver, Colo.

GOLD IN COLORADO!

Colorado has within its limits some of the greatest gold mines that has ever been discovered. In Cripple Creek in 1892 there were a few prospectors looking over the hills; in 1895 the camp turned out over $8,000,000 in gold. Leadville, the old bonanza camp and the mineral product of which made Denver what it is to-day, is becoming a big producer of gold. New inventions for working low-grade gold ores, together with the discoveries made to work rebellious ores, have opened up a field for the miners such as they have never enjoyed before, and Colorado has inducements to offer such as no other district in the world possesses; the record of the State in gold production for the last three years speaks for itself. Among the other prominent camps in the State are Telluride, Ophir, Rico, Silverton, Mineral Point, Durango, La Plata, Ouray, Saw Pit, Ironton, the Gunnison district and many others. New finds are being made and new camps are springing into existence every day. The Denver & Rio Grande Railroad, which is the pioneer road of Colorado and which has always been the miner's friend, reaches all the mining camps in Colorado. For elegantly illustrated descriptive books, free, of mines in Colorado send to

W. J. SHOTWELL, - - - - General Agent,
314 California St., San Francisco, Cal.

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Constantly on hand a full assortment of Manila Rope, Sisal Rope, Duplex Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc. ☞ Extra sizes and lengths made to order on short notice

611 and 613 Front St., San Francisco, Cal.

Assessment Notices.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek Humboldt County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 25th day of August, 1897, an assessment (No. 1) of Nine Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, No. 125 Beale street, City and County of San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of October, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 23d day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

E. deK. TOWNSEND, Secretary.

Office—125 Beale street, City and County of San Francisco, California.

SAVAGE MINING COMPANY. LOCATION OF principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Trustees, held on the 2nd day of September, 1897, an assessment (No. 93), of 20 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, No. 309 Montgomery street, Room 50, Nevada Block, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 5th day of October, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

E. B. HOLMES, Secretary.

Office—No. 309 Montgomery street, Room 50, Nevada Block, San Francisco, California.

ANDES SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia City, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of September, 1897, an assessment (No. 44) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, rooms 20-22 Nevada block, 309 Montgomery street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 4th day of October, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of October, 1897, at 1 o'clock P. M., to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

JOHN W. TWIGGS, Secretary.

Office—Rooms 20-22, Nevada block, 309 Montgomery street, San Francisco, California.

FAIRFAX VILLA COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fairfax, Marin County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 10th day of September, 1897, an assessment (No. 7) of Fifty Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 56, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of October, 1897, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on MONDAY, the 8th day of November, 1897, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

J. STADTFELD, JR., Secretary.

Office—Room 56, No. 309 Montgomery street, San Francisco, California.

ALTA SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Gold Hill, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 3d day of September, 1897, an assessment (No. 57) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to to Secretary, at the office of the company, room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of October, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 27th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. E. JACOBUS, Secretary.

Office—Room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Assaying Gold
.....AND.....
Silver Ores.

By C. H. AARON.

This work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist nor the pratical miner can mistake his meaning.

The work, like Mr. Aaron's former publications ("Testing and Working Silver Ores," "Leaching Gold and Silver Ores,") that have been "successfully popular," is written in a condensed form, which renders his information more readily available than that of more wordy writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:—Perface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay: Examples of cupellation; Weighing of Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Gessay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests of Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 126 12-mo pages, with illustrations, well bound in cloth; 1896. Price $1.00 postpaid. Sold by the **Mining and Scientific Press**, 330 Market St., San Francisco.

DELINQUENT SALE NOTICE.

OSBORN HILL GOLD MINING AND MILLING Company. Location of principal place of business, San Francisco, California; location of works, Grass Valley, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 6) levied on the 4th day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
Albert Allan	71	150	52 50
John deWitt Allen	245	500	175 00
Bessie Baird Archibald	252	100	35 00
William Bowers	219	10	3 50
C. H. Crocker, Trustee	243	1,000	350 00
C. H. Crocker, Trustee	244	700	245 00
C. H. Crocker, Trustee	254	1,300	455 00
C. H. Crocker, Trustee	255	1,000	350 00
Thomas Cole	226	50	17 50
V. C. Driffield	47	500	175 00
W. B. Fegley	168	200	70 00
Sam'l Goldstone	4	100	35 00
Sam'l Goldstone	250	50	17 50
Sam'l Granger	24	250	87 50
William George	33	100	35 00
J. J. Garvin	176	25	8 75
R. R. Grayson, Trustee	60	5,000	1,750 00
R. R. Grayson, Trustee	69	500	175 00
R. R. Grayson, Trustee	77	1,000	350 00
R. R. Grayson, Trustee	90	100	35 00
R. R. Grayson, Trustee	102	50	17 50
R. R. Grayson, Trustee	107	10,000	3,500 00
R. R. Grayson, Trustee	108	10,000	3,500 00
R. R. Grayson, Trustee	109	5 000	1,750 00
R. R. Grayson, Trustee	112	1,000	350 00
R. R. Grayson, Trustee	127	100	35 00
R. R. Grayson, Trustee	128	100	35 00
R. R. Grayson, Trustee	129	100	35 00
R. R. Grayson, Trustee	130	100	35 00
R. R. Grayson, Trustee	131	50	17 50
R. R. Grayson, Trustee	132	50	17 50
R. R. Grayson, Trustee	139	200	70 00
R. R. Grayson, Trustee	140	300	105 00
R. R. Grayson, Trustee	145	500	175 00
R. R. Grayson, Trustee	146	500	175 00
R. R. Grayson, Trustee	147	500	175 00
R. R. Grayson, Trustee	148	500	175 00
R. R. Grayson, Trustee	149	500	175 00
R. R. Grayson, Trustee	217	5,000	1,750 00
R. R. Grayson, Trustee	247	50	17 50
R. R. Grayson, Trustee	248	50	17 50
R. R. Grayson, Trustee	258	2,500	875 00
R. R. Grayson, Trustee	260	500	175 00
I. Haas	23	200	70 00
John Hosking	35	100	35 00
James Hosking	38	100	35 00
K. P. Society	180	20	7 00
A. Lucas	50	33	11 55
Mitchell & Bro	34	100	35 00
Mitchell & Bro	216	100	35 00
D. B. Marwick	46	50	17 50
D. B. Marwick	141	50	17 50
D. M. Murphy	263	2,000	700 00
Wm. McAdams	170	100	35 00
J. C. Morris	178	45	15 75
Richard Noell	31	100	35 00
Wm. S. Pugh	173	100	35 00
M. P. Quinn	169	200	70 00
W. C. Ralston	205	7	2 45
W. C. Ralston	261	500	175 00
W. B. Sharp	259	500	175 00
W. B. Sharp, Trustee	196	500	175 00
H. Silvester	42	100	35 00
S. Solomon	48	500	175 00
J. M. Thomas	36	200	70 00
F. J. Thomas	30	100	35 00
F. J. Thomas	232	100	35 00
Robert J. Tyson	204	100	35 00
Col. Wm. Thompson	167	250	87 50
Mrs. L. C. Thompson	253	25	8 75
Jos. Weisbein	25	250	87 50
Thomas H. Wilhelm	28	100	35 00
T. M. Womelsdorf	172	100	35 00
J. Haydon Womelsdorf	175	50	17 50
H. P. Womelsdorf	174	135	47 25
Lee Womelsdorf	177	50	17 50

And in accordance with law, and an order from the Board of Directors, made on the 4th day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Room 11, No. 331 Pine St., San Francisco, California, on MONDAY, the 27th day of September, 1897, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

R. R. GRAYSON. Secretary.

Office—Room 11, No. 331 Pine street, San Francisco, California.

Pacific Refining & Roofing Co.,

113 NEW MONTGOMERY ST., S. F.
Works, Potrero.

W. & P. ONE-PLY ROOFING.

For temporary use. Good for 2 or 3 years. Felt, Coating, Tin Caps, Nails—complete.

Per Square of 100 Feet, $1.50.

W. & P. THREE-PLY READY ROOFING.

A permanent roof. Easily applied. With Coating, Tin Caps, Nails—complete.

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W. & P. PARAGON ROOF COATING.

A good and cheap roof paint for wood or metal. Also for water-proofing walls, submerged or buried woodwork.

Barrels, 30c; Five-Gallon Cans, 35c.

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Unequaled for boiler fronts, stacks, pipe coating, or wherever a first-rate black paint is wanted.

Barrels, 40c; Five-Gallon Cans, 45c.

Specify W. & P. Can be Ordered of Dealers.

DELINQUENT SALE NOTICE.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 5) levied on the 3rd day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
John A. Heninger	16	250	10 00
Nils Johnson	120	100	4 00
Nils Johnson	121	100	4 00
Hattie E. Gray	124	100	4 00
Wm. Westhoff	144	250	10 00
A. O. Lindstrom	148	250	10 00
Wm. Westhoff	177	500	20 00
Richard Phelan	188	5	20
Wm. Westhoff	200	100	4 00
Wm. H. Lillie	202	10,500	420 00
Mark Strouse	208	5	20
P. E. Robertson	215	250	10 00
Sarah Spalding	218	100	4 00
Abe MacCreadie	220	500	20 00
Alfred H. Hogg	221	300	12 00
Abe MacCreadie	222	250	10 00
J. W. Brown	231	4,099	163 96
C. D. MacNeill	236	200	8 00
Paul Muller	239	50	2 00
Paul Muller	240	100	4 00
Paul Muller	242	1,000	40 00
Chr. W. Heyer	243	755	30 20
Chr. W. Heyer	246	606	24 24
Abe MacCreadie	247	200	8 00
Wm. Westhoff	250	200	8 00
Mary Ann Robertson	251	250	10 00
Mary Ann Robertson	252	250	10 00
R. H. Daley	268	1,000	40 00
C. M. Howe	272	1,000	40 00
C. M. Howe	274	500	20 00
R. H. Daley	275	1,500	60 00
Francis Brady	277	700	28 00
R. H. Daley	278	100	4 00
Dr. H. Sylvester	280	51,278	1,971 12
(2,000 shares of this cert. have been paid by H. Sylvester, being part of his stock.)			
L. V. Merle	286	10	40
J. T. M. Kelly	289	500	20 00
R. H. Daley	290	100	4 00
R. H. Daley	294	750	30 00
R. H. Daley	295	185	7 40
E. Swenson	296	1,750	70 00
Mark Strouse	297	5,000	200 00
Mark Weil	299	750	30 00
C. W. Heyer	300	400	16 00
Mark Strouse	301	100	4 00
Geo. Day	302	1,000	40 00
Dr. H. Sylvester, Trustee	305	1,105	44 20
Dr. H. Sylvester, Trustee	306	5,000	200 00
R. H. Daley	307	250	10 00
R. H. Daley	308	240	9 60
F. Heard	309	125	5 00
Mark Weil	310	125	5 00

And in accordance with law, and an order from the Board of Directors, made on the 3rd day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Rooms 12 and 13, No. 43 Sixth St., San Francisco, California, on SATURDAY, the 9th day of October, 1897, at the hour of 12 o'clock M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

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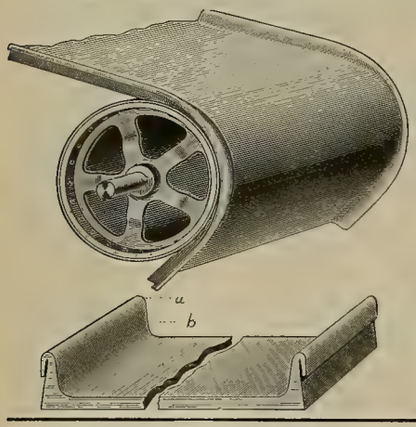

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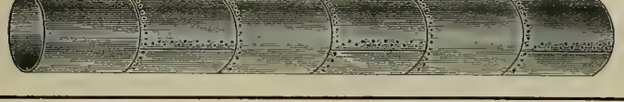

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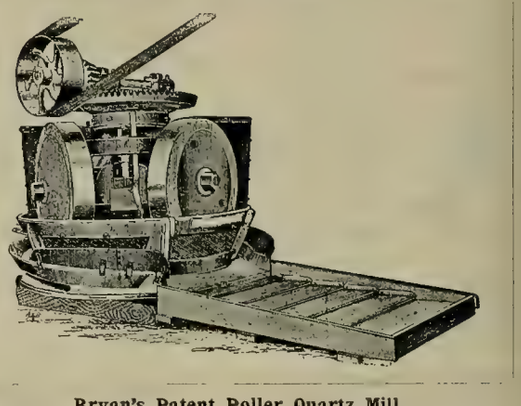

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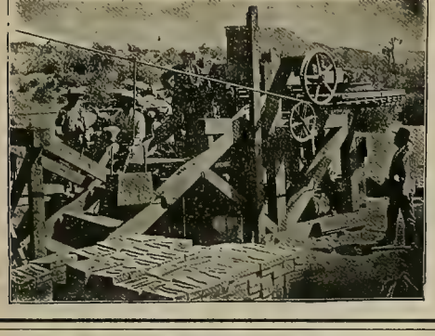

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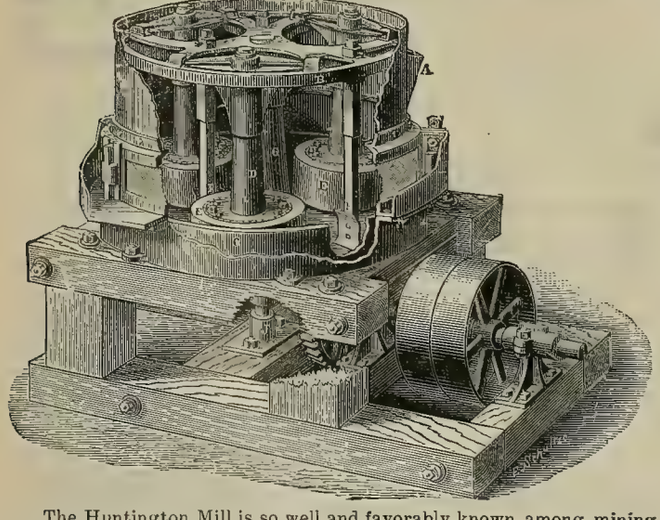

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AND PACIFIC ELECTRICAL REVIEW.

No. 1943.—VOLUME LXXV. Number 14. SAN FRANCISCO, SATURDAY, OCTOBER 2, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Deep Mining in California.

"The mines go down but the miners do not," is still said of some localities where it is held that deeper development would bring good results. That cannot be said of California, it having long since been shown that in this State the quartz veins hold as depth is attained. From Nevada county this week comes a statement that at the Providence mine, one of California's big gold producers, will shortly be begun a new shaft below the 1780-foot level, hoisting and pumping machinery to be put in capable of carrying it down 1000 feet. In this regard the extract on page 312 of this week's issue, regarding permanence in depth of ore bodies in that vicinity, is of interest. What an advance in scientific mining there has been since the announcement in these columns, many years ago, referring to this very Providence mine, that the MINING AND SCIENTIFIC PRESS would give $5000 for some satisfactory process to successfully extract the gold from the sulphurets! Since then, chlorination, the practical invention of a Californian, has solved that problem. These sulphurets make up from a fraction of 1 per cent to 10 per cent of the quartz mined, and contain from $30 to $100 or $200 per ton. The veins of the Providence-Gold Tunnel system are of interest and economic importance. They have in general a direction ranging from north-northwest to north-northeast and a uniform easterly dip of from 35° to 45°. A peculiar radiating arrangement is clearly noticeable, all of the veins converging toward a point a short distance west of the Fortuna mine. The westerly veins of the Providence system begin with the Mountaineer, which for many years has been a heavy producer. At the Providence mine the vein leaves the slate and enters the granodiorite. South of Deer creek, in the Providence mine, the vein is extensively developed by a shaft 1800 feet deep on the incline. The vein is characterized by heavy masses of quartz, up to 10 feet wide, and contains much sulphurets; there is also a considerable percentage of silver in the ore. The granodiorite on both sides of the vein is usually greatly broken and crushed, and is traversed by numerous seams parallel to the vein. Sometimes the crushing has gone so far that the rock is converted to a schistose, chloritic mass. In certain places there are two or more veins, separated by zones of crushed granodiorite, the whole mass "between walls" attaining 30 feet in width. To the south of the Providence mine, beyond the point where the vein enters slate, the old underground works, not accessible now, showed the vein to follow the contact for about 800 feet on the incline.

Of this, Waldemar Lindgren, in "Nevada City District Geology," says that the contact vein to the west of the Merrifield, its southerly part parallel to it in strike and dip, is first seen at the Providence mine, where a rich pay chute has been opened on it. It is also extensively worked on the Champion ground, as well as at the old and new Nevada City shafts. Near the latter it turns rather suddenly, without break, to a west-northwest direction. It has not been opened extensively to the west of the Nevada City mine. Practically the whole southerly part of the vein lies on the contact between granodiorite and slate. About 500 feet south of the Nevada City new shaft it leaves the contact and enters the granodiorite. It is usually a wide vein, heavily sulphureted—even more so than the Merrifield—carries considerable silver, and shows abundantly the same indications of an extensive overthrust fault fissure, the throw of which must be larger than that of the Merrifield. A short distance south of the Providence ore chute it runs into a diabase exposed on the sixth level and slate, and closes down to a mere seam. The fissure has a strong tendency to throw out stringers and fissure in the slate footwall; these have generally a flatter dip than the main fissure. Several such veins and stringers are seen in the Providence mine. A shaft near the Wyoming mill has been sunk on such a vein, which is found to unite with the contact vein. The northerly Wyoming shaft is sunk 900 feet on the incline on a slate vein, which in depth will probably be found to unite with the contact vein, as it does on the strike near the old Nevada City shaft. Between Indian Flat and Deer Creek the schists contain a great number of seams, mostly dipping southwest from 10° to 40°.

Deep mining has been the rule throughout many California sections for several years. In the same county—Nevada—and within a comparatively small area are a number of deep workings. The Empire mine contains two veins, Rich Hill and Ophir Hill, the principal work having been done on the latter, on which a shaft has been sunk to a depth of 2400 feet on the incline. The vein is from 1 to 1½ feet thick and frequently contains coarse gold. The sulphurets amount to 2½ per cent. The ore is high-grade and for many years averaged $25 per ton.

GOLD DREDGER IN YUBA RIVER, CAL.

GOLD DREDGER IN YUBA RIVER, CAL.

A California River Dredger.

In the issue of Sept. 4th appeared a short history of river dredging for gold and a technical description of a dredger being built by R. H. Postlethwaite on the Yuba river, Cal. Herewith are presented two views of the machine, from photos taken for this paper by Griffiths of Marysville, which give a general idea of the machine as it now lies in the Yuba river twelve miles from Marysville and six from Smartsville. The dredger herewith illustrated is the first one of the kind built in the United States, and is evolved from thirty years' costly experience in dredge building. As it lies, complete, it has cost about $25,000. Two pontoons, each 96 feet long, 9 feet breadth of beam, are connected by a third one 17x5 ft., making one boat 96x23 with a 5-foot well-hole 75 feet long in the center. The capacity of the dredger approximates 2200 cubic yards per twenty-four hours.

THE usual complaint is made about the bad roads in some of the mining districts in this State, notably Calaveras, Tuolumne and Amador counties. With the winter rains the same state of affairs will exist as did last winter, when supplies and machinery were delayed months and nearly all improvement stopped by reason of physical impossibility to go over sundry Chilcoot passes in that region. Such negligence is costly. California has lost many millions by this lack of proper action. The remedy lies in the county boards of supervisors. It is for the mine owners and working miners who annually lose money to see that capable, honest men are elected. "What is everybody's business is nobody's business" has prevailed to a distressing extent. The local needs are too often disregarded. To catch "the Austrian vote" or "the Italian vote" or some other vote is doubtless of surpassing importance to sundry local politicians, and little matters like the selection of county supervisors are of no consequence to men who have the making of mighty men like sheriffs and county clerks. It is an annual loss to the commonwealth that such miserable apologies for "roads" exist, and an annual loss to those most directly affected, and who can remedy the fault whenever they feel like doing so.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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TO THE PUBLIC.

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San Francisco, October 2, 1897.

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Important If True.

A Washington dispatch says that Secretary of the Interior Bliss is about to announce a new ruling regarding placer locations, namely, that one discovery within the limits of 160 acres entitles one individual to location of that area. The statement is not yet confirmed; but if it be true, the result will be of great benefit to many forms of placer mining, more especially the drift mines of California.

As construed by Secretary Bliss' predecessor, the individual was required to make a discovery on the twenty acres of placer location he was permitted to take, and a discovery demonstrated upon each twenty-acre tract included in the placer location of 160 acres; and a location made of such amount of land upon a single discovery was void except as to the twenty acres immediately surrounding it. It is believed that the ruling of Secretary Bliss, if authentic, will tend to lessen expense in the matter of drift mining. Under Secretary Smith's administration, there was constant trouble by reason of his rulings. Those familiar with California drift mining know that the value of such property lies entirely in gravel beds which are covered deep by volcanic rock. Secretary Smith ruled that there must be a discovery of mineral upon each particular claim. Just how to make a discovery of mineral upon each particular claim, except at an enormous expense, was, under that ruling, a matter of difficulty to California drift miners. Unlike ordinary placer locations, it is impossible for the drift miner to tell just where his claim should begin; it is also difficult to decide whether the valuable gravel will lie deep under one part or another of the volcanic capping. The surface area of such claims is of no value whatever. Costly tunneling for hundreds of feet can alone determine where the gold-bearing tunnel of the ancient channel lies. Under Secretary Bliss' alleged ruling the drift miner will have a chance compared, as heretofore, of eight to one.

It is interesting, in this instance, to note that two Supreme Court decisions are in line with the most recent assumption. The Supreme Court of California, in the case of Gregory vs. Hirschbacher, 73 Cal., 109–119, says: "It is insisted by the counsel that no location of mineral land is valid unless valuable mineral has been actually discovered on the land before the location was made. As to placer claims, we find no such condition in the acts of Congress, in the local laws or in the practice of miners." In the case of McDonald vs. the Montana Wood Co., the Supreme Court of Montana has held that a single placer discovery within the limits of a tract of 160 acres located by an association of eight persons is sufficient upon which to base the location of the entire tract. Of course in the granting of a patent such State decisions may yield to the dictum of the General Land Office and it is a source of congratulation to placer miners that the Department of the Interior seems disposed, under the present administration, to take a broader view of these matters than heretofore. Much, of course, may be said in favor of such governmental rulings, and argument could be put up on the general assumption that because some certain twenty-acre tract within a 160-acre area is mineral in character it could not be inevitably concluded that similar adjoining tracts were of the same character.

It would seem as though some one who had some knowledge of practical mining, or who had at some time got outside the governmental building at Washington, had access to the attention of the present secretary, who is to be commended for the intelligent attention bestowed on these matters since his induction into office. The last ruling—if ruling it is—comes in direct line and is consistent with another ruling which is, that in the case of placer locations $500 expended in work on an entire 160 acres is sufficient to secure before the Land Department patent to such area.

Some Resultant Losses.

In the issue of this paper of the 11th ult. was a practical suggestion that California farmers were themselves considerable losers by the stoppage of hydraulic mining in this State, and this matter of debris was one that could, with justice, be discussed. The item has been the subject of editorial comment by Valley papers; some unnecessarily taking the hostile attitude that opposition was assumed and must be met; winding up with the old story of firesides, sacred altars, the old flag, and an appropriation, etc.

The suggestion made in this paper was a business one and deserves to be discussed in a business manner. It is not anything for hysterics or sentimentalism, but is deserving of practical discussion in a kindly way. It is safe to accredit ordinary intelligence to anyone discussing the matter from the miner's standpoint, we being always willing to concede the same amount of consistency to others that we claim for ourself. As this subject has been opened up in the manner indicated, it is in order to adduce some statements of facts, the sources being official government reports and statements from the anti-debris association. Annual reports from the chief engineers estimate the amount of debris lodged in the Sacramento drainage system as being 1,314,000,000 cubic yards. During the twenty-one years of hydraulic mining from 1860, when it began, to 1881, when it ceased, except under certain limitations, it has been figured that about 21 per cent of the amount of debris is due to the work of the hydraulic miner, the assumption being that the other 79 per cent was due to natural erosion and the general result of civilization and agricultural progress.

The present condition of the Sacramento river—of which so much has been said and sung—while unsatisfactory to miner and farmer alike, is not chargeable to the miner. It is a common custom of rivers to so build up their channels as to make the surface of the water higher than the surrounding country, from which it is restrained by dykes. Tremendous results of long-continued natural erosion are manifest in nearly every navigable river; and in the case of the Sacramento and San Joaquin valleys, their geological history has an important bearing upon this question. Long before miner or farmer saw California the Sacramento had built up a channel, and will continue, after the fashion of the Missouri and the Po and other streams, until some topographical convulsion changes it. In such upbuilding cultivation has hastened the present condition, and the hydraulic miner has contributed some. Unless mining can be held responsible for the settlement of the valleys and the wash in the cultivated hillsides, it cannot be justly charged against the mining industry that navigation facilities on the Sacramento have lessened. But if mining be responsible for all this, then should be set down to the credit of mining the difference between California as a whole in '47 and '97.

The loss in the last seventeen years from the closing of hydraulic mining is very great. It has been estimated that but for this the gold production in this State would have been 75 millions more than it is. The depreciation in value of the property and equipment of the hydraulic miners has likewise been estimated at an equal amount, the loss to industries indirectly connected as much more; and the loss to local agriculture and to the farmers is best illustrated by the clamor heard of overproduction and want of consumption on the part of those who grow fruit, vegetables, etc. United States engineers estimate the loss to the farmer through debris at about $3,000,000; the loss to product and the loss to sympathetic industries amount to a great deal more, and direct and contingent with the agricultural interest through the years aggregate $40,000,000.

From the same official reports and the table of estimates of debris raised in California drainage channels, it appears that about 8 per cent lies in the Sacramento river and the Feather river below Marysville. Estimating that one-fourth of this comes from the mines, it would appear that about one-fiftieth of the debris excavated from the mines finds lodgment therein. At the rate of annual wash in 1880, that would raise the channel 1 foot in thirty-eight years. These figures, which are believed to be accurate, sufficiently illustrate the fact that, while there has been a loss on both sides, the loss by the cessation of hydraulic mining has inured to the injury of the State, affecting all residents alike; and that undeserved odium and exaggerated prejudice have diverted public attention from the true facts.

The miner is not desirous of evading his full measure of responsibility, nor of instituting a quarrel with the Almighty, or with the forces of Nature; much less is he desirous of other than the most cordial relations with his neighbors, friends and fellow citizens; and inasmuch as the meaning of the item referred to has been distorted and unwarranted hostile deduction drawn therefrom, it is but deemed just to make this further reference to a very important question; one that has worked to the direct injury of the commonwealth. Only by friendly counsel and cordial co-operation by all can adequate aid be secured, and holding post mortems is less beneficial than earnest, united effort to better present conditions.

Revision of Mining Laws.

The committee on revision of the mining laws of the United States, appointed by the Denver Mining Congress last July, met in that city on the 23rd ult., and formulated some suggestions which are being embodied in a report. It is believed that members of the committee not present will coincide with the views of those who took part. It is intended that the next meeting of the committee will be held in Washington, D. C., in the closing days of '97.

There was throughout a unaminity of opinion that the ideas suggested in the MINING AND SCIENTIFIC PRESS on this important matter be acted upon affirmatively. Indeed, more radical suggestion found almost unanimous favor, namely, that it were easier to secure such legislation than to attempt any patching of the present Federal statutes; the idea being to secure the development of the mines of the country with full protection to the miner, and at less cost.

Among the topics discussed were the doing away of the apex law, the fixing of an annual fee in lieu of assessment work at the option of the claimant, until such time as the patent is granted; the idea being that if the owner or operator is confined to the surface lines the claim should be of such a size that one claim should be sufficient, the claim to be 1320 feet square, in place of, as at present, 600 by 1500 feet. It is claimed that in a location of the size recommended—namely, forty acres—where the vein is located in the center of the claim and has a dip of 45 degrees, it would give the owner between 800 and 900 feet on the vein, the distance increasing as the dip of the vein approaches the perpendicular. In this regard it has been suggested that claimants be permitted to take up as many claims as they can afford to pay for.

The matter of adverses was also discussed, the idea being to have none in the proposed law, as

where filing is permitted by the local land office those questions which have heretofore made adverses and such like litigation possible, would be eliminated; the tenure of the claimant depending upon his payment of the annual fee and the performance of the required amount of work, on failing to comply with the law, his claim being vacated, thus no adverse proceedings being necessary. The idea of abrogating the tunnel site law was unanimously agreed to; and the important question which is referred to on this page in this issue under the head of "Important if True" was also further discussed, that matter being left in abeyance.

Regarding the status of the present holders of claims, in event of the passage of such new mining law, it was thought that they should be given until January 1st, 1900, to prosecute their claims to patent; and in the event of their failure to do so, the claims to revert to the Government without recourse.

Regarding placer claims, it was thought by the committee that due regard to all requirements favored the enlargement of the law to cover a wider extent of minerals than the most favorable official interpretation has yet considered.

A report of the public land commissioner in 1879 recommended the wiping out of the present Federal mining laws; and that official drew up a bill to be presented to Congress to construct an entire new code of procedure. This bill has been made the basis of the committee's report, with up-to-date ideas and practical suggestions from prominent mining men all over the country. The necessity for such a change has gone beyond the domain of argument, and it is generally understood and agreed that some radical change in the present Federal statutes regarding mining are made mandatory by the situation. Some additional phases of this matter are referred to by a leading Colorado miner on page 315 of this issue.

In this regard may be mentioned the article by Elliott Lord in the fourth monograph of the United States Geological Survey, in which the statement is made that from 1860 to 1865, inclusive, $9,000,000 were expended in litigation on the Comstock lode, Nevada, which was one-fifth of the total product of the mines and more than was paid in dividends in that time. Senator Stewart—who, on this subject, is an authority—estimated the amount so spent at over $10,000,000. Mining is costly enough at best without such an enormous burden, which the miners have been carrying for many years, and it is getting no better very fast. This subject will doubtless receive due attention at the hands of the convention of the California State Miners' Association which meets in this city on the 18th inst.

Concentrates.

AN application for a patent may embrace several locations.

PLATINUM is reported discovered at Pine Ridge, Fresno Co., Cal.

GEORGIA'S deepest gold mine is the Franklin, Cherokee Co., depth 350 feet.

IN Colorado the basis for mine taxation is one-fifth of the total output reported.

WAGES in the Enterprise mine, Slocan, B. C., have been cut from $3.50 to $3 per day.

AT the Spanish mine, Nevada Co., Cal., ore yielding 85 cents per ton has been worked at a profit.

THE California Debris Commission will pass upon applications for hydraulic permits on the 22nd inst.

COPPERAS is now a by-product in the manufacture of iron wire and is quoted at from 60c to 70c per 100 lbs.

SUPT. DALY, of the Daly-West, Park, Utah, mine, says work will not resume there till silver reaches 70 cents.

THE Eagle Bird mine of Maybert, Cal., which produced $900,000 in twelve years, is to be started up again.

RAND, South Africa, white employes average $5 per day; Kaffir wages, 69 cents per day, including "board."

THE insurance on the Iron Mountain property, recently destroyed by fire near Keswick, Cal., aggregated $80,000.

THE San Francisco Mint charge for foreign recoinage is $1 for 1000 ounces, making it much cheaper than exchange.

OSMIUM, sp. g. 22.5, is believed to be the heaviest known substance; lithium, sp. g. 0.59, the lightest metal known.

AT 55¾ the bullion, or, as our Eastern friends say, the "intrinsic" value of the standard silver dollar is 42.92 cents.

LESS than 90 days remain in which to do needed assessment work on unpatented mining claims for the calendar year 1897.

SINCE the Klondike excitement began Australia has sent six times the amount of gold to this city that the former has.

THERE will be 3000 extra copies of next week's edition. That is, in addition to the regular issue 3000 more copies will be printed.

AT the Spokane, Wash., meeting on the 8th inst. the Le Roi, B. C., mine will exhibit a 3400-lb. ore specimen from the 500-ft. level.

A CO-OPERATIVE mining company, if the partners stick together, has the strength of the game, and, rightly managed, will usually win.

ASPEN, COLORADO, reports that the Mollie Gibson and Argentum-Juniata will build concentrating plants to treat their low grade ore.

IT is expected at Leadville, Colo., that the pumps in the mines will soon be started and within two months 2000 men will be put to work.

GOLD 750 fine is worth $15.50 per oz.; 800 fine, $16.53 per oz.; 850, $17.57; 875, $18.08; 900, $18.60; 920, $19.01; 930, $19.22; 940, $19.43; 950, $19.63.

FROM Jan. 1st, '93 to Sept. 1st, '95, the gross receipts from the Utica and Stickles mine, Calaveras Co., Cal., were $4,154,026.52; expense, $1,683,414.24.

IN the convention of the California Miners' Association on the 18th inst., each county organization is entitled to one delegate for every ten members.

WITH silver at 60 cents and lead at $4.25 the silver lining would be restored to the cloud that hangs over the silver-lead mines of the west half of America.

TO REDUCE a one per cent cyanide solution to ¾ of 1% use 3 ozs. solution to 1 oz. water; to ½ of 1%, 2 ozs. solution to 2 ozs. water; ¼, 1 to 3; ⅛, 1 to 7, and so on.

THE Slate creek, Wash., boom of July, '95, is being repeated. One Montana syndicate then spent $50,000 to no purpose, and 3000 prospectors cursed the country.

URANIUM is worth 60 cents per gram. A specimen of ore believed to contain it might be sent to the State Mining Bureau in San Francisco for qualitative analysis.

ANY one in rightful possession of a placer claim is entitled to everything inside his boundary lines. No one can, without permission, prospect or locate a lode claim therein.

NEW YORK CITY men have bonded the Baisley-Elkhorn quartz mine, fifteen miles from Baker City, Or., for $50,000. Supt. O. R. Symmes will increase development work, etc.

ON page 320 of mining summary will be found a report of recent South African cyanide working, of prime importance to every cyanide worker, more especially to those operating in localities where water is none too plentiful.

THE 43rd dividend of 6 cents per share has been declared in the Western Silver Mining Co., Tasmania. The total amount of the dividend is $3750, and the total sum of dividends to date is $420,000.

THOUGH talk of "tons of gold" from the Klondike has subsided, it is interesting to recall the fact that from one mine in Nevada—the Con. Cal. & Va.—have been extracted 119 tons of gold.

THE records show the highest temperature ever recorded in California was 130 degrees, at Mammoth Tank, in the desert region of San Diego county, and 128 degrees at Indio, in the same county.

KLONDIKE gold runs about 700 fine; California gold goes sometimes as high as 925 fine. Probably the purest native gold is from the Mount Morgan, Australia, mine, which has gone as high as 987.

B. W. RICE of Milford, Utah, has filed the first papers toward getting a patent on a flour-gold machine. The principle is just exactly contrary to that existing in the mind of every old-time placer miner.

IN the far north silver is at a premium. At Skaguay silver is so scarce that a twenty-dollar gold piece has been given for nineteen silver dollars in change. In San Francisco in the early 70's the same condition prevailed.

THE report of the Geyser-Marion, Utah, superintendent for August shows that the company is daily putting out 150 tons of low grade ore. It is being taken from the mine and converted into cyanides at a cost of less than $2 per ton.

THE New York company advertising a dry washer "to be used in the Klondike country" is actually securing sales of stock in the country round about Manhattan island. "Succor for the Klondike" could be there reversed to "Klondike for the sucker."

THE gold crushings at Witwatersrand, South Africa, for August, '97, aggregated 259,603 ounces, an increase of 17,124 ounces as compared with the previous month's total, and an increase of 46,185 ounces as compared with the corresponding month of '96.

AUSTRALIAN miners have a variety of markets for their gold. New Zealand deals with San Francisco, Sydney or Melbourne; Westralia with London or Melbourne; New South Wales with Sydney, San Francisco or London; Victoria with Melbourne.

LABOUCHERE of London continues to make the surprising statement that nearly every journal in that city can be financially induced to say anything, editorially or otherwise, in any part of the paper about any mining property anwhere, which is probably an exaggeration.

IN case J. H. Neff, the present honored president of the California State Miners' Association, should decline to further serve, it is believed that H. T. Power of Sunny South, Placer Co., would be good timber for that position. The name of Mr. Edward Coleman of San Francisco is also prominently mentioned.

ASSESSMENT work on claims is estimated by the day's work at the ruling local rate of wages. No decision permits trail or road work to apply on the required amount of annual work or improvement. Work must be on the claim or in direct relation to it. No allowance is made for time or money spent going or coming.

A MINING company has been organized in Eureka, Cal., for black sand mining on the beach at the mouth of Little river. Four thousand dollars' worth of machinery has been purchased and eighty-eight acres leased. The plant will work 800 tons of sand every twenty-four hours, averaging, it is said, 80 cents per ton.

NOVEL reasons for lowering miners' wages are sometimes advanced, a more than ordinarily curious one being given by G. W. Lock, manager of two large Australian mines, who says that he reduced wages throughout because gold ore was being stolen—a case where the innocent were punished and the guilty encouraged.

THE Prescott, Arizona, *Courier* thinks the best use to make of authentic mining news "is to give it first to the local paper, which goes to the metropolitan publications, which latter, in turn, will republish such local news, giving the local paper credit therefor, thus more fully establishing the authenticity of the news."

THE prevalent newspaper desire to announce wonderful mining "strikes" causes some funny statements. One Missouri paper has locally found a "porous mineralified clay," and says, "judging from its appearance, if found in a mining country, this clay might contain any kind of mineral." Yea, verily, and then, again, it might not.

THE record of ore shipments from southern Kootenay, B. C., for the week ending Saturday, September 18, was the largest ever known. The value of all ores and matte entered at Nelson for the week was $271,018, the total value of shipments for September up to date $500,387. The value of the mineral exports for the current year to September 18 is $5,540,243.

THE electric dredge on the Kowarau river, New Zealand, made a return of 958 ounces in gold recently. The owners of this dredge are reported to have obtained gold to the value of £17,000 as the result of their first year's operations, with the work of seven men and an initial expenditure of £4500. The company has lately finished the construction of a second dredge.

THE Tucson *Citizen* says that the recent Arizona legislative enactment compelling the University assay office to make gold and silver assays for 50 cents each, virtually closed up the assay offices in that city. From 400 to 600 assays per month are made at the University, while the assay offices in town do not make a dozen. The law is unjust and should be repealed.

IT is about time for the annual fakir with his "souvenir," "official" programme of the California State Miners' Association to begin begging and coaxing manufacturers and vendors of machinery to take advertising space therein. The advertiser and his competitors may see the few dozen copies printed, but no one else will, and any money contributed to the thing is so much thrown away.

DURING the past five years, particularly in the last eighteen months, a great amount of space has been devoted herein to the cyanide process, or rather processes, so much that, probably, no where outside of the files of this paper can be found so much of the best thought and results of work on the part of those who, in this branch of progressive metallurgy, have given intelligent investigation of so important a subject.

WARDEN McDONALD of Charters Towers, Queensland, reports that forty cyanide plants are now being worked and others are in course of erection. For the three months ending June 30th: Ore crushed, 49,948 tons; yield, gold, 59,805 ounces; tailings treated by cyanide, 46,004 tons; yield, 21,391 ounces gold; tailings treated by chlorination, 1742 tons; yield, 2329 ounces; making in all 97,694 tons of material treated; total yield, 83,525 ounces.

THERE is a rich-looking quartz ledge running through the heart of the town of Placerville, Cal., says the *Nugget*, but until recently it was supposed to be held under a patent. A young lady named McConnell, living near the croppings, noticed a mining expert taking bearings as if about to locate the ledge, went down town and bought a location notice and had her claim recorded before the expert had his measurement completed.

THE question as to whether or not Canada should have a mint and make coins of gold, silver and copper is to be one of the issues of the coming campaign in British Columbia. British Columbia had a mint in 1877. It was located in New Westminister and after striking off a few $5, $10 and $20 it was closed by the late Sir James Douglas, Governor of the United Colonies, because he thought that would allay the intense jealousy that existed between Victoria and New Westminster.

RECENT notice in these columns of long ore shoots has elicited considerable discussion of what is the longest known ore shoot. A Kaslo paper and the Butte *Inter-Mountain* in discussing their local "shoots" claim that while others may be longer there are none richer than those they cite, which brings up an entirely different subject. So far the Smuggler-Union mine of San Miguel Co., Colorado, with its continuous ore shoot 5280 feet long, appears to claim precedence so far as length is concerned.

CONSIDERABLE is still being said about the recent silly newspaper "boom" of the Coffee Creek district "hurting" Trinity county mines, and California in general. The kind of people who take any stock in the yards of stuff printed during that brief "boom" cannot help nor hurt any section much. Trinity Co. is unaffected by such meretricious happenings, and miners and investors understand the situation. There is plenty of gold there—to be got by plenty of hard work and the putting out of plenty money—just the same as everywhere else.

RECENTLY were published the names of 213 new subscribers to this paper in twenty-one days. That is, the names of 213 men subscribing for this paper for one year were received in this office during twenty-one days. Incidentally it may be said that during the month of September, '97, there were received from California and Colorado the names of 179 new subscribers. This strikingly illustrates the growth of the circulation, the evident merit of the journal, and the evident value of its advertising columns to those who want business.

A MEETING of the joint committee from the State Miners' Association and the Anti-Debris Association was to have been held in San Francisco last Saturday to agree upon action before Congress on river improvement, but had to be indefinitely postponed, as there was no basis upon which to work. The joint committee from the Anti-Debris Association and the Miners' Association has delegated to its chairman, Wm. Johnston, power to call it together should the California Debris Commission be ready to report plans in time for action. The idea now is to have a conference after the publication of the report of the United States engineers, who have been long preparing a comprehensive and permanent plan for the improvement of these rivers. It is expected that this report will be ready soon.

A NEW method of shot firing in mines has been evolved by a working miner, consisting of a hollow brass or copper needle, to be inserted in the cartridge containing the charge. The shot is rammed in the usual way, but the detonator is not inserted in the charge until the stemming is completed. By means of a thin copper rod, tipped with hard paper, the detonator is passed up the hollow needle and placed in the position required in the charge and secured by a spring. Should a detonator prove defective and the shot fail to explode, it is stated that the faulty detonator can be withdrawn and another substituted. By the employment of this device it is claimed that the element of danger is almost entirely removed, for no second hole where a faulty charge occurs is required, while the hole is rammed before the dangerous detonator is inserted.

New Publications.

"*A Treatise on the American Law Relating to Mines and Mineral Lands Within the Public States and Territories, and Governing the Acquisition and Enjoyment of Mining Rights in Lands of the Public Domain. By Curtis H. Lindley of the San Francisco bar; in two volumes.*"

Notice was made of the above entitled work some months ago. It is now about to be issued, and from advance sheets it is evident that it will be a permanent and valuable addition to the mining literature of this country. It enters into the subject more fully than any similar work that has fallen under the writer's observation; and while its author modestly disclaims any pretension to originality, yet were it merely a compilation it would deserve favorable notice by reason of its admirable arrangement, everything following in natural sequence, the question suggested in the mind of the reader being explicitly answered and the authority cited. The following is an extract from the preface, which indicates the scope and value of the work:

"The United States cannot be said to possess a National Mining Code, in the sense that the term is used and understood among the older nations of the earth.

"The system of rules which sanctions and regulates the acquisition and enjoyment of mining rights, and defines the conditions under which title may be obtained to mineral lands within the public domain of the United States, is composed of several elements, most of which find expression in positive legislative enactment. Others, while depending for their existence and application upon the sanction of the General Government, either express or implied, are in a measure controlled by local environment, and are evidenced by the expressed will of local assemblages embodied in written regulations, or rest in unwritten customs peculiar to the vicinage.

"American mining law may therefore be said to be found expressed—

"(1) *In the legislation of Congress;* (2) *In the legislation of the various States and Territories supplementing Congressional action, and in harmony therewith;* (3) *In local rules and customs or regulations established in different localities not repugnant to Federal legislation, or that of the State or Territory wherein they are operative.*

"This system, as thus constituted, is deemed national only in a restricted sense. As a rule of property, it has no application or force in many of the States of the Union.

"Generally speaking, its operation is limited geographically to the area acquired by the General Government by cession from the original States, or by treaty with or purchase from foreign powers subsequent to theorganization of the General Government, or perhaps, more logically stated, its operation is co-extensive with the area of the public domain, the primary ownership and right of disposal of which resides in the General Government.

"It does not seek to regulate or control mines or mining within lands held in private ownership, except such only as are acquired directly from the Government under the mining laws, and then only forming a muniment of the locator's or purchaser's title, and measuring his rights.

"It does not require the payment of either tribute or royalty as a condition upon which the public mineral lands may be explored or worked.

"It treats the Government simply as a private proprietor holding the paramount title to its public domain, with right of disposal, upon such terms and conditions, and subject to such limitations, as the law-making power may prescribe.

"The National Government acquired no rights to property within the present boundaries of the thirteen original States; nor in the States of Vermont, Kentucky, Maine or West Virginia, which were severally carved out of territory originally forming a part of some one of the original States; nor in Texas, as by the terms of its admission in the Union the State retained all the vacant and unappropriated public lands lying within its limits, for the purpose of liquidating its debt contracted while it was an independent republic.

"The entire area of Tennessee was originally public domain, but the United States donated the same to the State, after deducting the lands necessary to fill the obligations in the deed of cession of North Carolina.

"In Arkansas, Illinois, Missouri, Iowa, Michigan, Minnesota and Wisconsin lands of the Government containing the baser metals (lead and copper) were ordered sold under special laws prior to the discovery of gold in California.

"By acts of Congress, passed at different times, Alabama, Michigan, Wisconsin, Minnesota, Missouri and Kansas were excepted from the operation of the general mining laws.

"The system is inoperative in Oklahoma, as by Congressional law all lands within that Territory are declared to be agricultural.

"With the exception, perhaps, of lands containing deposits of coal, and some of the baser metallic substances, the system is practically confined in its operation to those States and Territories lying wholly or in part west of the 100th meridian, embracing the States of California, Colorado, Oregon, Washington, Nevada, Idaho, Montana, North Dakota, South Dakota, Wyoming and Utah, the Territories of Arizona and New Mexico, and the District of Alaska. These comprise the precious metal-bearing States and Territories of the 'Public Domain.'

"As thus defined and limited, 'American Mining Law' is the subject of this treatise.

"While in the treatment of the subject, and in the discussion of the origin and growth of the system, as we understand it, we shall at times encounter the earmarks of an older civilization, and find lodged in what we might term a primitive custom, the experience of ages; yet wherever its rules depart from the doctrine of the common law the system, as such, is of recent birth and modern development. It is an evolution from primitive and peculiar conditions, a crystallization of usages which do not appeal to antiquity for either their force or wisdom.

"It is the principal design of this work to treat of this system as it is at present constituted. But as it is in itself an evolution out of antecedent and somewhat complex conditions, some space will be devoted to a consideration of an historical nature concerning the policy of the Government in dealing with its mineral lands prior to the enactment of general laws affecting them, and to trace the growth of the system through its various stages of development.

"As an appropriate introduction to a treatise of this nature, the author has inserted a chapter epitomizing the different systems of mining jurisprudence in force at different periods in the countries from which the United States acquired its public domain. We may reasonably expect to find in the growth and development of our own system the influence of those laws. It has also been deemed advisable to insert a brief review of the systems adopted in the States of the Union wherein the Federal Government acquired no property, and where the regulation of the mining industry falls exclusively within the jurisdiction of State legislation.

"This comparative review of the mining laws, foreign and State, will at least be of historical interest, if it should serve no other or higher purpose.

"As State and Territorial legislation supplementing the acts of Congress is permitted, if not in fact contemplated, by the Federal laws, careful consideration will be given to these local statutes and the decisions of the courts in construing them. The value of a decision as a precedent often depends on local customs. The legitimate scope of this permissive local legislation is a fruitful subject of controversy.

"The existing legislation of each State and Territory supplementing the Federal laws, and together with references to legislation on cognate subjects, will be found in the appendix, with citations under each section indicating where the subject matter has been discussed and generally treated in the text.

"The appendix also contains the various acts of Congress upon the subject of mineral lands, and the regulations of the land department, with back references to the text; also such forms as in the author's judgment might be serviceable to the profession.

"In citing authorities the author has adopted the rule of citing the case from the original report only. But in the table of cases appearing at the end of the second volume will be found the date of the decision, and a citation to every standard report, including the 'National Reporter' system, wherein the case appears.

"Realizing the importance of a comprehensive and exhaustive index, the author has himself undertaken the work of its preparation. While the treatise is in the main devoted to a consideration of the Federal mining system, to meet the general expectation of the profession, we deem it advisable to devote some space to cognate subjects, including rights and liabilities arising out of the conduct of mining ventures, mining partnerships, co-tenancy, and obligations flowing from contractural relations.

"The necessity for a comprehensive treatise on American mining laws is conceded. The literature on this branch of jurisprudence is limited. Most of the works which have been presented to the profession, while possessing great merit, have not attempted a systematic or philosophical treatment of the subject.

"The preparation of a work which will fulfill the requirements of the profession and prove measurably satisfactory, is a matter of great moment, involving much time and patient labor.

"While not anticipating that the result of his efforts will fully meet the wants of the profession, the author expresses a hope that it will be found of value to those who are interested in the study of the many intricate questions arising out of the mining laws."

* * *

With the author the performance is equal to the promise, and it is to be reasonably assumed, from its character, that the work will be cited as authority on the subjects discussed. It is being issued by the Bancroft-Whitney Co. of San Francisco, and will be shortly on sale.

"*Seventeenth Annual Report of the United States Geological Survey.*" Eight Volumes. During the week was also received the Seventeenth Annual Report of the United States Geological Survey—Charles Walcott, director—in its entirety. Apart from the statistical portion, there is a vast collection of original information in connection with the subject, throughout the entire country, admirably arranged and more than ordinarily well produced typographically, being even more than up to the customary standard of these publications.

The work of the United States Geological Survey is of such enormous magnitude, and covers so great a scope of country, that any attempt to publish a result of the work completed or in progress must necessarily be greatly condensed. Recognizing the great importance of the mining industry of the country, such condensation has been less manifest in that portion of the work than in any other branch, and the present work does full justice to that important factor of public prosperity. California, particularly, has reason to feel complimented in the space given to its mining industries and their intelligent discussion.

In previous issues of this paper have been given at great length extracts from advance sheets of monographs on the various gold districts of this State. Following is an extract from Part II—"Economic Geology"—being a portion of an article by Waldemar Lindgren on the "Gold Quartz Veins of Nevada City and Grass Valley Districts, California:"

Structure of the Veins.—The character of the fissure determines, to a great extent, the structure of the vein. The simplest form of a fissure is a joint plane, such as is seen in regions of intense sheeting about the Lecompton and Canada Hill mines or in the seam belt of the Red Hill west of the Nevada City mine. On some of these joints there is a narrow line of quartz, accompanied by a slight bleaching of the rock on each side. Certain of these breaks along the joint planes may be more pronounced and extensive, or one larger break may be produced instead of a series of smaller ones. In such case there is usually a more noticeable movement along the fault plane, and the sliding of two irregular surfaces on each other produced more or less continuous open spaces, which were subsequently filled with quartz. This is the character of the Idaho-Maryland, the Mountaineer and the Omaha veins, for instance. The vein here consists simply of a filling of white quartz 2 or 3 feet wide between two parallel surfaces. The regularity is usually not maintained over a large extent of the vein. It is extremely common to find local pinches, and sometimes the vein is found to close down to a mere seam in whole levels, above and below which good ore is found. Again, in places the vein loses its regular character by reason of local fracturing and brecciating of the hanging wall. To this first relatively simple type many veins in the district belong.

Another class of veins, to which the Empire, the North Star and many others belong, presents a somewhat more complicated structure. In them the simple clean break is replaced by a compound one, in which two or more distinct fractures have been formed at a distance of a few feet; between these lies more or less crushed and brecciated rock. Quartz-filled fissures lie along the hanging wall or along the foot wall, or along any minor break in the rock between the walls. The latter may more or less distinctly assume the character of a breccia cemented by quartz. It is usual, however, to find the main quartz vein close to the hanging wall. The rock between the walls is always most altered by metasomatic processes. The little veins and seams, sometimes, forming a network in it, are predominantly composed of calcite. The hanging wall is generally more distinct than the foot wall.

In the examples mentioned thus far the evidence of extensive movement along the vein is less pronounced, the brecciated structures indicating a sudden short break rather than a long-continued grinding of the walls against each other. Schistose structure, due to the latter condition, occurs in places—for instance, along both walls in the Idaho-Maryland and the North Star, but only in the Ural and Merrifield veins does it become prominent. In these the quartz, where the vein is simple, is adjoined by several feet of schistose rocks, produced by the pressure and movement along the fissure; where the vein is compound, smaller streaks and seams of quartz are distributed through this schist, which may attain a width of 20 feet or more.

The width of the quartz vein may in some cases attain several feet. On the Merrifield vein a width of 6 and 10 feet of solid quartz has been observed, and in the Ural vein, in the Nevada City mine, one smaller ore body reached 12 feet. Ordinarily 2 to 3 feet is the width of the Merrifield and Ural veins. The other veins in the Nevada City district will not average 2 feet in width. With a few exceptions, the veins in the Banner Hill district are narrow, averaging hardly more than 18 inches. The Grass Valley veins are narrow, excepting the Idaho-Maryland, Gold Point and a few more, and scarcely average 18 inches in width. Many veins, such as Houston Hill and Norambagua, have paid well with an average width of 6 inches, or even less. Seams with only an inch or two of quartz will sometimes contain an extraordinary amount of gold.

In the comparatively soft black slates of the Mariposa formation, along the mother lode, a vein structure frequently appears, which, though not occurring in the region described, may be mentioned for comparison. The vein lies along the contact of black slate and diabase, separated by a distinct, and often polished, hanging wall of the latter. There is rarely a continuous and well-defined vein, but the black slate is crushed, sometimes over a width of 20 feet, or even more, and stringers of quartz penetrate it in all directions. Again, the pay is contained in the quartz, but it is, of course, necessary to mine the whole width of the stringer zone, which thus furnishes large masses of low-grade ore.

General Features.—The rich quartz may occur in entirely irregular patches and areas on the plane of the vein. It is much more common, however, to find it occurring in more or less regular bodies, usually referred to as "ore shoots." Extremely rich masses of small extent and irregular form are called "pockets," or when they have a regular, long-drawn form, "chimneys." Pockets with local accumulation of coarse free gold often occur in the pay shoots of the Grass Valley mines; the Peabody and also the Gold Hill mines in Grass Valley, the Sneath and Clay and the Mohawk near Nevada City are examples of such pocket veins. The quartz between the pockets may be almost barren or it may contain a fair-grade ore.

In most of the veins the development of quartz is not confined to the ore shoots. In other words, the vein preserves its general character over a large area, but only in part of it—the ore shoot—does the quartz contain enough gold to be extracted as an ore. In another and smaller class of veins, represented by the Nevada City, the Omaha, the Pittsburg and others, all quartz occurring in the vein is good ore, and outside of the ore shoots the vein closes down to a seam. The question what grade of quartz is regarded as ore of course influences the extent of the shoots. In the district here considered everything above $6 per ton, the average cost of deep mining and milling, is included as ore, although in most mines this tenor is considerably exceeded.

Form of the Shoots.—In general the shoot has an elongated shape, and forms an angle with the horizontal plane, which generally differs, though usually not greatly, from the dip of the vein. In other words, the shoot usually pitches at a steep angle on the plane of the vein. The following law appears to govern the general direction: *The shoot will, as a rule, pitch to the left of an observer standing on the apex of the vein and looking down in the direction of the dip.*

In a number of veins there is, to be sure, no great regularity, or the ore shoot will often be found to dip at the same angle as the vein, but the number of instances in which the above rule is applicable renders it indubitable that this occurrence of the ore is the result of certain conditions as yet not fully understood. This law holds good in a great many mining districts of the gold belt outside of these here described, and it is certainly worthy of close scrutiny. Pay shoots dipping in opposite direction from that above stated are said to occur on the Gold Flat vein, the Slate Ledge vein, and the Little Diamond vein.

No relation could be established between the direction of the pay shoots and the direction of the striation on the walls. According to the so-called Clayton's law, they should coincide.

Pay shoots may cross from one formation into another without change. As examples may be cited the Providence mine, Merrifield vein, in the Nevada City district; Union vein, Banner Hill district; Empire vein and Granite Hill vein, Grass Valley district. The apex of most of the large pay shoots discovered very naturally crops on the surface, but this is not an invariable rule. The apex of the Eureka-Idaho shoot, for instance, was found at a depth of about 100 feet; the beginning of the main ore shoot of the W. Y. O. D. was not found till a depth of several hundred feet was reached; neither did the rich shoot of the Ural vein in the Providence appear on the surface. The possibility of finding a new ore shoot at any depth must be conceded.

While the largest ore shoots may be from several hundred up to 2000 feet wide and up to 3000 feet long, there are many shoots on the smaller veins which have a much less width and length. These smaller shoots sometimes go down to great depth, but are in general less to be depended on for permanence in depth than wider ore bodies. Even the small chimneys and pockets in the seam belt of Red Hill are stated to follow the law stated above.

The North Star workings form an excellent example of a large ore shoot following the same law. In this case the main shoot is composed of a number of smaller ore bodies with similar trend, separated by spaces in which the vein has closed down to a seam. The Eureka-Idaho ore shoot is unique in its long extent and flat dip; this is also probably the most uniform shoot in the district, containing relatively few barren places or pinches and having a known length of over 3000 feet. No relation of the ore shoots to the cross fissures could be found. Indeed, the latter are generally later than the ore fissures and do not carry quartz. Intersection of two veins—a phenomenon not very often observed—will sometimes, but not always, produce richer ore bodies.

Permanence in Depth.—This question is one of the highest importance, bringing up the whole future of the industry of gold mining.

It is certain that the experience with many of the smaller bodies of ore is that they give out or pinch at varying depth. Others, again, have continued to the greatest depth at which the exploitation of the mines has been carried on. Similar relations prevail in regard to the large ore shoots. While some have been found to cease in depth—the Sierra Buttes mine, in Sierra county, being a well-authenticated example—others continue to the deepest levels as strong as or stronger than in the upper part of the mine, the Kennedy mine, in Amador county, being an example of the latter class.

The frequent local irregularities of most shoots make it very difficult to affirm, without extensive explorations, that the end of any certain ore body has been reached. Owing to the habit of immediately distributing profits as dividends, reserve funds for exploratory work are seldom available, and a local impoverishment in a level has often been sufficient to close a good mine. Experience with the large shoots is still insufficient for safe generalization.

The ore shoot of the North Star extends for a distance of about 2500 feet in depth, measured along the plane of the vein. When approaching the sedimentary area to the west, it was cut off or divided into stringers. Still, the explorations are scarcely extensive enough to affirm that its end has

been reached; its continuation may be found, or a parallel shoot may be found in depth. In the case of the large Empire shoot a complication has arisen, due to a split of the main vein, reducing the tenor of the ore by dividing it on three veins. The Eureka-Idaho shoot has held its own remarkably well and uniformly over a distance of over 5000 feet, though the richest part of it was probably found in the Eureka and the western part of the Idaho ground.

High-grade ore is now mined in the Maryland mine on the same shoot at a vertical depth of 1500 feet, and a small ore shoot was found near the bottom of the Idaho shaft at a depth of 2200 feet. As gold quartz veins of fair grade occur near the summit of Banner hill, at an elevation of 3800 feet above the sea, or 3500 feet above the bottom of the Idaho shaft, we have in this district within short distance a vertical interval of 3500 feet within which there is no evidence of any gradual change in the character or quality of the ore. Again, in the vicinity of Washington, Nevada county, excellent quartz is mined 600 feet below the river level, in the Eagle Bird mine, and on the ridges north of the river 2000 feet above the river level. In this distance there are no distinct differences in the quality of the ore.

Many smaller veins carry only one ore shoot, but in the larger fissures there are generally several of them. There is a strong probability that in such veins thorough exploration laterally or in depth will develop new bodies of ore if the one on which exploitation has been carried on is found to pinch out. The question will naturally arise as to whether, with increased depth and cost of mining, it will be a good venture to carry on the necessary dead work. This will have to be decided by the record of the mine and the character of the fissure.

It is generally conceded now that fissures are, comparatively speaking, surface phenomena, and that below a certain depth, where plasticity and flow of rocks under pressure come into play, open spaces cannot exist. This limit Professor Heim, for instance, places at 16,000 feet, while professor Van Hise, basing his consideration on the strength of rocks, arrives at 33,000 feet as the maximum limit for hard rocks in which fissures can exist. Even the lowest of these estimates far exceeds the depth of practical mining. But it is not likely that all fissures continue until that limit. On a small scale the discontinuance of fissures may be observed in extensive sheeted outcrops. It is also an incontestable fact that many small veins close up in depth, while others continue unchanged. In considering the probable permanency of a given vein, its general character must be taken into consideration. Continuous well-defined outcrops and wide bodies of quartz are in general good indications of the maintenance in depth, as is also any evidence of strong faulting and movement. Some quite extensive veins, though, have relatively short outcrops. Thus, the Eureka-Idaho practically shows croppings only for a distance of 2000 feet, but within that distance they are very prominent. Those of the North Star are less than 2000 feet long. From the developments to the east along the Omaha system it is pretty certain that the vein does not continue far across in that direction. A fissure which can be definitely proved to extend only a short distance will in all probability be found to be correspondingly limited in depth. In regard to probable permanency of the vein in depth, the Ural and Merrifield, along which extensive faulting has taken place, stand first in the districts.

In scrutinizing the scant statistics of the production, in tons and value, of the Grass Valley district, it can not be denied that they show on the whole a distinct decrease. There is also a distinct decrease in the average value of the ore. It is not safe, however, to draw too far-reaching conclusions from these data, because there are many factors involved: The cost of treatment and mining has decreased greatly by reason of the modern methods introduced, and more low-grade ores are now milled than formerly; nor are there any rich surface ores left to swell the grade.

Leaving the difficult question of deep mining out of consideration, there are, however, in both districts a large number of veins which have been only slightly developed, but with improved methods may be converted into paying mines. The development of these will probably maintain the production of the district for many years in the future, even if no new ore bodies are discovered in the old mines.

It can be confidently stated that there is no gradual diminution of the tenor of the ore in the pay shoots below the zone of surface decomposition. Within the same shoot there may be many and great variations of the tenor, but there is certainly no gradual decrease of it from the surface down. This important fact has been previously stated by those conversant with the veins, such as Professor Silliman and Mr. J. A. Phillips. The statements to the contrary, for instance, by Mr. Laur or Mr. Reyer are due to imperfect acquaintance with the facts and generalization from insufficient premises.

Crosscutting.—As a means of finding new and parallel veins, crosscutting is frequently advisable, especially in those parts where strong sheeting of the rocks prevails. In the larger part of these districts, however, a series of parallel, distinct veins appear instead of the sheeting. These veins are nearly always traceable on the ground, and in such cases crosscutting has rarely developed veins not known already on the surface.

Gold in Dutch Guiana.

The Dutch Guiana gold mining ledges are mainly placer quartz, only approachable by wealthy corporations and men fully understanding the details of the enterprise they are about to undertake. The country is one dense forest. Beyond a radius of 100 miles from the sea obstructions become frequent in all the rivers, and portage has then to be resorted to. There is a total absence of any knowledge of what gold mining really means and a lack of capital in the country. All the gold found up to date has been placer. It penetrates large surfaces in minute particles. In the creek beds it is found in small nuggets in pockets. In the interior the rolling country is called the "hill system," and is described as being composed of gneiss and mica schists, crossed by basaltic dykes, containing auriferous deposits of drift conglomerate, old river beds and the shallow course of existing waterways. The drift conglomerate is of ferruginous nature, of a red color. The gold bush is the unhealthiest part of the colony. Fumes arise from stagnant water, poisonous plants are everywhere, and lucky, indeed, is the American gold seeker who escapes alive from the green tombs of the Dutch colony.

It Rained Pebbles.

Sometimes we have what is known as an east or desert wind. It is not pleasant and the air becomes so charged with dust and heat that one can scarcely breathe. They are supposed to emanate from the Colorado desert, and from a traveler recently crossing those barren wastes our sand storms almost vanish by comparison with one which he describes. They had come down from Yuma in a boat, he and two Indians who worked the oars, and had just made a landing on the Hardy Colorado river, when the sky became overclouded in almost as little time as is occupied in the telling—there were flashes of lightning and peals of thunder, and then it began to rain pebbles. As the fury of the storm increased these pebbles had almost the size of bullets and attained a terrific velocity. The Indians sought protection behind trunks of trees on the river bank, while the traveler got behind some boxes in the boat and covered his head with a blanket. The storm continued for two hours and not a drop of water fell. The Indians afterward stated that it was of unusual violence, the most severe that had occurred in four years, though sand storms are frequent on the desert. —Ensenada Lower Californian.

Georgia's Bauxite Mines.

The traveler through Georgia might well inquire what animal frequents the country that burrows in white clay. For, as bauxite is usually found in such soil, every man who has a spot of it on his farm digs for ore. It is the peculiarity of bauxite to occur in pockets of more or less frequency in one vicinity, the value of the land being determined by the size and number of the deposits. Bauxite is not found at a greater depth than 150 feet, and, because of this, intricate machinery is not necessary. Until the last few years the work was done entirely by hand. The expense of manufacturing aluminum from the ores keeps down the demand, as it is still utilized chiefly in the making of alum—a much less valuable product. The aluminum is made by the electrolysis process, which is controlled in the United States by the Pittsburg Reduction Company, which owns the mineral right of the Barnsley mines in Bartow county, Georgia. Many efforts have been made to manufacture aluminum by some other method than electrolysis, but so far they have failed, and the Pittsburg people still monopolize the aluminum product. The mining outfit consists of a washer that separates the ore from the clay, a dryer, elevator, and the engine and boiler with necessary pumps. The washer is a large box of heavy planks 30 feet long, and rests upon a frame of heavy wood; inside this there revolves two heavy logs, upon which are the agitators in the form of conveyors. One end of this box is elevated about 6 inches. The ore is dumped in at the lower end, and the water is forced through a perforated trough the entire length. The ore is passed up by the washer by the water and agitators, and at the upper end the clay and water pour into a trough just above the level, at which time the ore passes out in its natural globular form. When this machine is working correctly the ore is as clean as when washed by hand. From here the ore goes to the dryer. It has the capacity of retaining a large per cent of water, and it has been a problem to dry it successfully in a short time. Until recently the principal mine dried by exposing the ore to the sun, which delayed returns from the work for a long time. The dryer now in use is a large cylinder, from 30 to 60 inches in diameter, graded by the capacity of the mine. At one end is a large firebox, or furnace, with smoke box and stack at the other. This cylinder makes from four to eight revolutions per minute, propelled by the engine. It is elevated at one end, where the ore is poured in; it is taken up by the conveyors, passed around and around in the flame from the fire box, which pervades the whole cylinder, and when it is received by the elevator from a box on one side the fire box it is perfectly dried. It is taken from the elevator to the storeroom, and, after being classified by an expert, is ready for the market.

$33 for One Apple.

TO THE EDITOR:—The story came to me second hand, so I give it as it came. The man who related it is an old man now, residing in our town. I have not a speaking acquaintance with but see him quite often when down town.

Years ago he was running a three-card monte game (whatever that means, I don't know) in a southern California town. One day a big apple of the Gloria Mundi variety made its appearance among the crowd around his table. The man who had it paid $5 for it. The apple was "put up at $1.50 on the corner," and the owner kept winning it back. The game ran for three days and three nights, the "corners" reduced meantime to $1, when luck went against the owner and the "three-card monte man" won it. He was out just $33 to get it. He said he deliberately cleared up the table, climbed up on top of it and ate that apple, skin, seeds, core and stem, while men stood around and offered $5 for just one bite. MRS. MAY TAYLOR.

Hale, Mo.

This beats current Klondike quotations.

The Cyanide Process.

Beginning with the issue of November 7th, 1896, appeared herein a paper by H. Van F. Furman, entitled "Laboratory Tests in Connection with the Extraction of Gold from Ores by the Cyanide Process." With the issue of December 19th, 1896, began a paper on the "Solution and Precipitation of the Cyanide of Gold," by S. B. Christy of the California State University. These two papers—more especially the latter one, the last portion of which appeared in the issue of February 6th, 1897,—have attracted a great deal of deserved attention, Professor Christy's paper having been the subject of vigorous criticism in all parts of the mining world. At the Chicago meeting of the American Institue of Mining Engineers there was some discussion of Professor Christy's paper, which, taken in connection with the article itself, is of considerable interest to cyanide workers everywhere. E. B. Wilson, himself an author of a work on the cyanide process, says:

Professor Christy's paper is, beyond doubt, the most valuable contribution hitherto made by an impartial investigator to the literature of the cyanide process; and the Institute is to be congratulated upon its possession of a member willing to labor so greatly, and to communicate the results of his labors so freely, for the benefit of his professional colleagues.

In offering some criticisms upon Professor Christy's interpretations and conclusions, I do not question the accuracy of his work, or the facts which it establishes, but only the application of these facts to the theory (and incidentally to the practical operation) of the process.

I start with the proposition, which I think has been proved by experiment, that in the solution of gold by means of alkaline cyanides the various reactions are determined, as to their order and intensity, by the relative position of the elements concerned in the electro-chemical series, or series of voltaic tension. While this theory, originally propounded by Berzelius as a law governing all chemical reactions, has been questioned (and, perhaps, in its universal and unqualified application, disproved) on the evidence of contradictory observations, I think the results reported by Gore and others show it to be a safe guide under the conditions here in question.

From the voltaic-tension series, as given by Gore, I quote the following elements, as those especially involved in this inquiry, prefixing to each the number indicating its position in the series, in the order from electro-positive to electro-negative:

3. Potassium.	20. Lead	37. Carbon.
4. Sodium.	24. Copper.	39. Nitrogen.
8. Calcium.	25. Hydrogen.	40. Arsenic.
9. Magnesium.	27. Silver.	43. Sulphur.
12. Manganese.	28. Antimony.	45. Bromine.
13. Zinc.	29. Tellurium.	46. Chlorine.
15. Iron.	31. Gold.	47. Oxygen.

According to the well-known principles of the electro-chemical theory, the wider apart any two elements in this series, the greater the electro-motive force of the current they would produce as a voltaic couple; the greater their affinity, or tendency to unite; the greater the amount of heat they liberate in uniting; and conversely, the greater the amount of heat (or equivalent electrical energy) required to decompose the compound formed by their union.

Oxygen, being the most electro-negative element in the voltaic series, is the one which liberates most heat by its union with other elements, and consequently the one most effective in decomposing their compounds.

It follows also from the theory, that in solution involving oxidation, those elements are most readily dissolved which are farthest from oxygen in the electro-chemical series, and evolve by their oxidation the most heat. And it may be asserted, as a corollary proposition, that in cases, both of chemical union and of chemical decomposition, those changes first occur to which there is the least resistance, as the resultant of the relative affinities of the elements present, as measured by their distance apart in the electro-chemical series. In voltaic cells, each metal of the series is corroded, and evolves heat; but the highest electro-motive force is obtained by coupling two elements widest apart in the series; that is, other things being equal, the most easily corroded metal, coupled with the one least easily corroded, yields the most intense current. Potassium and gold would thus form a stronger voltaic couple than could be formed by either of them with zinc, iron, lead or copper, or by either of them with any other. This may account, in some measure, for the stability of the auro-potassic cyanide.

But, in my opinion, the action of oxygen is necessary to develop the molecular energy required to effect the reactions resulting, under the conditions of this process, in the union of potassium and gold. Professor Christy aptly compares the part of oxygen in this case with that which it plays in the circulation of the blood of men and animals. At all events, his thorough investigations confirm the results of my own experiment and practice, in showing that the presence of oxygen, or an equivalent agent, is

necessary to the solution of gold by this process. Whether either chlorine or bromine does, in fact, perform directly the work of oxygen in the case under consideration, will be considered below. For the present, I assume that oxygen is required.

Since the development of oxygen by the decomposition of the water present would require the expenditure of more energy than the furnishing of it from the atmosphere or by other artificial means, the process would proceed more slowly in the former case.

The Pelatan-Clerici method obtains oxygen in two ways, namely, by the decomposing action of the electric current upon water, and by the exposure of the charge, through agitation to the oxygen of the air. This permits the employment of a much weaker cyanide solution.

Mr. Kendall furnishes oxygen by the use of sodium dioxide. His method, like that of Pelatan-Clerici, requires careful preliminary determination of the amount of oxygen required.

The representatives of the MacArthur-Forrest patented process, while claiming, as Prof. Christy has pointed out, that the action of oxygen was not necessary, ignorantly included it, nevertheless, in the practical operations of percolation and drainage which they prescribed. For not only would the material which they propose to treat be, in their process, at all times exposed to the atmosphere, which contains free oxygen, but the water with which they dilute their solvent solution always carries, in addition to the oxygen which is one of its constituents, a considerable amount of oxygen in solution (by aeration). To these circumstances may undoubtedly be attributed the effective operation of their process when neither agitation nor extraneous artificial means of supplying oxygen are employed.

Since the double salt, $KAuCy_2$, is very stable, and acid does not readily destroy it, I am inclined to believe that acid and the salts of base metals do not cause in this process the extensive loss of cyanogen which has been attributed to them, but rather that this loss is due to other impurities present in the solution at the moment of the formation of the double cyanide of K and Au. I am aware that this view may be controverted on the ground that KCy is readily decomposed by dilute acids. But it may be replied that this is not the case in the presence of gold—a phenomenon which I ascribe to voltaic action. In this connection also the fact may be mentioned that if the amount of lime necessary for the mineralization of the ore be determined, it seems to make no difference in the result whether this lime be added before the lixiviation or at the time of the latter; the amount of cyanogen consumed being about the same in either case. This proposition, I am aware, contradicts the statement of Mr. Furman, in his paper on "Laboratory Tests," etc. (page 4), to the effect that if an ore be acid "the result will be decomposed of potassium cyanide unless this acidity is destroyed before the cyanide solution is added." In support of my view I would refer to the experiments described below.

These experiments show also that a 0.1 per cent cyanide solution may dissolve the gold as thoroughly as a 1 per cent solution. If the latter were used in a given case, we might expect the loss of cyanide to be ten times as great, depending, however, on the amount of impurities in the ore having affinity for the cyanogen set free.

Strong cyanide solutions have shown, when applied to acid ores, considerable loss of cyanide, but at the same time a high extraction of gold—higher in a given period than when the ore had been previously neutralized. However, when impurities in the solution are a minimum or entirely absent, it will be found that the stronger the solution, the greater the loss of cyanide.

Accepting Prof. Christy's conclusion (as opposed to the view of Mr. MacArthur) that free oxygen is necessary to the usual reaction effecting the solution of gold in cyanide solutions, I must venture to doubt his opinion that bromine is capable of doing the same work as oxygen in this reaction. I agree with him that strong solutions of bromine and potassium cyanide should be avoided, as occasioning a loss of cyanogen; but I believe that the formation of paracyanogen, to which he refers, requires the liberation, in some way, of oxygen.

The order, in the voltaic series already given, of the elements K (3), C (37), N (39) and Br (45) would indicate that bromine has stronger affinity for potassium than either carbon or nitrogen taken separately; but we have here to deal with the compound negative radical cyanogen (CN), which closely resembles bromine in many respects, and is more volatile, assuming the liquid state under the pressure of three atmospheres, while bromine is liquid at ordinary temperature and pressure. We are justified in the inference that if the compounds of cyanogen require oxygen for the reaction here under consideration, bromine, which stands so near cyanogen, will not effect the reaction without oxygen.

The question is: Does KCy require the presence of oxygen for the formation of the double cyanide with gold?

Mr. W. Bettle has reported experiments in which gold was dissolved from tailings containing basic ferric sulphate in the absence of even traces of free oxygen, the active agent being cyanogen. The formula which he proposes for the reaction is:

$$4KCy+K_6Fe_2Cy_{12}+2Au=2KAuCy_2+2K_4FeCy_6.$$

It will be noticed that, according to this explanation, the ferricyanide is reduced to a ferrocyanide, which calls for an oxidizing agent.

Mr. Bettle says in another communication:

"While potassic ferric cyanide is capable of decomposing water in the presence of an oxidizable material, I maintain that gold in ordinary solutions is not an oxidizable material, and, therefore, for the dissolution of gold cyanogen must be placed in atomic contact with this element in a cyanide solution. * * * To argue otherwise is to assume that aurous or auric oxide is formed by the oxygen liberated, and one of these oxides dissolves cyanide to form the auro, or auric cyanide, of the metal."

Prof. J. C. S. Wells of Columbia University has declared that zinc-potassic cyanide is a solvent for gold, but not when free potassium cyanide is present; and he adds that since in the practice of the cyanide process the solutions do always contain free potassic cyanide, the solvent power of the double zinc-salt is not available.

Prof. Christy and Mr. Bettle require the presence of free cyanogen to effect the reaction in the absence of oxygen, while I think, with Prof. Wells, that the reaction will not take place without oxygen.

Mr. Clannel, in a paper on the Sulman process, has described certain experiments which throw light upon this subject. He placed in three separate breakers the following solutions: (1) A dilute solution of KCy; (2) a dilute solution of BrCy, and (3) a mixture of the two solutions, and covered each with a watch-glass, on which was suspended a drop of nitrate of silver. The drop over No. 1 gradually became turbid from the formation of cyanide of silver; the drop over No 2 remained unchanged; the drop over No. 3 rapidly became white, showing that hydrocyanic acid was rapidly liberated from the solution below. This requires hydrogen, and the only source of hydrogen under the circumstances is the decomposition of water, which must liberate, either as free oxygen or as peroxide of hydrogen, the oxygen necessary to the reaction. Mr. Clannel proposes the following equation, based on the fact that HCy is a product of the decomposition:

$$5KCy + 2BrCy + 2Au + H_2O = 2KAuCy_2 + 2KBr + KCyO + 2HCy.$$

If his explanation be correct, the active agent is not cyanogen bromide, but potassium cyanate, which quickens the reaction when bromo-cyanide solutions are employed.

Before seeing Mr. Clannel's article on the Sulman cyanogen-bromide process, I had formulated the following reactions, which I considered as occurring, not simultaneously, but in close succession:

I. $3KCy+Au+BrCy+O+H_2O=KAuCy_2+BrCy,Cy+2KOH.$

II. $2KOH+BrCy,Cy+Au=KAuCy_2+KBr+O+H_2O.$

The first of these equations represents the supposition that Cy has more affinity than Br for K. It is evident, however, that any potassic hydrate formed will not long remain unaffected in such a solution, and hence the reaction expressed in the second equation quickly follows, supplying the oxygen necessary for the solution of the gold as an element in the double cyanide. The above equations leave free oxygen as a result, and, if the theory here advanced be tenable, we may expect more cyanogen to be liberated the more oxygen is present. With this result the consumption of cyanide in the process stands connected, and if base metal salts or other impurities are present in abundance the loss will be greater from that cause. It is my impression that too much stress has been laid upon metallic and not enough upon earthy salts in this connection, and I hope to be able to give, at some future time, experimental proof that, by paying due regard to the latter, an increased extraction of gold, coupled with a saving of cyanide, can be realized in practice.

The experiments of my own, to which reference has been made above, were made upon several portions of the same ore-sample at the same time, and occupied the same period of treatment—namely, fifteen hours. The results were as follows:

	No. of Experiment.		
	1.	*2.*	*3.*
Percentage of KCy in solution before use	1 0809	0.5404	0.1081
Percentage of KCy in solution after use	0.5145	0.0837	0.0042
Consumption of KCy by difference	0 5664	0.4567	0.1009
Extraction in milligrammes, gold	0.5	2.3	2.2
" " " silver	72.45	138.4	103.3
Percentage of extraction of total gold and silver	73.0	86.7	79.0

It is evident that the proper strength of the solution for this particular ore would be between that of experiment No. 2 and that of No. 3, since in the latter case nearly all the cyanide was consumed, and the amount was shown to be too small for a maximum extraction. It will be noticed that the consumption of cyanide did not influence the percentage of extraction in this case.

The Electrical Precipitation of Gold from Auro-Potassic Cyanide.—Of the three conditions, none of which Prof. Christy says (p. 23) can be secured in precipitating gold electrically from a cyanide ore-extraction solution, two are not essential to the process. The conditions necessary for successful electro-chemical action are: (1) a liquid; (2) a definite chemical compound in the liquid; and (3) that the liquid compound be a conductor of electricity.

These conditions do not necessitate either Prof. Christy's No. 1, a soluble anode of the metal to be deposited, or his No. 2, concentrated solutions of the double cyanide of gold and potassium. As to his No. 3, an electrolyte of constant composition, whereby the proper working conditions may be constantly maintained, it is not, as he thinks, impracticable. The electrolyte is a solution of potassium cyanide. It may be changed chemically by the passage of the current, but in any case the potassium and cyanide remain in some form in the solution. It is true that the electrolyte may offer a high specific resistance; but it is more than likely that impurities in the liquor assist in a measure the passage of the current, or they may be introduced artificially to assist it, as, for instance, in the Pelatan Clerici process, in which about 1 per cent of common salt (NaCl) is placed in the bath, for no other purpose than to give the electrolyte a sufficient and practically constant conductivity during the whole operation. If other impurities in the liquor assist the passage of the current, so much the better; if they retard it, their effect is not noticeable.

With such a feeble current as is generated in the zinc-boxes the strength of the cyanide solutions is of considerable moment, but when electricity is applied to weak cyanide solutions, the strength of the solution is of very little moment. Prof. Christy's comparison of electroplating or gilding with the electrical precipitation of gold in this case is not well taken. In the first instance, we want an even deposit in a given time; in the second, we want the gold irrespective of uniformity of deposit.

Professor Christy says with reason that the two processes are different; but all the differences and difficulties which he points out, such as absence of a gold anode, weakness of the solution, formation of aurocyanhydric acid, or imperfect division of the double cyanide into its constituents, may be, as he acknowledges, avoided by the use of currents with sufficient intensity and quantity of electricity. He remarks (on the last line of page 23) that nobody would think of extracting, from such weak solutions, any other metal than gold by electricity. His reason for this opinion is apparently the high cost of the current required. At least, if the difficulty of maintaining a practically constant electrolyte be overcome, the question of cost seems to be the only one which can justify his conclusion. Let us see what is the weight of this consideration.

To decompose the gold salts and cause this metal to be deposited, a theoretical voltage of about 0.4 volts is required, without a gold anode. Let us assume that in practice it is 1.5 volts, a figure which should satisfy the most conservative. A current of 1.5 volts and of 500 amperes represents 1-horse power, which costs, say, 40 cents per twenty-four hours; this estimate being likewise liberal.

Such a current, in a solution of gold employed for gilding, where the whole of the amperage is used to precipitate the gold, would precipitate more than $1000 in gold per hour, and more than $24,000 in twenty-four hours. The cost of the electric energy consumed would therefore not reach $\frac{1}{600}$ of the value of the gold. If, in order to exhaust the weak solutions and overcome the difficulties pointed out by Professor Christy, the electric energy and quantity should be increased a hundred-fold, the expense would be $\frac{1}{600}$ of the value of the gold; or if it should be increased 1000 times, it would be but $\frac{1}{60}$ of the value of the gold, which would still not be a prohibitory condition. In fact, when we calculate upon the generation of electricity by hydraulic power we can almost reduce the running cost to that of oil and waste.

The action at the anode in saving the double salt $AuKCy_2$ would be first upon Au, then upon K, as gold is less positive than potassium; and the order of deposition would be the same. The cyanide in part reunites with K forming KCy; the remainder of the Cy being lost, as far as practice goes. It may form paracyanogen or ferrocyanide, but even then the loss is less than occurs in the zinc-boxes, because of the weaker solutions used. The Pelatan-Clerici process takes advantage of the cyanide liberated at the anode in this way: if free gold is near, the free cyanogen unites with it; or if KCy and Au are in juxtaposition they are also united by the oxygen at that point, and in both instances being electrolyzed, are made ready for deposition. Thus by this process the solving and deposition goes on in the same vessel in an almost constant electrolyte, until the gold is exhausted.

With the Siemens-Halske process artificial diffusion is necessary to precipitation; but in the above process it is already provided as requisite to the solution; nor is it necessary to enlarge the size of the plates in the latter process beyond a definite proportion necessary for the size of each vat. Hence no inconvenience or extra expense is encountered (p. 24), such as would, in Professor Christy's language, "rob the method of its simplicity, cheapness and convenience."

(To be Continued.)

Mining Law Amendment.

To the Editor:—I enclose a communication on the important subject of the revision of the present absurd and inconsistent mining laws in force in the United States. I never fully realized how bad they were until I attempted to explain them to the venerable Professor Cumenge of the Ecole des Mines, Paris, on the occasion of his visit to Cripple Creek. While I was a delegate to the Denver Gold Convention, I was called away before I had an opportunity to bring the matter up and present my views. Hoping that something will come out of this agitation, and glad to assist in any way, I am,

Yours sincerely,

Francis T. Freeland.

Aspen, Colorado, Sept. 24, '97.

If the intention be to propose a bill which would be of some real benefit to the mining industry, let the entire system be altered to one following somewhat the last Mexican law. Thus, in brief:

First—Location without discovery.

Second—Official survey in plots of ten acres or less, in one piece of any shape without conflicts.

Third—Federal tax until patent of $50 per claim per year in lieu of assessment work, the recorded receipt of the land office to carry title, and a failure to pay working forfeiture.

Fourth—Vertical boundaries and no lateral rights.

1.—*Discovery*: Most mining claims, especially in Leadville, Aspen, and Cripple Creek, have no mineral in place of any commercial value for mining purposes in the discovery shafts. Yet when one buys the oldest location in such a case, the title is liable to fall when brought to a trial. The laws and decisions in the various States and Territories are not in accord as to whether a discovery in the discovery shaft is required.

2.—*Survey*: An official survey would make precise the position of the claim, and insure compliance with all the requirements of location.

3.—*Assessment Work*: It is extremely rare for the assessment work to be of any real benefit in the development of a claim; it is usually wasted labor. The tax would prevent the holding of large blocks of claims by one person.

4.—*Lateral Rights*: With the present laws and decisions it is impossible to determine the ownership and rights of a piece of mining property under the Federal and State laws.

The best statement of what may become the law, that can be given is:

"A.—The extralateral right must be bounded by parallel lines.

"B.—The extralateral boundary must be an extension of some line or lines of the claim as located, or preferably as patented—or parallel thereto.

"Let a line of the claim crossed by an apex be called an actual end line in distinction to the nominal endline named in the location patent. Neglecting the condition altogether too rare yet assumed by the law, where the apex crosses the two nominal end lines, then:

"C.—Where the nominal side lines are the actual end lines, the extralateral right will proceed in the direction of these side lines provided that the true dip is more nearly in that course than in the course of the nominal end lines, and vice versa.

"D.—Where the apex crosses a side and an end line, the extralateral right will be bounded by lines drawn through the points of intersection of the apex with the side and end line, and in the direction of the end line when the true dip is more nearly in that course than in the course of the side line, and vice versa; and similarly for a claim located before May 10, 1872, with end lines which are not parallel but crossed by an apex."

But if vigorously pushed the number of trials, appeals and rehearings are nearly interminable. Most suits end by an agreement defining their rights without reference to the supposed law, or by buying out of the weaker party. After twenty-two years of litigation it is not known positively what are the lateral rights of a claim where the apex crosses a side and an end line, or where it bows out across one side line! The curious doctrine of cross lodes enunciated by the Colorado courts does not obtain elsewhere and has not been passed upon by the courts of final resort. Yet it must be worked under at present, when it is almost certain to be reversed. The effect of dykes, faults and a lode or contact without ore, upon the continuity of the vein has not been authoritatively fixed. The relations of lode claims to placers and tunnel sites are in the greatest confusion. Town sites, agricultural, railroad and school lands and grants give much trouble to the miners.

The patenting could proceed about as now on payment of $500 per claim additional. On this plan the tedious and perplexing procedures in the land office, hearings, adverses and protests would be much abbreviated and the delay and expense lessened.

While no such law could be made retroactive, the tendency of the courts and juries, after it had been passed, would probably be to give much importance to the earlier location, even when not showing a strong pay vein, and to make it difficult, if not impossible to win an apex case.

Such a law would stop 90 per cent of the litigation affecting the industry of the West, with its enormous cost and paralyzing delay, resulting in bitter hatreds and unneighborly conduct in regard to drainage, ventilation and exchange of valuable information. With diminishing prices for the products of mining and increasing difficulties on account of depth, low grade and refractory ore, scarcity of timber and available water, etc., every unnecessary expense must be cut off if the industry shall continue, and the towns and farms dependent upon it regain some measure of their former prosperity. And litigation is the most unnecessary expense of all. Title ought not to be dependent upon the longest purse, tentative decisions of the courts, the testimony of expert witness advocates, the vagaries of socialistic juries, or the crude impressions of their hasty trip to the locality when unskilled in the art of mining.

The present law is tainted with geology, giving rise to great difference of opinions in the course of a trial, and has been the cause of bringing the profession of mining engineering into disrepute among the general public. With a law as suggested, a joint survey would settle the boundary, and a reference to the records the ownership, in most cases, without a suit. With a secure title one could sell at a fair price, and when buying, he would know what he had bought; again, the miner, if so inclined, would have but little difficulty in raising money for development and equipment, where the technical conditions justified the venture. The absence of apex rights would tend to distribute valuable territory among many different owners.

The miners have hitherto been opposed to such a law, but it is believed that a great change has taken place in their sentiments. They can hardly expect attorneys to agitate for it, and legislators must be pressed. The expert witness is probably indifferent to the matter. If such revision of the laws were made, the increased amount of mining would afford them ample opportunity for the exercise of all their learning and ingenuity. The East has no interest in it generally, except from investments in mines and mining stocks. If the miners wish it, it can be done. The details of a law so different from the one in force, and untried here, should be thoroughly discussed.

Francis T. Freeland.

Mr. Freeland is manager Isabella G. M., Co. Zenobia G. M. Co., Work M. & M. Co., Ingham Cons. G. M. Co., Crippie Creek; Durant M. Co., Late Acquisition Cons. M. Co., Compromise M. Co., Mineral Farm Cons. M. Co., Aspen Contact M. Co., Bimetallic M. & M. Co., Aspen, Colo. He is one of Colorado's representative miners, and takes the same general stand that do others, viz.: that proposed amendments should be in the interest of the working miner and mine owner.

One of Their Questionable Methods.

To the Editor:—In your last issue to hand you comment in "Concentrates" on the International Ore and Reduction Company. Amongst its references that company uses the Eureka and Excelsior mines, and we receive weekly inquiries as to the size of the furnace in use, its cost and its success, the circular of the International Ore and Reduction Company stating that the results of our work here and our uniform success in treatment of rebellious ores is due to use of one of their furnaces. As old subscribers to your journal, we ask you to kindly state that the International Ore and Reduction Company have no right to refer to us; that no furnace has been in operation at any time upon ores of the Eureka and Excelsior mines, as the ores—containing, crude, over 90 per cent of silica—are not adapted for smelting, and that we are no way interested in any of that company's endeavors to dupe mining men. Yours very truly,

J. Henry Longmaid,
Manager Eureka and Excelsior Mines.

Bourne, Baker Co., Or., Sept. 23, '97.

During last week at Woolwich arsenal, England, employes have been engaged in destroying 400 torpedoes, together with their fittings, which were recently condemned as a result of the reports made to the lords of admiralty. These reports set forth that the movements of the torpedoes after firing were extremely erratic, and that on several occasion they had come seriously near blowing up the ship from which they had been discharged. The missiles were made under the Whitehead patent. Their approximate cost was $2,500 each and hence their condemnation means the virtual throwing overboard of a round million of dollars. A Birmingham firm of ammunition manufacturers made an offer to purchase the entire lot at face value, with a view to making a re-sale to a foreign nation, but the lords of admiralty decided that such sale would involve the revealing to the naval department of such nation of the secret mechanism by which the balance chambers of these torpedoes are arranged, and the offer was refused.

A new diving bell at work in Lake Michigan is claimed to be able to withstand the pressure of water at a depth of 1156 feet. It has discovered the wreck of the steamer Pewabic, sunk in 160 feet of water thirty-two years ago.

British Comment on American Mines.

To the Editor:—While in your issue of the 14th ult. you editorially answer partially—though not, as you indicate, effectually—the question, "Why should a man want to sell mining property?" you leave, I think, much to be said on the subject of the buying and the selling of mines that, I feel sure, might be advanced with advantage to your journal, as well as profit to many of your readers, providing they could be prevailed upon to view mining property as farming, shipping or industrial property of any description is usually regarded by the man of business who invariably invests himself or influences others to do so on at least the speculation of deriving benefit therefrom.

It is now nearly a quarter of a century since I first visited California, and many years have passed since my last visit, but having numerous friends there, besides business interests, I have to some extent maintained a certain connection with the State that from time to time brings mining and other ventures under my notice. And it is to a few of the former that I would now like to draw your attention and, if permissible, to encroach upon your valuable space. As it would be eminently unfair, if not improper, to give undue publicity to affairs that after all chiefly concern the individual, I will, without mentioning either names or localities, allude to some instances of what appears to me to be unwisdom on the part of mine owners. A. is a company that has millionaires many times on the list of its stockholders. It owns what is considered to be by competent experts very valuable placer ground, on which, in consequence of miscalculations or erroneous judgment (contingencies closely connected with and almost inseparable from all mining ventures) on the part of the management, a large amount of money was expended without producing the expected or any profit, and the outlay of which was only useful in so far as it went to establish the necessity of an additional expenditure in order to arrive at the hoped-for results. Was this "additional expenditure" incurred? No; work was discontinued and the property offered for sale at a fixed *cash* figure. And, as no one has thought this figure tempting enough to warrant the essential expenditure, the mine—reported, mind you, to be a good one, and many of its stockholders capitalists—remains unworked. And why? Because the owners insist upon a tidy sum in *cash*, and will not exchange say one-half or any proportion of their share holdings for the expenditure of the sum regarded as requisite to make the property a very profitable one in place of being, as it has been for years and now is, nonproductive and dead and not even good for the taxes. The question in this case is as to whether the owners, in their own interest or in the interest of the mining industry, are pursuing a prudent plan.

B. is a company with few stockholders, possessed of a good-going gold mine producing say $100,000 a year net profit, and in order to double this amount an expenditure of probably $200,000 was estimated, so that rather than risk this the owners, or some of them, thought the best course for them to follow would be to offer the mine for sale, which they did at, by way of illustration, say $1,000,000 in cash. Responsible parties to whom this proposal was presented, and who were from independent sources not unaware of the merits of the mine as well as its history (which was the reverse of regular as to profit), replied by intimating that on the basis of $500,000 cash and $250,000 in shares the business would be taken up in earnest, which intimation was, I am advised, received by the owners as almost an insult to their intelligence. In this instance were the owners judicious or otherwise? If they had accepted the $500,000 cash they would have been assured at once to that extent and become participators with their new co-owners in whatever profit or loss they might have, while in the course they have chosen they require to risk $200,000 to increase the profit or output, for which they will have to wait until it—as well as the $500,000, which would have been paid in cash—is taken out of the mine—which will be years—in order to be in as good a position as they might have been, with their risks largely reduced and a stated sum secured to them for investment elsewhere, or, as the saying is, "to put their eggs in more than one basket."

C. A. P.

London, Sept. 16, '97.

The total length of the world's telegraph system has now reached 4,908,921 miles, exclusive of 180,440 miles of submarine cables. Of this Europe has 1,764,790 miles, Asia, 310,685 miles; Africa, 99,409 miles; Australia, 217,479 miles; and America 2,516,548 miles. United States Consul Germain, who sends these figures to the State Department from Zurich, says they show that, notwithstanding the steady increase in the building of telegraph lines all over Europe, America leads the world, and has almost doubled the European mileage.

The Southern Pacific Company has completed an examination of its trainmen, dispatchers, station agents and section men west of El Paso and Ogden for color blindness. There were about 5200. Out of this number, the sight of 193 was found to be defective as to colors.

Electrical Progress.

Electric Metering from the Station Standpoint.*

By CARYL D. HASKINS.

It has occurred to me that in presenting a paper to the Institute upon such a subject as that which I have selected I may appear to have departed too entirely from the technical side of our profession, and to have selected a line of argument which would have been more appropriate before a commercial body. But, in my opinion, such is not the case, for I find that almost every merit in or objection to metering apparatus, or in connection with the use of it, is dependent upon some point involving engineering skill.

The general adoption of the electric meter is in itself an indorsement of the precise methods which characterize engineering practice. It is, indeed, a well-established fact to-day, well borne out by data from widely separated portions of the country, that the average electric lighting station can do one-third more business with the same station capacity on a meter basis than it could upon a contract basis, under what were nominally equivalent contract rates, netting at the same time the same revenue per light as formerly. In other words, it is apparently well established that 33⅓ per cent represents the average wastefulness of average human nature in connection with the use of light.

In many central stations to-day I find that, while managers are almost universal in favor of an exclusively meter basis, a large proportion are still in ignorance as to what qualities they should seek and what they should avoid in selecting a meter.

In response to an inquiry as to what merits in a meter are necessary to success, a common reply is accuracy, durability, registration in a simple unit easily comprehended by the customer and ability to withstand tampering. These points are probably of importance in about the sequence in which they are commonly stated, but they are too sweeping, too entirely generic and too slightly specific to be in any high degree helpful.

Let us, for example, consider the broad question of accuracy. A meter which will be accurate under commercial conditions from quarter load to full load within one-tenth of one per cent, or a meter which will start on one per cent of its rated capacity, are neither of them necessarily either the most accurate or the best for general commercial use. This latter point is one which is frequently raised. The fact that a meter will start on one per cent of its rated capacity is in reality no sure criterion of the accuracy of that meter, even on light loads. It is not necessarily even good evidence, yet I find that in very many cases this is almost the only test applied to meters at the time of purchase. The percentage of accuracy at light loads is very important—more important, I believe, than is commonly appreciated; but I am perfectly safe in saying that a meter which will run within five per cent of zero, or on five per cent of its rated capacity, may readily be a much better meter, even though it will not run at all on one per cent of its rated capacity, than one which will run on one per cent of its rated capacity, but in regard to which no evidence is at hand as to its percentage of accuracy at reasonably low loads.

Ability to start on very light loads is certainly an indication of merit and is important, but it is not nearly as important a point to determine as is the lowest load at which a meter begins to register with fair accuracy. I have inspected a very large number of meters which would start on phenomenally low loads, and which would yet fail to give anything like approximate accuracy at reasonably low loads.

In considering the question of accuracy, therefore, the first two steps should be to determine the accuracy of the meter by actual measurements at full and medium load, and also at a reasonably low load—say, for example, five per cent of the meter's rating.

That low load accuracy is really of vital importance is well shown by the fact that, with the average 24-hour station, in the neighborhood of 15 per cent of the total station output goes to feed one and two lamp loads. Yet in the face of this I have seen large installations of meters reported as entirely satisfactory, tested with frequency and care under admirable systems, but only at full or medium loads, and yet failing to account for more than 50 per cent of the one and two lamp load—or, in other words, losing to the illuminating company an average of probably 7½ per cent of the revenue which their measured station output should give them, after deducting for legitimate losses.

Granting that, having determined the actual percentage of accuracy obtainable at light, medium and full loads, a very important, and, in fact, probably the most important, evidence as to accuracy has been obtained, there still remains much information of vital importance which should be sought and which should materially influence a decision.

One point which is very commonly neglected, but which is, nevertheless, quite essential, is the ability of a meter to give accurate results for brief periods on overloads. This is a point at which many meters fail, and it is also a point which, odd as it may seem, is intimately related to light-load accuracy. It may be laid down, as a rule, that in station operation the smallest meter which will do the work should always be used. Otherwise, however good the meter on light loads, much of the light-load revenue must be lost in the effort to take care of occasional heavy loads. Extremely heavy loads are generally of brief duration, and on these loads a meter should operate with accuracy and also without injury to itself. This, therefore, should be an early point of investigation in selecting a meter.

On alternating circuits inductive loads are becoming commoner every day. The wider use of fan motors and other alternating power devices, the rapidly growing popularity of alternating-circuit arc lamps, and the commoner use of inductive "dimmers," all render it essential that a meter should be accurate, irrespective of the power factor. The company which insists upon charging its patrons for power delivered to fan motors on a basis of volt-amperes, is obviously rendering itself unpopular, greatly limiting its business and giving its competitor or competitors the best opportunity for intruding; yet many such companies exist to-day, and they exist, not because they are following a wise policy in their own estimation, but because they are ignorant of what they should look for in the meter which they are using.

Again, there are few electric light stations to-day of any considerable size and age which are not operating some smooth-core and some tooth-core alternating armatures. It is, therefore, important that the meters in service at such stations should be equally accurate on any shape of wave; yet many meters fail in this particular, and seldom, if ever, is the point made a subject for investigation in selecting measuring apparatus.

This same consideration holds good in connection with frequency, and this is a point which it is difficult to overcome in most metering devices; but it is one which should be earnestly sought, and which is of importance both to the station and to the consumer.

Even after this long list of points which must be investigated, as contributing to the broad question of accuracy, there are others which also merit consideration, but to a less degree. Such, for example, as barometric conditions (more especially altitude), temperature, and humidity. These all have direct bearing upon the question and all enter into the every-day conditions of central station practice.

Summing up the question of accuracy, we may say, therefore, that the following points should be investigated with care: Ordinary volt-ampere accuracy, accuracy on inductive loads, accuracy on varying wave forms, accuracy on overload, accuracy on varying frequency, influence on accuracy of variations of temperature, barometric conditions, and humidity.

The second point which is commonly given consideration in the selection of a meter is that of life. This is a question which must depend more upon good judgment than upon any test which can be applied; for it is in reality no test of the enduring qualities of a meter to run it at excessively high speed for a relatively brief time. The life of a meter, in other words, cannot be measured by revolutions, irrespective of the speed of those revolutions, nor can it be determined by the speed at which it rotates alone.

Ninety per cent of all the wear in a meter centers, in the case of motor meters, at the single jewel bearing, which is almost universal. The two chief factors which have influence upon the mere mechanical life are the weight of the moving mechanism and its speed, the variation of the area of the point of contact being, of course, always so small as to be out of the consideration.

A low-speed meter is usually the best meter, provided the speed be not carried so very low as to threaten the accuracy of the meter on light loads, by reason of being held up by intermittent friction in the form of dust or a spider. Practice has indicated that low speed is more conducive to long life than is light weight of the moving mechanism, although both are, of course, very important. More important than either, however, is the quality of the material used at the points of friction and the ease with which the friction parts can be renewed. The best of sapphire is barely good enough, and the pivot end must be of correct shape, burnished to the highest degree, and its point must be absolutely concentric with the center of movement.

More than half of the meter jewels which are destroyed are rendered useless, not by the rotary motion of the shaft, but by reciprocating motion of the shaft, due to vibration. Hence, it is very necessary that the jewels should be in some way cushioned, for vibration cannot be always avoided.

These are all, I admit, mechanical considerations, but they compass much of failure or success in electric metering. The purely electrical features of the meter contribute no grave factor of consideration in connection with the life question, always supposing that the copper is ample, and the potential windings are so distributed and so ventilated as to preclude a burn-out.

Passing over the central station man's third factor for consideration, that of the best unit of measurement, as one which is practically a closed question, we are brought face to face with his lamentable fourth point—the necessity that the meter should be able to withstand tampering. It is a regrettable fact that this is a consideration which is coming daily into more prominence; but light has to be sold to all sorts and conditions of people; and apparently the transgressor against meters is even more common than the transgressor against taxes; and this is a growing evil, largely, perhaps, because of the lax condition of the laws which can be invoked to protect the meter owner in many of our States.

(To be Continued.)

*Read at the Fourteenth General Meeting of the American Institute of Electrical Engineers, Eliot, Me., July 27, 1897.

WIRELESS telegraphy was recently carried out on board the Italian war vessel Spezia as follows, telegrams being transmitted twelve miles: Secured to the mast of the ship, 90 feet high, was a vertical copper wire, ten millimeters in section, covered with guttapercha; one end attached to the receiver on board, the other end free. Another mast of like height was erected ashore, and the transmitter attached to its vertical wire. Another mast and transmitter were also placed in the arsenal. Two ironclad war vessels were engaged for two weeks in taking observations. In these experiments it was demonstrated that the instruments could be securely placed deep down in the hull—messages being intelligible by the receiving instrument in a cabin 8 feet under water, notwithstanding its surroundings of iron.

A LARGE electric plant is proposed in the Cœur d'Alenes, Idaho, to utilize the mountain water power in generating electrical power and light for the several mines in that region. Thompson's Falls is suggested as being the most feasible point.

Mechanical Progress.

Boiler and Flywheel Compared.

The *Journal of Commerce* compares the centrifugal force which acts evenly over every square inch of a flywheel rim, to disrupt and throw it off, to the pressure on a boiler, exerted the same on all sides, tending to tear the cylinder asunder, and says that the bursting point is obtained for the former the same as for the latter.

The centrifugal force of a certain rim revolving varies as the square of the speed of revolution. If the speed is twice as much the centrifugal force will be four times as great. If the mass increases the centrifugal force is increased in proportion, and it also varies as the radius of the circle of revolution. To find the centrifugal force, multiply the weight by the square of the velocity and divide by 32.2 times the radius of gyration (one-half diameter).

We may take, as in a boiler, a rim 1 inch thick and 1 inch wide and we have a certain condition, and the addition of an inch inside or outside, or on either side to make up the whole wheel, we need not consider, but allow each inch to take care of itself. Or we might consider the wheel made up of a large number of inch-square plugs, and figure the centrifugal force of each plug and call it the pressure, as we would in a boiler on each square inch.

If we figure it as we would a boiler, we will take a 3-inch rim, and say it has a tensile strength of 12,000 pounds per inch, then $12,000 \times 3 = 36,000$ pounds. To find the bursting point of a boiler, divide the lowest tensile strength by one-half the diameter in inches. So with a 20-foot flywheel, 3 inches rim, a tensile strength of 36,000 pounds, and diameter 20 feet, 240 inches. According to the rule, the bursting point would be $36,000 \div 120$ (half the diameter)$=300$ pounds. That is, it would require 300 pounds centrifugal force on each inch of the rim to burst the flywheel. See how much there really is. An inch-square plug through the rim would weigh $3 \times .26 = .78$ pounds. According to the rule given for the centrifugal force, the square of the velocity, 62.83 feet per second at 60 revolutions per minute $= 3947.61 \times .78$ (weight per square inch) $= 3079.13 \div 322$ (32.2×10, radius of gyration)$= 9.5$ pounds on each square inch, while it requires thirty times as much to burst it. This looks safe, but when we consider that the centrifugal force varies as the square of the velocity, it does not take long for this fifty to disappear. Thus, if the speed went up to 120 revolutions, twice as much, the centrifugal force would have been increased to $4 \times 9.5 = 36$ pounds against the 300, or now only eight times as much as would burst it. Increase the speed to 240 revolutions a minute, four times as much, and the centrifugal force is sixteen times as much, or 152 pounds against 300, and so it goes. It looks very well when a wheel is running at normal speed to say, "It will take thirty times as much force as is on it now to burst it," but that soon disappears when an engine commences to race.

TO CANVAS COVER a pulley, have it ready and cement thinned; use a flat, soft brush and paint the surface of the pulley, laying it on smoothly. Let the coating on the pulley set for an hour, when the canvas may be put on. Cut the canvas about half an inch narrower than the pulley and of ample length to go around it. When ready to wind the

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ALASKA AND N.W. TERRITORY GOLD FIELDS

FROM SAN FRANCISCO

Via ST. MICHAELS	Miles 2,850
To Circle City	4,350
" Forty Mile	4,600
" Klondike	4,650
St. Michaels to Kutlik via River	100
" " Andreafski	225
" " Holy Cross	370
" " Koserefski	375
" " Anvik	450
" " Nulato	675
" " Novikakat	820
" " Tanana	900
" " Fort Yukon	1,350
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VICTORIA	" JUNEAU	846
" JUNEAU	" SITKA	160

From San Francisco to Portland by the Southern Pacific Railroad.
" Portland to Seattle by the Northern Pacific Railroad.
" Seattle to Vancouver and Victoria by the Canadian Pacific Ry.

ALASKA MAIL SERVICES.

There is to be a weekly mail service between Juneau and Circle City.

Forty Mile, Fort Cudahy, Dawson, and other points in the Klondike country are in the Dominion of Canada, and any mail addressed to these points will also be included in this service.

TABLE OF DISTANCES.

Miles	Point	Miles from Juneau
	Hames Mission (Chilkat)	80
20	Dyea	100
0	Head of Canoe Navigation	100
10½	Summit of Chilkoot Pass	116¼
9¼	Head of Lake Linderman	126
8	Foot of Lake Linderman	134½
1	Head of Lake Bennett	135½
26¼	Foot of Lake Bennett	161¾
2¼	Foot of Caribou Crossing	164¼
16¼	Foot of Lake Tagish	181¼
5	Head of Lake Marsh	186¼
20	Foot of Lake Marsh	206½
16¼	Head of Canyon	223
¼	Foot of Canyon	223¾
1½	Head of White Horse Rapids	225¼
14¾	Tahkeenah River	240
16	Head of Lake Le Barge	256
31	Foot of Lake Le Barge	287
39	Hootalinqua River	316
26	Canoe Bar	342
7	Big Salmon River	349
35½	Little Salmon River	385½
58½	Five-Finger Rapids	444
6	Rink Rapids	450
53½	Pelly River	503
96	White River	599½
9½	Stewart River	609
20	Sixty-Mile Post	620
60	DAWSON	680
40	Forty-Mile Post	720
¼	Fort Cudahy	720¼
249¾	Circle City	970

Forty Mile to Miller Creek Diggings	70
Circle City to Birch Creek Diggings	50
Klondike to Diggings	5

N.S. CROCKER CO. S.F.

canvas make a scraper of wood the width of the pulley, and then cement about a foot of one end of the canvas, giving it a good heavy coating that it may adhere well in the fiber of the cloth, and lay it on the pulley, leaving an even margin on each side, then rub down with the scraper, getting the canvas down flat and hard. Proceed in this way, cementing only about a foot at a time, until the pulley has been circled; then cut off the end to form an even butt, and finish by cementing strip of thin cloth across the seam.

Inventions Ahead of Their Time.

We sometimes hear of inventions which have appeared "before their time," and it may be of interest to consider just what it means for an idea to have come into the world before conditions are ready for it. Every one who has had to do with the Patent Office knows what is meant by the "state of the art," and one of the first duties of an examiner is to investigate the status of general knowledge and practice in that branch of science to which the application belongs. In such cases, however, the intention is to discover, if such be the case, whether the invention has not been anticipated by some device or method in general use. On the other hand, it may sometimes be most important to know whether or no the "state of the art" is far enough advanced to enable the idea to be utilized or applied, as upon this very question the practical fate of a device often depends. Many ingenious and patient men have worked persistently to develop inventions for which the art was not ready, but which, in later years, when materials, methods and markets had developed, proved to be fully as valuable and important as had originally been anticipated.

The pneumatic bicycle tire would be of little value if the rubber industry were not equal to the production of the proper material from which to make it, and the motor carriage is, in like manner, dependent upon the parallel development of the storage of energy. Professor Langley has shown us how to meet the essentials of a successful flying machine, and now calmly throws the burden of the commercial success of the problem upon the builders of motors by telling them to go ahead and produce a source of power which shall be at the same time powerful enough and light enough to drive his æroplane without overweighting it. Similar conditions often confront students of applied science, and in many cases brilliant ideas have proved commercially worthless simply because of the practical impossibility of realizing the constructive conditions. There is little doubt that it would prove a most profitable occupation for thoroughly informed specialists to make a study of neglected inventions upon which the patents have expired, and which have never been developed for the above reasons, bringing to this revival of past ideas the present possibilities in the light of more recent developments in science and construction. — W. H. Smyth in Cassier's Magazine.

A Magnetic Drill.

The use of magnets for lifting purposes and as a substitute for clamps is rapidly extending, and to see the ease and facility with which a five-ton casting can be picked up and carried around the shop is very striking, says the *Engineering Magazine*. With the old process holes have to be bored in masses of metal in all sorts of odd and inconvenient places and at angles so that very often it is necessary to rig clamps for holding the drilling machine to its work. The application of the portable electric motor for this purpose was a long step in advance, and this method has been of great service in dealing with the armor of the new cruisers. When a portable drill, however, is coupled with a magnetic clamping device the ideal conditions are realized. Dr. Louis Bell recently described a drill of this pattern. It consists of a motor and its worm-driven drill, together with a universal mounting of four adjustable feet. When placed fairly upon a ship's plate or other mass of iron these drills have an adhesive force of nearly half a ton each. The drill can then be adjusted and clamped by the simple turning of a key, and it will then bore holes up to an inch in diameter as fast as it can be safely worked. The whole affair weighs only about 200 pounds. These portable drills in small sizes, particularly when the clamping is magnetic, are invaluable in general machine shop practice and in modern building work.

THE Pittsburg Reduction Company has been asked by the United States Geological Survey to make a bid for furnishing aluminum discs and pins for bench marks. The Survey uses these bench marks in its topographic work to indicate attitudes. They are placed as permanent records at conspicuous points where the Survey parties have been at work. The Survey has been using bench marks made of brass, but these have not proven altogether satisfactory, and aluminum may be substituted.

Scientific Progress.

The Eastern Arctic Sea.

Supan gives a review of Nansen's polar expedition, from which the following notes on the Eastern Arctic sea (the northern part of the eastern hemisphere) are taken. Sheets of ice occupy much of the surface, continually drifted by currents and winds; now torn apart and opening water channels, now pressed together and forming walls and ridges. The latter reach heights of nine miles, and offer the greatest obstacles to sled traveling. The remnants of former ridges drift about in berg-like masses with steep walls. The drift ice here is contrasted with the much thicker pack ice west of Greenland. The winter snow began melting in June, and the firm drift ice was not revealed till the end of summer. Its color is then a dirty brown, caused chiefly by mineral dust. Fresh water pools are formed on the ice surface, surprisingly rich in microscopic organisms. The ice increased in thickness slowly through the winter to June, varied until August, and decreased to early winter. Thickening in summer is ascribed to freezing underneath of fresh water supplied by melting snow above. In early spring the ice was coldest, from —16° to —30° C. In summer it approached the melting point, and then became plastic, so that crushing took place without sound; bending frequently replaced breaking.

The discovery of the great depth of the Arctic, 3000 to 3900 m., where traversed by the Fram, is regarded as the most important geographical result of the expedition. Polar lands are, therefore, not to be expected. A sample of serial temperature soundings gives a surface layer 200 m. deep at —1° C.; a second layer, 660 m. thick, with mean temperature of +0°.22 C., and about 3000 m. of deep water with mean temperature of —0°.57 C. The surface layer has least salt, and the intermediate layer most. The latter is supplied from the North Atlantic, dipping beneath the Arctic surface layer because its density is determined by salinity rather than by temperature.

WHEN climbing a staircase or ladder a man can exert about 2,000,000 foot-pounds in a day of eight hours. An average military ration is equivalent to about four pounds of meat, of which fully three-fourths are water and one-half of the remaining fourth only is carbon, so that half a pound of carbon, burnt in the human furnace, will do as much work as four times the quantity in the form of coal used through the medium of an engine and boiler. For the present, at least, therefore, the most economical form of stored energy which one can carry about with him is a good square meal, although its conversion into effective work may not be so pleasant an operation as that of permitting the coal to expand its own latent energy.—Scientific Machinist.

Premature Burials.

Consul Mantius writes from Turin, Italy:

"Prominent physicians and laymen are at present busily engaged in preparing an exhaustive report, with exhibits, on the subject of 'apparent death and premature burial.' This report will be the striking feature of the medical department at the national exposition to be opened here in April, 1898. Reports of similar kind are expected from all over the world. There will be an international competition and a prize will be awarded for the best work on the solution of a problem in which not only the profession, but, more or less, every mortal is interested. Up to the present time, no infallible test for distinguishing apparent from real death has been discovered, in consequence of which horrifying cases of persons buried alive occur from time to time, and are narrated in medical journals and daily papers. The committee of physicians and laymen organized to gather and sift the material realize that the first step to remedy such conditions should be to obtain modification of the laws relative to the limited space of time allowed for bodies to be kept before burial in some countries. It is clearly proved that the number of persons buried alive is much larger in such countries. Therefore, the members of this commission appeal to the heads of the Governments and to all those whose position gives them influence over the people for their support in a movement which can not fail to interest humanity. It is the intention to start a periodical, which will be devoted to the furtherance of the matter in hand. Early this year, the Italian Government, through foreign ambassadors and ministers, extended an invitation to other nations to take active part in those branches of the Turin exposition which are of an international character. The main feature of the medical department might have been easily overlooked in the bulk of other interesting material. I believe inestimable good to the cause will be done by bringing it to the notice of the people of the United States."

IN the *Annales des Mines* is given an account of some experiments made at the instance of M. H. Le Chatelier to determine the chemical composition of fire-damp. In the samples examined the incombustible parts varied from 3.1 per cent to 44.4 per cent in volume, and contained of carbonic acid 0 per cent to 4 per cent, of oxygen 0 per cent to 0.9 per cent, and of nitrogen 2.2 per cent to 39.8 per cent. Nitrogen is invariably present in quantities varying from 0.74 per cent to as much as 30 per cent. In all cases the nitrogen was found to contain argon varying in proportions from 0.74 per cent to 3.28 per cent of the total nitrogen and argon together. It was concluded, as the result of experiments, that argon in fire-damp is not derived from the coal, but is only probably present in fossil air of the Carboniferous period, either absorbed directly or carried in by water, in which argon is more soluble than nitrogen, and which would account for its being generally present in higher proportion than in the atmosphere.

THE Chabot Observatory, of Oakland, Cal., has decided to send a special expedition to India to observe the total eclipse of the sun. It will be headed by astronomer Burckhalter, whose expenses will be paid by William Pearson, of San Francisco. Dr. George C. Pardee will provide a new lens for the use of the observers. The expedition is, of course, entirely distinct from that to be sent out by the Lick Observatory, the funds for which were provided by the late Mr. Crocker.

A LATE invention is the cold stove for use in the heated months for reducing the temperature. Salt, a small quantity of ice and a patented chemical produce a most intense degree of cold. It is as dangerous to touch this stove when in operation as it would be to place the hand on a fire stove at a high degree of heat. The skin is instantly taked off and painful injuries are the result of the slightest contact. The inventor claims that during the hottest weather the temperature of a room may be run down and made pleasant by the use of this novel device.

New Publications.

The Hydraulic Gold Miner's Manual: T. S. G. Kirkpatrick. A little book of forty-six pages, containing very little of information to the California miner and not up to date as to methods of their description. The time-honored definition of what a miner's inch is and what a gallon of water weighs, etc., are given, and good advice is vouchsafed to the river miner to refrain from the demon drink. The most interesting part is an extract from a newspaper letter entitled "A Season's Gold Digging on the Yukon." Some good rules are given for distinguishing different gems. Published by Spon & Chamberlain, 12 Cortland St., New York. Price, $1.

Practical Notes on Hydraulic Mining: By Geo. H. Evans, M. E. A handsome and convenient reprint of the article which was written for this paper and appeared serially in Volume 74. It is just what a man who does not know much about hydraulic mining, but would like to learn, needs. It is adapted to California theory and practice and is the result of about thirty years' practical experience of a man who is at the head of one of the biggest enterprises of the kind in the State. The issues of the MINING AND SCIENTIFIC PRESS which contained the article are all sold, and those wishing a copy of the little book, which contains the article in its entirety as it originally appeared, can be supplied by McNutt, Kahn & Co., 306 Market St., San Francisco. Price, $1.

Personal.

R. H. BRITT succeeds Supt. Cavill at the Poorman, Idaho, mine.

B. MACDONALD has returned to Gibbonsville, Idaho, from British Columbia.

PHILIP BAKER is the new manager of the Cedar Valley G. and S. M. Co., Kingman, Arizona.

COL. W. S. KEYES has returned fron attendance at the Denver committee on revision of mining laws.

THE El Dorado Co., Cal., Miners' Association has elected Thos. Clark and A. H. Ten Broeck president and vice-president, respectively.

J. J. CRAWFORD, ex-State Mineralogist, will shortly occupy his new office in the Spreckels building as a mining and hydraulic engineer.

E. N. LINDSAY, accompanied by Hermann Stahlschmidt of Germany, left for southeastern Alaska this week to examine some quartz properties.

E. DE STUTZ has resigned the superintendency of the Continental mine, Globe, Arizona, to take charge of the French Society Gold property, Coolgardie, Australia.

Commercial Paragraphs.

H. B. MATHEWS, a machinist and millwright of Clear Creek and Boulder counties, Colo., has gone to Vernon, British Columbia, to erect a stamp mill built by the J. H. Montgomery Machinery Co. of Denver, Colo.

THE Colorado Iron Works Company of Denver, Colo., reports the shipment of a 10-stamp mill, including crushers, etc., to the Golden Star Gold Mining Co., Baker City, Oregon, and the closing of a contract for a smelting plant to be erected in Mexico.

THE Baker Iron Works of Los Angeles report the shipment to W. A. Dalton, Coborce, Mexico, of one 3-stamp 1000-pound mill, 40 H. P. boiler and 20 H. P. engine; to J. D. Thomson, Santa Ana, Sonora, Mexico, one complete 2-stamp mill, 900-pound stamps, including boiler, engine and all equipments.

THE Union Iron Works will build a steel steamer of 2000 tons, speed fifteen knots, for the Alaska Commercial Co., to run between San Francisco and St. Michaels. They are also building a new steamship for the Hawaiian inter-island trade, a double-ender steel ferry-boat for the Southern Pacific Company and a steel steamer for Goodall, Perkins & Co.'s line to Mexican ports to replace the Orizaba.

Recent California Mining Incorporations.

Metropolitan Reduction Company, San Francisco; C. H. Fish, R. Hamilton, E. J. Fraser, W. L. Palmer, H. G. Blasdel; capital stock, $20,000,000; $10,000 subscribed.

Little Butte Extension Mining Company, Los Angeles; E. L. Allen, S. M. Hay, J. W. Oakley, W. J. Clark, I. C. Wood, W. Friend; capital stock, $1,000,000; subscribed, $800,000.

Oriole M. & M. Co., Stockton; F. E. Dunlap, J. B. Freitas, J. K. Wagner, A. A. Smallfield, S. A. Kitchener; capital stock, $200,000; subscribed, $150,000.

Mining Summary.

CALIFORNIA.

Amador.

The *Dispatch* says the long-standing litigation between Dr. Bardue of San Francisco, Amador Queen Mining Company, Ira P. Rankin and A. S. Cochrane, involving title to the Amador Queen and DeWitt mines, has finally been compromised by the attorneys for the parties, Vincent Neale and Wm. J. McGee, and the compromise judgment, which ended all the cases, was entered by Judge Rust on Wednesday. By the terms of the compromise Dr. Bardue becomes sole owner of the DeWitt mines, Amador Queen No. 2, the 20-stamp mill and the mill site west of Hunt's Gulch. Ira P. Rankin's estate dismissed its appeal in the Supreme Court, cancels its $13,000 mortgage on the above property, and takes a new mortgage for $1250, payable in five years, without interest. Vincent Neale becomes the owner of Amador Queen No. 1 and the balance of Amador Queen mill site, and takes the $1120 redemption money which has been in ex-Sheriff Adams' hands for the past six years. Mr. McGee says that Dr. Bardue's properties will be operated on an extensive scale as soon as men, materials and machinery can be obtained.

Record: At the Wildman-Mahoney mines eighty stamps will be put in operation in a short time. Nearly 150 men are employed.

At the American mine on Sutter creek the last run of less than two weeks with five stamps yielded $2000 in bullion. Superintendent Dennis employs twenty men.

The old Lincoln mine, which made such a brilliant record as a bullion producer when it was worked a number of years ago, remains idle. An unfortunate condition of affairs surrounds this property, as it is owned partly in Scotland and partly in this country, and there seems no immediate hope of an amicable understanding between the two factions.

The Eureka Consolidated mine is bonded by Hetty Green of New York. Some day when she turns her attention to mining, disposes of it to some one else, or passes away, it may be made to yield.

Republican: At the Anita the drift has reached 600 feet from the shaft. It is expected that another 100 feet will have to be run to reach the ore chimney which shows on the surface. It is the intention to resume sinking as soon as the north drift has reached the ore body. They will go down another 500 feet, making 1000 in all. New machinery will be put in, as the present engine is not capable of going down the depth intended.

The Butte Basin Tunnel Company, operating the big tunnel to tap the auriferous gravel supposed to lie under Butte basin, has suspended work. W. E. Stewart is working on the claim, sinking through the marl to the gravel. Some of the gravel prospects 25 cents to the pan, but nothing has been encountered so far to justify the large tunnel undertaking. The company expended about $18,000 in running this tunnel.

The Zeek mine and mill at Butte City are again in operation.

At the Alma mine they are still running the diamond drill in an easterly direction, with little or no change in the formation. The water is troublesome, which is surprising at this season of the year.

Ledger: The South Spring Hill, J. R. Tregloan, superintendent, will continue to 1400 feet in depth before going to the ledge.

The Keystone is now cleaning up every two months.

At the Live Oak mine, Stony creek, Young & Sullivan are sinking in a good ledge of ore.

Butte.

In the Carter mine there are nearly thirty men employed on the flume, tunnel and mill.

In the Peter Woods mine A. J. Walsh is superintendent, nine men are employed. The tunnel is now in 1600 feet and is still being driven ahead.

In the Pershbacker or Magalia mine Supt. Gassaway is building a 10-stamp mill to crush the cement.

Of the "Consolidated Gold Mines of California, Limited," near Oroville, E. Harvey, one of the directors, has returned to England with some notes, from which it appears that in the Banner mine at the end of August, there were 146,400 tons of payable ore in sight ready for mining and milling. Average value, $4.33 per ton. With a 40-stamp mill there would be a profit of £35 per day, or £10,500 per annum, reckoning 300 days to the year. The report says: "Corroboration of this value has been shown by actual milling tests, the particulars of the last mill run to hand giving a return from 650 tons of $4.30 per ton, without taking the yield of the concentrates into account. The value of the ore has been ascertained by a series of assays taken throughout the mine. In no instance has any sample been picked, as the whole of the face of each drift and level was cut down and included in the assays. In cases where the ore ran high in value (it has reached as much as $1,727.70 per ton) the assays were discarded in arriving at the average value, on which the above calculations of profit are based, and it will, therefore, be seen that only the low-grade ore has been taken into account. This method of valuation was decided upon so that the estimated profits should be well within the mark and absolutely reliable. All rich ore—and there are ample proofs that much exists in the quantities already opened up—will necessarily greatly increase the profits. Each additional foot driven on the 1000-foot level of the Banner mine alone will open up at least 700 feet of backs, or, say, 1400 tons of extra ore, and as driving on this level can be continued at the rate of 42 feet per week there would be about 58,800 tons of ore added weekly to the large quantity now in sight ready for mining and milling. This immense mass of payable ore will add many years to the life of the mine, and by continuing in depth below the 1000-foot level the mine will certainly, as far as any present shareholder is concerned, be inexhaustible. Assays of ore encountered in sinking the Clark & Coffee mines shaft gave a yield of $13.73 per ton. Note.—At present all exertions on these mines (the Clark and Coffee) are being confined to the sinking of the shaft, and, as the bodies of ore have not as yet been opened up, your directors have made no allowance for any yield from these mines in the estimate above given. At the same time your directors feel assured that in these, and also in the Long's Bar mine, which is also owned by the company, there is a bright future for the shareholders. The general equipment of the mines is excellent, and the machinery and plant are in first-rate order. But what is now urgently needed, and what is strongly recommended by the company's consulting engineer, is an addition of at least 30 stamps to the present milling capacity, as the existing 10-stamp mill, running full time, is utterly inadequate to cope with the enormous quantities of payable ore referred to above. Your directors are, therefore, contemplating the erection of thirty additional stamps as soon as possible. As the development work proceeds in the mines, a still further addition will have to be made to the milling power, and the more stamps the company has running the greater will be the profit, and the more economically will the operations be carried on. Your directors feel it due to Mr. Evans, the company's general manager, that they should record their appreciation of his able and untiring efforts in the interests of the shareholders. During his appointment he has made many alterations in all departments, and has effected such improvements that the company benefits considerably by the saving of expenses and the more expeditious and methodical working of the mines. In conclusion, your directors consider the present prospects of the company excellent, and in their opinion, the shareholders will not have many months to wait before knowing that the company is on a dividend-earning basis."

Calaveras.

Chronicle: In the Lamphear mine ore encountered at the 300-foot level averages 10 feet and prospects at the rate of $10 per ton the entire width. The company intends to go ahead with the sinking of the main shaft, run the necessary crosscuts and thoroughly develop the mine. W. T. Harris superintendent.

At the El Encino, Supt. Regan has tapped one of the old working shafts of the old mine, but as the old works were badly caved about the shaft the connection did not drain them. He is now cleaning out the old shaft and will push for the old works from that point.

Prospect: At the Thorpe mine, at Fourth Crossing, it will be remembered some time ago the large cog-wheel to the Cornish pump broke, then the pump got away from its mooring at the 600-foot level and went to the bottom—at the 700-foot level—in consequence of which the shaft nearly filled up with water. After long and persistent work in hoisting and pumping the large quantity of water was rapidly being mastered, and the bottom of the shaft was almost in sight. In fact another day's work without mishap would have seen all the water out, but the cable broke and the large bucket along with 150 feet of cable went to the bottom, and again the water rose to the 500-foot level. A new bucket and cable were secured and work once more resumed.

The Big Bonanza mine, near Angels, formerly known as the Harris mine was purchased by Stockton men several months ago and considerable work has been done on it. The shaft is down 140 feet, the crosscuts show a ledge with a rich pay chute.

El Dorado.

Nugget: A. A. McDonald of Grizzly Flat has struck some rich gravel in his claim and will increase the working force to upward of twenty men next week.

Fresno.

L. B. Beard writes from Pine Ridge: "One miner, one carman and my partner furnish rock to keep our four stamps at work day and night, knocking out ore worth $10 per ton in free gold. The ledge averages from 1 to 2½ feet of pay rock. We have about 3000 tons in sight. The last assay showed $42 a ton in gold, besides eighteen ounces in silver."

Kern.

Randsburg *Miner*: The clean-up of a twenty-ton run of Val Verde ore showed a value of $25 per ton. The ore came from the No. 2 shaft, out of the 3-foot ledge.

Los Angeles.

Parsons and Neiswender have located a placer mining claim in the Los Angeles river, in the Los Angeles city limits, and claim that they will go to work with machinery, pumping, etc.

Mariposa.

Gazette: R. Harper has charge of the Karan mines recently purchased by a San Francisco company. Ten men are employed.

Mono.

The Standard Consolidated Mining Company's recent dividend of 10 cents per share makes the total dividends declared to date, $3,757,868. The earnings since the declaration of the last dividend have amounted to, gross, $120,000, and net, $60,000, as it takes only $18,000 to pay a dividend, the company's surplus is rapidly increasing. There are 179,394 shares issued, 21,606 being in the company's treasury.

Nevada.

(Special Correspondence).—J. Coan and others are developing a new prospect on the Chapman ranch, two miles west of town. The shaft is down about 80 feet on a 2-foot ledge of fair grade ore.

Current rumor has it that Mrs. E. C. Huntington of New York is about to reopen the old Banner mine, three and one-half miles east of town. The property has been closed for years.

Development work on the Mountaineer is progressing successfully. This property was a rich producer for ten years, after which a barren zone was struck, and the property lay idle for a long time and filled with water. Encouraged by the success of others in deep mining, the company resumed work. Their shaft is now 1800 feet below the croppings. They are drifting north and south on the lowest level, expecting to reach the two pay chutes within 200 and 600 feet, respectively. They find good ore in their present work. W. A. Denis is superintendent.

Ohmert & Co. have leased the Gold Tunnel property from A. D. Allan. After running the tunnel 500 feet they tapped the ledge, which averages 18 inches in size and $15 in value. The property is within the city limits.

The Old Home Consolidated, comprising seven claims, five and one-half miles east of town, on which are five pay chutes, has a shaft 250 feet deep and a tunnel on the course of the ledge 1150 feet. Work was begun on this property three years ago by a San Francisco company. The ore averages $25 per ton.

La Suerte Company have begun grading a site for a 10-stamp mill.

A. D. Allan is operating his California Tunnel mine, adjoining town, on the tribute system. The shaft is 350 feet deep, connecting with the tunnel, which is 3000 feet long. This is the tunnel that drains the Reward property. There are 300 tons of $20 ore on the dump.

The Old Montana, idle for many years, resumed work recently and the outlook is promising. The property is bonded to Dr. Tickel, who has gone East to "place" it with his friends.

Nevada City, Sept. 27, '97.

(Special Correspondence).—The Red Dog Mining Company, near You Bet, have reached 200 feet on an incline. This is gravel property. From the bottom of the incline the tunnel has reached 380 feet in bedrock. The indications are that the work is close under the channel. They expect to tap the channel this week by an upraise. There is fine gold throughout all the gravel.

Times are prosperous in You Bet, so much so that a hotel of large proportions (the only one in the village) is being constructed.

The North Star Company are sinking a new shaft about 400 yards from the Stockbridge, commonly known as the Massachusetts Hill. The work is down 140 feet. It is expected that they will strike the ledge at 600 feet.

New work is progressing favorably on the Old Norambagua mine, four miles southwest of Grass Valley. The property is owned by Wm. Campbell. This property has produced a great deal of gold—in fact, it was a rich mine, but was never worked below 500 feet. Mr. Campbell proposes to pump and retimber the shaft and go to greater depth. There is a tunnel 1100 feet, striking the ledge at 500 feet. The ore runs as high as $60 per ton and the pay chute was the longest in the district, excepting that of the old Idaho. The formation is granodiorite.

Grass Valley, Sept. 25, '97.

The Liberty Hill mine, near Bear river, will soon resume operations.

The *Transcript* says there is an unusual scarcity this fall of free water for mining purposes, and the South Yuba and Excelsior companies have a demand from regular patrons for all they can supply. The operations of a number of the smaller mines in the county are as a result considerably hampered. A big storm just now would be hailed with delight in the mining regions.

Transcript: There are eight tributers working at the Pittsburg mine, but they are not getting rich very fast. There were nearly four times as many there a few months ago, but they have been quitting gradually and looking for something better. One of them says he put in a good part of the summer there and averaged only about 80 cents a day. The men there now are putting in their time on the fifth, sixth and seventh levels. Tributers occasionally strike it rich in some mines and make a good thing for a little while, but it has been generally observed that when their luck turned that way the owners of the mine would find some excuse to put them on day's pay so as to get for themselves the benefit of the improvement in the mine. As a rule, when a good miner goes to tributing, he does it for the same reason that a ship puts into any port in a storm, or as the hungry man consoles himself with the reflection that half a loaf is better than no loaf at all.

At the La Suerte quartz claim the shaft is down 225 feet. Men are grading for a 10-stamp mill to be run by water power.

The success attained at the Gaston Ridge, near Graniteville, has given a new impetus to mining in that section. This property only a few years ago was abandoned at a depth of 219 feet. It had a pay chute over 1000 feet long and produced nearly $600,000. The present company began a prospect tunnel two years ago and at about 1900 feet they have a strong ore body at a depth of 650 feet. They have 1800 tons of ore on the dump. The company is now moving the mill and boarding-house down into the canyon, and adding a rock-breaker and concentrators to their machinery. Mr. Harmon expects to have the plant in operation by the 15th of October.

There is a probability that work will soon be resumed upon the Nevada City mine, which was for years one of the most prominent producers of this district. Robert Mein is daily expecting telegraphic instructions to to take charge of the property in the interest of the London Exploration Company and another combination of capitalists who have been jointly negotiating for it.

Placer.

At Dutch Flat J. E. Doolittle is repairing flumes, putting the old Gold Run ditch in order and equipping the mine for active operations.

W. Rablin has ten men doing prospect work on the Bartley drift mine, between Dutch Flat and Alta. The main tunnel is 1020 feet. The channel is estimated to be at least 1000 feet wide. The gravel is free and works easily, there being no trace of cement.

The Young America gravel mine, below Forest City, has been bonded to a San Francisco company who will open up the channel.

Philip Nicholls of Colfax will reopen the Polar Star mine, near Dutch Flat. No doubt this will give many men employment.

The Morning Star mine at Iowa Hill has just paid its 82d dividend, the latest of $7 per share, and is now opened up so that there is said to be four years work ahead on pay gravel.

Plumas.

F. S. Quigley, from seven tons of quartz near Greenville, realized $17.50 per ton.

M. Lambert, Supt. Little Hope mine, near Merrimac, will put in five more stamps, using the heaviest make, and increase the capacity of the plant.

The *National Bulletin* says: A few men are employed at Bean Hill for the Quincy Mining & Water Company, putting that mine in readiness for work in February. Six hundred feet of flume have been built and 900 feet of pipe laid. The restraining dam at Green Flat has been improved under direction of the Debris Commission by the erection of bulkheads below and raising the dam.

Riverside.

At the Leon mine, seven miles from Winchester, owned by the Leon Gold Mining Company, the main shaft is down 220 feet and about 1500 feet of development work has been done. It is intended to erect a 10-stamp mill, 1200-pound stamps. There is a good mill site with plenty of water. The mine is patented.

San Diego.

According to the *Union*, a San Francisco prospector named Louderville has made a strike near Warner Ranch in that county. The half-column account of the find closes as follows: "An assay of a lot of the ore showed a value of $152.13 a ton. Louderville has four claims on the ledge. He has just returned from San Francisco with an expert, who will report on the property in the interest of San Francisco capitalists. The discovery is 20 feet outside the boundary line of Warner Ranch and adjoining the Indian reservation."

Shasta.

J. L. Cannon, who recently leased the Three Sisters mine, near French Gulch, took out forty-five tons of ore in two months, netting $3600.

Supt. Frick is developing the Deaken & Taylor mines at Lower Springs.

Crowell and son, owners of the famous Banghart group of mines on Mad Mule have expended considerable money in placing their property in good condition.

Courier: At Harrison Gulch experiments are being made with the cyanide plant under the supervision of Mr. McGregor and it is said that the proceeds from the tailings alone will pay the expenses of milling all the ore. Should the small plant now in operation prove as successful as it promises it will be replaced by a ten-thousand dollar plant in the Spring.

Sierra.

The *Sierra Valley Record* says that things look brighter. The Sierra Buttes and another mining company will run twenty stamps each. Copeland, in Slug canyon, will be running five stamps and the Sierra Gold Company twenty stamps.

The Bunker Hill Mining Co. has levied an assessment of 9 mills per share.

The Gold Bluff mill is now in charge of Geo. Black. Tributers' ore is being crushed.

Regarding the road from Sierra City to Cisco, W. H. Freeman of the latter place assures the *Enterprise* that as soon as the opportunity offers he will certainly complete the road. There are three miles to build; seventeen miles have been built.

Siskiyou.

A Delta dispatch says men from the gold strike, twelve miles from there, say that a good quartz ledge is being worked, giving high in free-milling gold.

The Barnes ledge on Cherry creek is being operated by Hunter & Co. Morrison & Lash on the North Fork of Humbug will continue development work all winter. The formation is porphyry and granite contact.

Work on the Klamath Flume and Mining Company's property has been temporarily suspended, but will be resumed within sixty days. Mr. Day, the president of the company, is equipping a large placer property on the Olalla river in Douglas county, Oregon, and wishes to devote all of his time to the latter until it is in running order which will be by the first of November.

T. J. Nolton, after spending considerable time and money in developing a tract of placer ground, to show to intending purchasers, suspected that the owner, an Italian, was salting the ground. After several days of additional work in which the Italian was not allowed to assist, Mr. Nolton's suspicions were confirmed. Several kinds of gold were found in one pan, some of it touched with quicksilver, and fine gold was found sprinkled on the surface of the ground.

Work is progressing on the Klamath Chief group of mines, located in the Cottage Grove district. A three and five-eighth mile ditch which is to bring 1000 inches of water from Coon creek onto the property is under way. Fifty men are at work under Superintendent J. C. Wood.

Trinity.

J. Frank has bonded the Jumbo mine on Virgin creek and has ten men developing a 9-foot ledge.

The Paulsen-Hughes mine, Union Hill, Dutton creek properties are reported sold by P. M. Paulsen, to a company represented by O.

H. Simonds of Redding. This group forms the largest deposit of gravel under one ownership in the county, comprising 1500 acres of auriferous gravel, which carries coarse and fine gold averaging $17.50 to the ounce. Where prospected, its estimated average yield is 15 cents to the cubic yard.

Tuolumne.

From Jamestown is reported a strike in the Green mine, of a 4-foot vein of ore, giving high assays.

Independent: The new 10-stamp mill on the Riverside will be run by water power obtained from the Stanislaus river. Superintendent, F. Plank.

The Confidence continues to look well. The new mill is turning out bullion.

At the Alabama crosscutting is now going on on the 300-foot level. The ore averages $11 per ton.

At the Lewis mine Scott Bros. have recently made a rich strike.

Yuba.

J. C. Campbell proposes to add five more stamps to the battery of the Klondike mine, two miles from Brownsville. The ledge, 8 feet in thickness, carries $2 per ton in free gold. The sulphurets go 5 per cent and yield $65 to the ton.

NEVADA.

EDITOR *Enterprise*:—In your issue of the 25th you published what purports to be an official statement of the results obtained from the working of some low-grade Con. Cal. & Virginia ore at the Kinkead mill. As the test was made for the information of the Con. Cal. & Virginia Co. and its stockholders, I think it right and proper to publish both sides of the question. The official statement shows ore to be worth, as per battery samples, $7.25 in gold and $5.38 in silver, computing the silver at $1.29 per ounce. If the Con. Virginia assays are correct, I only recovered about 53 per cent of the value. But my own assays showed a value of $4.77 in gold and $4.50 in silver, and that I recovered 86.81 per cent of the gold and 54.50 per cent of the silver, a total of 71 per cent of the gold and silver. The battery samples were taken in the usual way, dried, and fairly divided between the Con. Virginia Company and the mill company. The result of the assays showed a wide variance, to wit: Con. Virginia assays $12.68, Kinkead's $9.28. I then sent the samples to San Francisco, where they were assayed by Falkenau, who returned an average value of $9 57 per ton, which practically checks our work and justifies me in saying that we recovered 71 per cent of the assay value.

Yours, JAS. H. KINKEAD.

Virginia, Nev., Sept. 25, '97.

Enterprise: It is many years since the Comstock has witnessed so much concentrated activity as that now in progress about the plant of Harris, Blood & Co. in Six Mile canyon. Since the 23rd of August, when active operations commenced, on an average twenty-five men have been constantly employed. About 4000 feet of flume and ditch have been constructed. This system raises the water so that a fall of 180 feet is secured at the works. It is expected that the plant will be in full operation by the 25th of next month, when it will have a capacity of 130 tons per day.

OREGON.

The property of the Apollo Mining and Milling Co. is in Pearl mining district, Elk creek, Jackson county, forty-five miles northeast from Central Point. The company intended putting in their mill this fall, but has postponed that till spring. They will keep men at work all winter, building roads, bridges, tramways, store house, assay office, etc.

Woodcock & Taylor have sold their placer ground on Briggs creek, Josephine county, to J. C. Franks of Alameda. The property will be equipped with hydraulic appliances. A new ditch one and one-half miles long will be built.

Conde & Locke have bonded the Magnolia mine, Granite district, for $40,000.

In Jackson county Whipple & Holcomb are fitting up a hydraulic plant at their mines on Jump-off-Joe. The Black Gold Channel Mine Co. will put in 2000 feet of hydraulic pipe on their property on Foots creek. The Eureka Mining Company have received their forty-ton mill at Grants Pass. Smith & Beer are equipping a large hydraulic plant on the East Fork of the Illinois river, Josephine county, to cover six miles of ground on the river. Three giants will be operated on this property. The ore from the Oro Fino on Jump-off-Joe is now going to the Ashland stamp mill. The old combination mill and arrastra used for so long at this mine went to pieces recently. The owners propose putting in a 10-stamp mill.

WASHINGTON.

At Chewelah the force of men on the Copper King has been increased. They are drifting both ways from the bottom of the 80-foot shaft.

Ellensburg *Capital*: L. H. Jansen is down from the Swauk with a lot of nuggets, the largest of which weighs sixteen ounces and is worth $240. The next in size is worth $128, and the other eight range down to $20, the lot of a little over fifty ounces being worth about $800. They are from John Black's claim.

BRITISH COLUMBIA.

(Special Correspondence).—B. R. Brierly of Seattle has finished prospecting the British Columbia Mining and Development Co.'s hydraulic ground on Wolf creek and has gone to Seattle via Quesnelle Forks. It is understood that the property makes a satisfactory showing and development will be vigorously prosecuted. Jack Pinkerton has bonded his placer holdings on Lowhee creek for $40,000 to Edgar P. Rothbone, the expert for English capitalists. A cash payment of $1000 was made. The latest strike is on Jubilee creek which flows into Little Valley creek from the east. The gold is coarse. The heaviest piece so far found is worth $20. The discoverers Neigesen, Campbell and Taggart are running a tunnel to the bottom of the ground.

The locating party sent out by the Black River Exploration Co. took up and prospected one and one-half miles of placer ground on Mason creek, Omineca district. If the ground is one-half as good as the locators say it is, it will pay as big dividends as any placer in British Columbia with a very moderate cost for equipment.

Jack Kavanaugh, formerly of Angels Camp, was one of the B. R. E. Co. party.

Charles McKinnon got a $69 slug on Lost creek this summer. Several good mining interests ranging from prospects to dividend paying mines can be had dirt cheap from owners who want to go to Klondike.

Barkerville, Cariboo, Sept. 21, '97.

A Boise, Idaho, dispatch of Oct. 1st says: "Advices received here tend to confirm the reported deal for the sale to an English syndicate of the famous Rossland mine, the Le Roi. The officers of the company at first pronounced the story false, but it is now learned that a deal is really on, and that the amount involved is $5,000,000. Colonel I. N. Pelton of Spokane and Senator Turner of Washington will leave at once for England, it is said, to close the deal. An examination of the property has just been completed by Edgar Rathborne and W. Hamilton Merritt, and their report is said to be favorable. It is rumored that a number of smaller mines near the Le Roi will be included in the deal."

A Sandon special to the *Kootenaian* says the Last Chance mine and group, owned by E. H. Thomlinson, F. A. Wood and Dr. Hendrix, has been sold. The figure was $225,000, practically cash. Scot McDonald, manager of the Payne, and a Mr. Biggerstaff acting presumably for the McCunes, were the purchasers. The mine was examined this week by Mr. McDonald and the deal was closed on the day of examination. The actual transfer has already taken place and Mr. McDonald s now in charge.

Supt. Field of the Wonderful Mining Company in the Slocan figures that were the entire output of that mine for the past thirteen months put upon the market at present prices he would receive only $2581.93 less than at the best figures of a year ago. Calculating the Wonderful output at the best prices of a year ago, silver at 66 cents per ounce and lead at 2¼ cents per pound, which is at the rate of 3 cents less duty of three-quarters of a cent, the mine produced 535 tons of ore, which yielded silver and lead as follows, calculated at highest prices:

62,171 ounces silver at 66c	$41,032 86
732,604 pounds lead at 2¼c	16,483 69
Total	$57,516 55
Average value per ton	107 50

Taking the present market prices and making the same calculation, the tariff on lead 1⅛ cents, the price is now 4 cents per pound, which leaves the net 2¼ cents. There is a reduction of $2.50 per ton on freight.

62,171 ounces silver at 56¾c	$35,282 02
732,604 pounds lead at 2¼c	18,315 10
Freight saved on 535 tons at $2.50	1,337 50
Total	$54,934 62
Average value per ton	102 68

He says Slocan mines can stand a reduction in silver to 40 cents and still show profits.

The Supreme Court has decided in favor of R. T. Daniel in his suit against the directors of the Gold Hill Mining Company, taxing the costs to the latter. This is the case in which the directors attempted to dispose of the Gold Hill mine to themselves by selling to the brother of the president, thereby shutting out the stockholders. Daniel, one of the stockholders, took the case to the Supreme Court. The case hinged largely on whether property owned by foreign companies in British Columbia was controlled under the laws of the country in which the company was organized or the laws of British Columbia. This decision determines that henceforth the operation of all foreign companies must be governed by the British Columbia statutes.

In Slocan more men are being taken on at the Whitewater mine. It is the intention to have ninety men at work before winter.

The galena property on Ten Mile, the Enterprise, near New Denver, was closed down this week, and forty men are out of employment. Supt. Covington says the mine will soon be reopened on a $3 a day basis.

At Trail creek the Monte Cristo mine has shut down.

The Fern mine, three miles from Hall's siding, is a free milling property, and the machinery now in course of erection is among the largest in British Columbia. The battery, which is 32x40 feet, includes twenty stamps and eight vanners, with ore bin 24x4 feet. The boiler has a capacity of 240 H. P. and supplies a driving engine of 165 H. P. The machinery is supplied by the Union Iron Works of San Francisco, and is being erected under the supervision of F. M. Barr. Forty-five men are employed under Supt. Veitch. The mine itself is situated quite close to Hall creek, so that at certain seasons water power sufficient to drive the battery will be available. At present 1300 feet of work has been done on the mine, including two tunnels of 350 and 500 feet respectively.

The Golden *Era* thinks the provision in the mining law which gives claim owners the privilege of commuting assessment work, by payment to the public treasury of a sum equivalent to the cost thereof, is one of the most mischievous enactments of a Government famed for the trouble-breeding tendency of its legislation. Our contemporary very properly says that the country wants development of its mineral resources, and that any provision which enables claim owners to escape development work is "against the best interests of the mining industry." The man with money is given an advantage over the man without money. We are not aware to what extent this provision has been taken advantage of. Claim owners would surely prefer to expend $100 a year upon their claims rather than pay that sum to the Government and have no development work to show for it. Nevertheless, the regulation is an invidious one, and cannot serve any good purpose. Its only effect when taken advantage of must be to reduce the amount of development work, and to that extent poor men are deprived of work which they would get if there was no commutation provision.

Rossland *Miner*: The Hall Mines smelter, under the direction of R. Hedley, is making a record. One day during the past week 272 tons of ore were smelted. The only trouble encountered has been in the granulation of slag, the water not being sufficient to properly take care of this. A large amount of blister copper has been produced and started for its destination at Swansea, Wales. Both the roasting and calcining furnaces have been kept busy producing copper.

ALASKA.

T. S. Nowell, president of the Berner's Bay Mining and Milling Company, speaking of the quartz gold-bearing vein at Berner's bay, says the ledge averages 32 feet in width and has now been traced 4000 feet. The mill test of ore taken from the ledge runs $50 to the ton on an average. The new discovery will necessitate the enlargement of the stamp mill.

Record: The Nowell Gold Mining Company keeps two giants constantly turning over the gravel in their Silver Bow basin placers. The bank increases to 100 feet in thickness as Ice gulch is approached. In former years the old miners worked some very rich ground in that gulch, but the depth of gravel was too great for them to reach the bedrock by their methods of shoveling in and with no outlet for tailings.

The stamp mill at Funter bay is now running, former delays that arose having been overcome, and new developments on the Boston & Alaska Company's properties at that place will now go ahead. The mill will be enlarged and a working tunnel to tap the veins started in from the beach.

In the Bald Eagle mine at Sum Dum the tunnel is now in 1800 feet, and a body of ore ranging from 5 to 7 feet in width has been opened out. It is the intention to extend this tunnel on into the Sum Dum Chief, the extension above, and there attain a depth of 2000 feet on the vein. A new mill of ten or more stamps will be erected on the beach—a distance of two miles from the mouth of the working tunnel, the two to be connected by a traction tramway.

The Treadwell (Paris) now has a depth of 225 feet, of which 150 feet is below sea level, and the body of ore exposed is of such great extent that it is found expedient and necessary to double the capacity of the present enormous plant to one of 280 stamps. The Mexican has attained a depth of 220 feet below the working tunnel, and development work on the Ready Bullion has reached a depth of 500 feet. The deepest workings in Alaska are in the Comet mine at Berner's bay, a crosscut tunnel about 1700 feet in length tapping the vein 1000 feet deep. The Kensington vein in the same locality will in the near future be cut at the 1400-foot level. The workings on the Glacier and Silver Queen mines at Sheep creek have reached depths of 350 feet. The shaft on the Bald Eagle mine at Sum Dum is 350 feet deep, but the working tunnel continues on, and a much greater depth is now reached. This tunnel will be driven on into the Sum Dum Chief and a depth of 2000 feet reached on the vein.

THE KLONDIKE.

The steam tug Holyoke, at Port Townsend, Wash., Sept. 29, eighteen days from St. Michael, reports that the statement that there are three tons of gold at St. Michael awaiting shipment to the Sound in the steamer Portland is untrue: that unless the gold arrived from Dawson after the tug sailed, very little will be brought down before the river opens and the boats get down next June. Travel from St. Michael up the Yukon was still going on when the Holyoke left, but the river was not expected to remain open longer than between the 1st and 10th of October. People at St. Michael are well provided with the necessaries of life for winter and many of them are engaged in building boats which will be operated on the river next season.

UTAH.

R. C. Chambers, in speaking of the recent advance in silver quotations, states that this will have no effect on the Ontario company in the way of resuming work at the mine, unless silver should go to 70 or 75 cents.

Park *Record*: It is becoming more evident every day that the time is not far distant when silver will be rated here, as in Butte, Montana, simply as a bi-product. In ten years from now Park City will be as noted for its copper and gold production as it is now for its silver and lead.

Mercur *Miner*: The semi-monthly shipment of cyanides from the Geyser-Marion this week amounted to $8,400.

Tribune: Philo T. Farnsworth, who has just returned from the Horn Silver, of which he is the manager, says the output of the old bonanza, which has paid over $5,000,000 to its stockholders, while disbursing nearly that amount for supplies and among those employed upon it, has been steadily increasing since the advance in lead began, and that he hopes to keep it up steadily. At present he is sending out about 1200 tons of ore per month, which, with the advance in the lead market, is earning the company a good margin; and should silver advance, the mine will be in as good condition as at any time in its career. Of the property of the Austin Mining Company, Manager Farnsworth says the mill is operating with perfect satisfaction, and that the property is on excellent foundation at this time.

The Bingham *Bulletin* says that a series of leaching experiments, made during the past month by H. G. Bowdich, have been attended by what appears to be important results. He has a miniature leaching tank charged with 200 pounds of dirt scraped from the surface of the All's Well copper claim. The stuff was first assayed by Cowan and found to contain about 4½ per cent copper. In a precipitating vessel loaded with scrap iron, under the tank, were several pounds of copper, which had also been assayed, and the certificate showed it to be 86 per cent pure. The run was not fully completed, but evidently a five-pound ingot will be obtained from the 200 pounds of ore. Mr. Bowdich seems to have accidentally discovered a new combination of chemicals, else he is utilizing an old and disused one, the most expensive ingredient of which is common salt, with which he can extract the mineral from oxidized copper ore for an incredibly small sum. Thus, the cost of leaching the 200 pounds was 12½ cents, though the fluid agent, after precipitation, can be used over and over again by simply adding to it. Mr. Bowdich claims it is so powerful and searching that it will readily dissolve and leach dirt as coarse as fine gravel, barring base matter, and that to prepare ore for the tank it is only necessary to run it through rolls. He concludes that if a plant capable of treating fifty tons per day were operated, the extreme expense need not exceed 45 cents per ton.

IDAHO.

At the Bunker Hill & Sullivan, Kellogg, when the new air compressor at the mill is finished an electric plant will be put in there and the power to light the mine will be generated at the mill.

The Yellow Jacket 60 stamp mill at Yellow Jack creek, fifty miles west of Salmon, has been idle for eight months, owing to a miners' strike. Forty men at the mine are doing development work.

F. D. Howe, manager of the Hidden Treasure mine at Neal, says a 10-stamp mill is to be erected on the property at once. Later, a cyanide plant will be put in.

Hailey *Times*: The cyanide works at the Camas No. 2 are in successful operation; the first lot of forty-five tons put through the tanks yielded 90 per cent. There is an excess of ferric sulphate and of sulphate of copper in the tailings. The iron obstructed the action of the cyanide and the copper had a tendency to precipitate. Metallic copper was found in the wash water. It was liable to coat the pipes and make base bullion. To offset this and prevent the copper from coming into contact with iron the pipes were lined with rubber paint. The works will leach forty-five tons of tailings per day. There is about $1 worth of silver in the ton of tailings; but no special effort is made to save over 50 per cent of this. There is about $6 in gold per ton, and 90 per cent of this is saved. The product is, therefore, between $200 and $250 per day—of which $200 or thereabouts is profit to the Recovery Company and the owners of the Camas No. 2.

Thompson and Cusic, of Butte, for Snake river placers have automatic concentrator of grizzly, a smooth steel plate perforated and counter reamed on the under side. In ground sluicing the fine gold and black sand passes through the grizzly into a sub-sluice or undercurrent. The concentrates then flow over copper plates, when the undercurrent forces them through a hopper and then to a tank. Two diverting blades of copper are placed opposite the feeding hopper on the floor of the tank, over which is placed a half disc, the circular edge of which is set above the mouth of the hopper, the straight edge sloping downward toward the bottom of the tank, and practically submerged in quicksilver. By this means all the concentrates are passed under the disc, and are drawn upward through the quicksilver by the blades of the sand elevators which drive the sand into the top of the tank. The sand is skimmed from the surface of the quicksilver and carried to the tail sluice. At the top of the tank there are four side plates at equal distances, the water circulating around the tank by the motion of the elevator blades, which create an eddy between each of the plates and forces the water and sand to the quicksilver again. The half disc, side plates, elevator blades and full disc which cover the top of the tank, are all plated to catch escaping particles of gold. The larger machines will operate directly on the end of the ground sluice or tail-race, working automatically. Driven by horse, steam or water power, it is estimated that the machine will work 50 to 1000 cubic yards per day. A working model is exhibited in Walkerville, Montana.

MONTANA.

The Toledo Mining and Smelting Company's smelter at Brandon is now running. An examination into the cause of the trouble showed that the smelter was all right, but the fluxing was all wrong.

At Sylvanite fifty men are at work on the gravity car line and Gold Flint mill. The mill will commence operations November 1. The Gold Flint is opening up a 100-foot level. The vein has been cut across 12 feet, all in ore, and the hanging wall is yet to be reached.

The new 25-ton concentrator for the Buckeye mine, on Basin creek, about fourteen miles from Basin, is nearing completion and will be in operation within three or four weeks. The mine is now shipping some crude ore to the East Helena smelter.

The southern reserve of the Blackfeet Indian reserve is reported already lined with prospectors awaiting the proclamation of President McKinley restoring that area to the public domain. There are reported to be 200 on the border, three-fifths of whom know where to jump to when the news of the opening of the reserve should be heralded. If the opening day is not announced before spring, much suffering will be the lot of many of the men, as they are not prepared to withstand the winter season there.

The Butte *Miner* reports that the Diamond Hill mine, in that section, is producing. Eighty men are employed. B. F. Fisher, late

of Grass Valley, Cal., is superintendent, and he has installed a satisfactory cyanide plant.

SOUTH DAKOTA.

Pioneer: It looks as though the Harney Peak Tin Mining & Manufacturing Co., unlimited, was going to take the advice of Dr. McGillicuddy and Prof. Smith to "get all the machinery together at a central point, put it in repair and sell it." This, with a number of splendid ranches owned by the company, seems to be all the available assets for an expenditure of some two and a half million dollars. This expenditure was made largely upon the report of Prof. Vincent, the eminent expert, who was probably mistaken in his conclusions. During the days of its promotion, Rapid City people declared that there was "enough tin in the Harney Peak mines to roof the entire vault of heaven."

COLORADO.

Denver branch mint gold bullion receipts have been computed for nine months of '97. The receipts during September aggregated $1,149,365 59; during September, 1896, $443,-356.74. During the nine months from January 1 to September 28 the receipts aggregated $8,388,088.56; for the same period of 1896 the aggregate amount was $3,128,436.16.

A Denver special says Leadville representatives are there to get the various railway lines going into Leadville to reduce the rates now in vogue for the transportation of ore. The present rate on ore valued at $100 per ton and less is 22½ cents. The low price of silver cuts off the profit, and if not remedied several of the Leadville mines must stop operations. It is believed the Rio Grande, Midland and Gulf roads are disposed to make the desired reduction.

The production of Cripple Creek is said to be by those well informed still far in excess of the reduction capacity. The Victor, concerning whose enormous output it is unable to market, much unfavorable comment has been excited, produced 12,000 tons of ore last month without stoping, and none of this, or practically none, can be treated at the Florence works, because of the glut of custom ores.

Speaking of the condition and prospects of the Argentum-Juniata mine, Aspen, Colo., Manager Palmer states that during the past year there has been put in the mine two triple expansion pumps of a capacity each of 1000 gallons a minute under 1000 feet vertical lift. These handle the water most satisfactorily, the flow being 1020 gallons a minute on July 1, '97, as against 760 gallons on July 1, '96. The average water flow for the year was 825 gallons a minute. There were 5004 feet of development work performed and 480 sets of timbers put in, covering 2223 feet of workings. The gross value of the ore taken out of the mine was $138,930.48, and the net cash value, after deducting sampling, smelter and railroad tolls, reached $103,121.64. The total tonnage was 4,203,016 and the average net returns per ton was $24.54. The cost of operating the property was $178,155.78, The net loss to the company for the year was $67,249.76. The resources of the company are placed at $2,801,885 97, property interests being valued at $2,628,929.89 and a cash balance of $24,476.31. The credit balance July 1, '97, is $189,495.53, as against $256,790.29 July, '96.

The net smelter and mill earnings by the Elkton Consolidated Company for August are shown by the following table:

	Grade.	*Gross.*	*Net Returns.*
153¼ tons	1 and 2	$24,529 20	$22,154 45
695 3-5 tons	3d	20,837 20	13,604 61
2 cars	1 and 2	.....	$ 4,000 00

* Estimated.

Total net returns, $39,759.06. Mine operating expenses for August (estimated), $14,000; net earnings (estimated) $25,758.06. The main shaft will be sunk an additional 200 feet.

By a mining deal, involving $175,000, the Portland Town and Mineral Company has passed into the hands of the Gold Knob Mining Company; S. T. Smith is president, N H. Cone manager.

J. Kurrie cables from London that he has succeeded in raising the $275,000 necessary to take up the bond on the Squaw Mountain tunnel, says the Cripple Creek *Times*. It is capitalized at $2,000,000. The tunnel has been driven nearly 2000 feet into the mountain, and, while it has shipped ore of a paying grade, it has never been regarded as a rich producer.

Mining Investor: Miners are expecting better prices for their ore shortly. They hold to this theory from the fact that all the chlorination and cyanide mills that depend upon this camp for ore are increasing their capacity. The Brodie management has lately received instructions from the directory to put in additional machinery and tanks that will practically double the capacity. The works at Gillett are being enlarged. The Page plant, at Florence, will be in the market within the next thirty days. The big mill at Colorado City is constantly adding to its capacity, while the Requa gulch plant has so thoroughly demonstrated that its work is a success that it is said that money sufficient to many times double the plant is ready for investment as soon as the smelting companies that have in the past received some of Cripple Creek's ore have their agent in camp looking out for future contracts, while a smelter that has never heretofore been in the field is now out fighting for business—the Arkansas Valley of Leadville. With all this competition there can be but one result, a cut in the treatment charges. The miner looks on complacently and hopes that the war may be not only a long one, but a hot one as well.

NEW MEXICO.

The value of the output of Hillsboro mines for 1896 was $428,399, an increase of nearly $200,000 in five years. The output for the week ending September 16, 1897, was 115 tons.

ARIZONA.

There are none of the mines at Tombstone now being worked on company account, nothing being done except by chloriders, who are making fair wages. There is at present a demand for fluxing ores, and some business is being done in that line.

Harqua Hala reports that the company who have leased the Bonanza mine in that district have closed down the cyanide works, having worked up all the tailings and on the first of October their lease expires.

Nine copper claims adjoining the property of the United Globe, at Globe, have been bonded by C. A. Cutting of the Old Dominion Copper Company, for twelve months; $40,000 the price to be paid for the property, $2000 to be expended in development work.

Yuma *Sentinel*: Frank Vomicil, on his lead mines in Castle Dome, will start thirty men and will ship fifty tons a week to San Francisco.

CANADA.

The Toronto *World* says it has the best reason to believe the Sultana mine at Rat Portage has been practically sold to English capitalists for a million and a half dollars.

SOUTH AFRICA.

South African *Journal*: Slimes treatment at the Bonanza.—As the slimes-pulp leaves the tailings plant it receives a supply of slaked lime. Hitherto the lime has been fed by hand into the launder, which conveys the pulp to the spitzkasten, separating the more solid contents from the water; the proportion used to be six bags to the 60 to 70 tons of dry slimes produced per day. Now a small lime-mixing machine is used, which has decreased the consumption of lime by 66 per cent. The machine consists of a small water-wheel driven by a stream of water flowing from a pipe of about ¾-inch diameter; the axle of the wheel prolonged into a box, and is set with knife blades capable of taking any angle to the longer axis of the box. Into the box is fed, from a hopper, finely ground lime, the speed of feed being regulated by a feed-pipe which moves up or down vertically, and which provides a larger or smaller crown of lime as the bottom of the pipe is farther from, or nearer to, the bottom of the box. The knife blades throw, at each revolution of the wheel, a small quantity of lime through a door in the bottom of the box into the launder feeding the slimes-pulp into the spitzkasten. The lime serves two purposes: it neutralizes any acid there may be in the pulp; but it performs the infinitely more important work of causing the rapid precipitation of the solid contents of the pulp. The proportion of slacked lime to the ton of solid slimes works out (on the basis of two bags at 175 lbs. to a mean daily output of 65 tons) at obout 5¼ lbs. To allow of the lime being properly dissolved the length of launder is some 100 feet.

The spitzkasten (of 15 compartments) measure about 25 feet long by 15 feet broad by 5 feet deep. The dimensions of this concentrator are a very important factor in the problem of precipitation, for the superficial area is a matter of less importance than the slow speed of the current through it; wherefore comparative breadth is to be sought for more than length. With properly regulated flow, the water overflowing at the end of the spitzkasten is so clear that it is to be returned directly back to the battery for use over the plates.

This detail—the precipitation of slimes by admixture of lime, and the return of the clarified water to the battery—is a matter of importance to every gold mining proposition to which a superabundant supply of clear fresh water has not been vouchsafed; for not only is great economy in pumping effected, but after the water supply has circulated once or twice it will be appreciably alkalized and will be so much the more suitable for battery use.

The clarified discharge from the end of the spitzkasten thus flowing to the mill, the product of the lower discharge runs into a circular vat with peripheral overflow. The settling of the solid portion of the pulp—induced by the mechanical action of the lime—is so rapid that it is accomplished in about 2½ hours, where without the lime it would take not less than 12 hours. This also is a detail of great importance to the gold mining industry throughout the whole world, for it practically amounts to this—that a saving of some four-fifths can be effected in the prime cost of construction in the matter of vats.

After this curtailed interval of settlement, the clear supernatant water is decanted off from the settling vat and finds its way back to the mill service, and the concentrated slimes are pumped into the agitators. Here the KCy solution is mixed (at a strength of from .006 to .008, equal to a consumption of about .2 lbs. KCy to the ton of solid slimes) with the charge and the whole agitated by two bare revolving arms. It is during this period of agitation that air will be sprayed into the charge for the quicker and more perfect dissolution of the gold. At present the necessary apparatus is not at work. In about four hours all gold is dissolved, and the charge is pumped into a settling tank, whence the auriferous solution is decanted off in a state of remarkable clearness to the intermediate clarifying tanks. These are two in number, the lower one containing a sand filter which removes every trace of turbidity. The pellucid auriferous solution is then delivered at the precipitation houses for electrolytic precipitation. It is worth noting that a precipitating box of a different design is used for this work at the Bonanza just now. It has a working capacity (at a first cost of £600) equal to that of four boxes (at £400) of the older type.

The muddy deposit left behind in the settling tank is then treated with a weaker cyanide solution, known as the first wash; some 600 tons of this solution are used daily at this plant, of which one-third reaches the precipitation house, and two-thirds are sent to the tailings plant—where it is used in the preliminary washing of the sands to be cyanided.

During the last dry season the Bonanza had to pay at the rate of £185 a month for pumping charges, in order to secure a proper water service for their mill; to-day under precisely similar conditions, the company is spending £25 a month—thus effecting a saving of £160 a month by returning the water (clarified from slimes by lime) straight from the slimes plant to the mill. Moreover, the slimes process is so successful that there is not the reason which formerly existed for preventing the creation of slimes in milling. Under the old mining method, screening of 400-mesh was used to prevent creation of slimes; the sands reaching the tailings plant were, therefore, comparatively coarse and held a certain proportion of locked-up gold which the cyanide solution could not reach. Under the present method, screening of much finer mesh (1,000) is used, a larger percentage of the gold is caught in the battery boxes; the sands cyanided are finer, and a larger percentage of the locked-up gold is attacked by the cyanide solution; and the only difference is that the proportion of slimes in the mill pulp is 30 per cent now, where it used to be 20 per cent.

Coast Industrial Notes.

—Recent shipments of livestock from southern Oregon are unusually large. The amount of money left in the vicinity of Ashland is $29,500. The cattle were shipped to Cedar Rapids, Iowa, and to Atkinson, Illinois.

—Large naval docks will be constructed at Goat island, at Mare island and at San Pedro, Cal. The cost of such improvements will aggregate about $4,000,000. The docks at Goat island and San Pedro will cost $1,500,000 each and that at Mare island $1,000,000.

—The Alcatraz Asphalt Company expend considerable money in Santa Barbara county, Cal. At their mine in the Sisquoc district, near Gaviota landing, the company will build a wharf, reservoir and other works. They have on hand for the new pipe line 500 tons of pipe.

—The Austin (Nev.) *Reveille* says: Cattle are selling over there at the following prices: Yearling heifers, $10; yearling steers, $13; two-year-old steers, $18; three-year-old steers, $23 50; dry cows, $15; cows and calves, $18, making an average price of $15.50.

—The Santa Rosa and Sonoma County, California, Electric Railway has finished fifteen miles of surveying in the vicinity of Sonoma, but will do no more active work, pending the disposal of $400,000 of its bonds. It is proposed to build seventy miles of electric railroad in Sonoma county, connecting with the shipping point at Embarcadero.

—The first California Limited east-bound will leave Los Angeles on Tuesday, Oct. 26th, going through to Chicago in 71 hours and 43 minutes. Immediate connection will be made at Barstow with sleeper leaving San Francisco on Monday night, Oct. 25th. The train will leave east-bound Tuesdays and Fridays, connecting with trains leaving San Francisco Monday and Thursday afternoons. The train will consist of ten-section double drawing-room palace sleeper, buffet smoker and dining car through to Chicago, also palace sleeper through from California to St. Louis via Kansas City.

—During last month almost $5,000,000 worth of grain left Pacific coast ports for Europe. Thirty-five vessels sailed from San Francisco. Of these 17 carried wheat, 5 carried barley, 12 carried mixed cargoes of wheat and 1 carried 23,025 barrels of flour, which was valued at $115,112. The grain vessels took away 2,200,134 centals, valued at $2,374,760, and general cargoes of canned goods, etc., would foot up another half million. Oregon sent 7 vessels with 352,206 centals, valued at $621,513, and 2 vessels with 50,075 barrels of flour, valued at $200,500, while Seattle, Wash., sent 3 vessels with 160,310 centals, valued at $242,240. Besides these, 28 lumber vessels have sailed for foreign ports with cargoes valued at over $200,000.

—The Union Pacific Reorganization Company proposition for the settlement of the company's debt to the United States will be accepted, the Government mortgage will be foreclosed, the road sold and the company reorganized. The Reorganization Committee will bid for the road under the foreclosure sale, the sum of $45,754,059. The principal of the debt of the Union Pacific to the United States was $35,539,512. A portion of this has not yet been advanced by the United States. The interest paid to the Government amounts to $36,954,893. The whole indebtedness on the first day of July, 1897, was $70,494,405. The sinking fund of the Union Pacific in the hands of the treasurer of the United States on the same day was $17,738,209. After deducting the sinking fund, which is an asset of the company in the hands of the United States for the purpose of paying the debt of the Union Pacific Company to the Government, the sum of $28,015,805 remains to be paid. That is the only sum which Fitzgerald's Reorganization Committee will be required to pay the Government. The loss to the Government is the difference between $53,000,000, the net amount due the Government in round numbers, and the $28,015,805, making a loss of nearly $25,000,000.

—Siberia's railway time between Tscheljabinsk and the bridge over the Obi, 930 miles, is fifty-one hours. Fare: first-class, $39; second-class, $23.25, and third-class, $15.75. As often happens in Russia, the travelers bring their own beds and samovars, or tea urns, with them, besides other articles. Refreshments are supplied by the peasants of the neighborhood region, who come down to the stations with bread, cheese, butter, meat and baked fish. As one-third part of this gigantic railway is now ready, $150,000,000 out of the estimated general cost of $345,000,000 has been spent. Colonization has greatly increased along the line, and the hope of the Russian Government is being rapidly fulfilled, that the cultivation of the swampy Taiga district on both sides of the line will proceed. There is no data as to the influence of the construction of the line upon trade; there can, however, be no doubt that this influence does exist to a considerable degree, as also an influence for good as regards the administrative system in Siberia. Its importance from the point of view of transporting troops is clearly seen from the fact that Russia at this moment has in eastern Siberia alone an army of 60,500 men.

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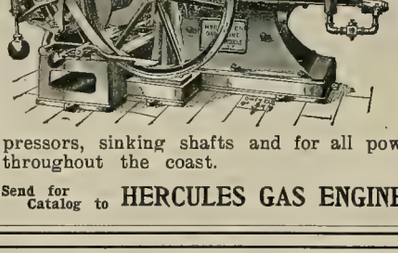

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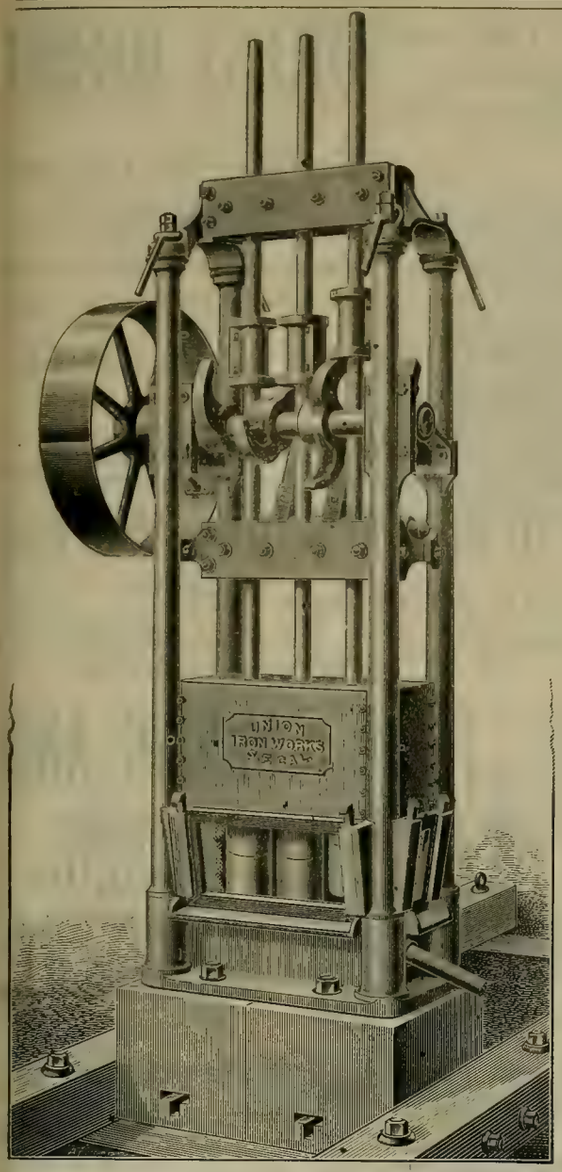

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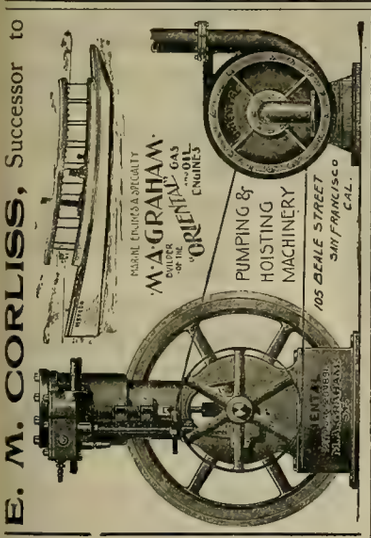

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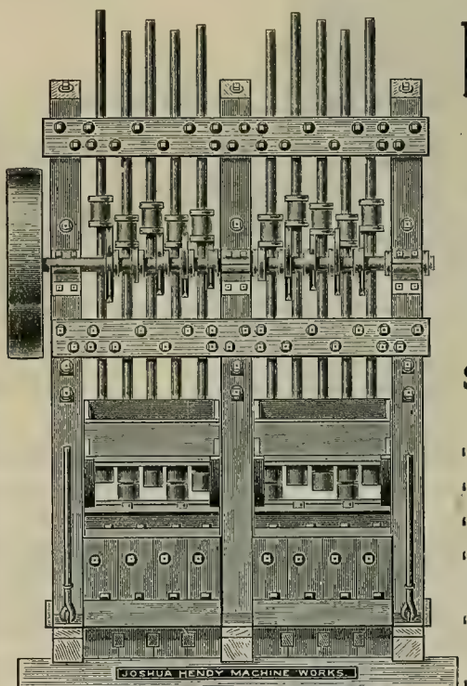

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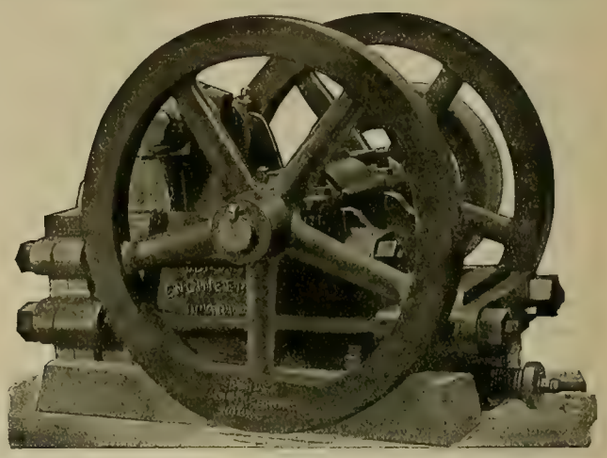

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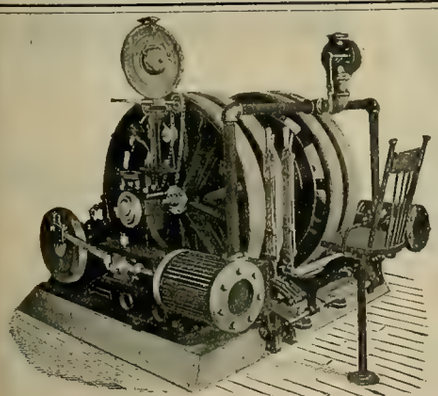

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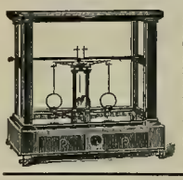

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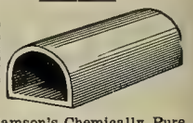

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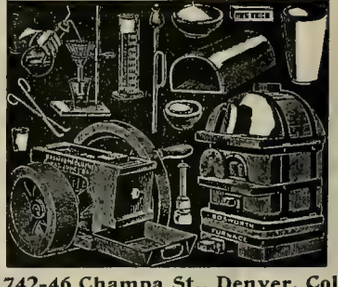

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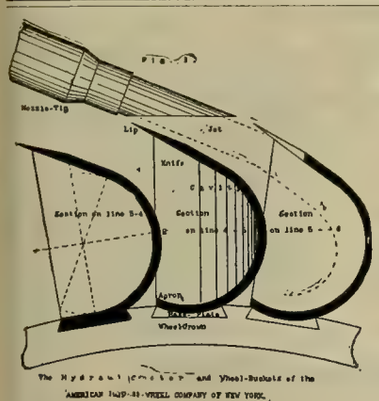

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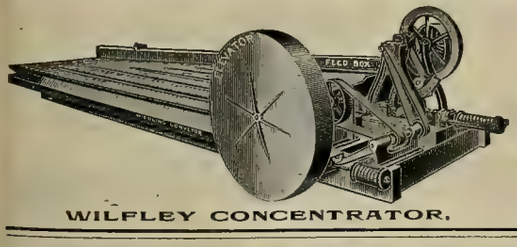

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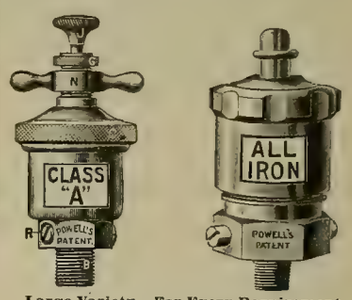

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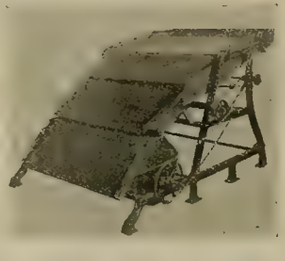

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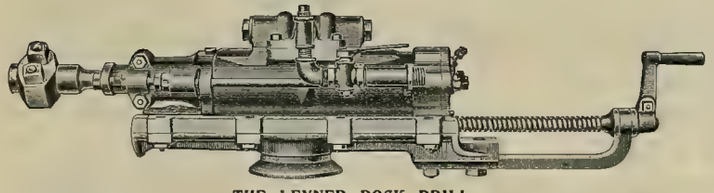

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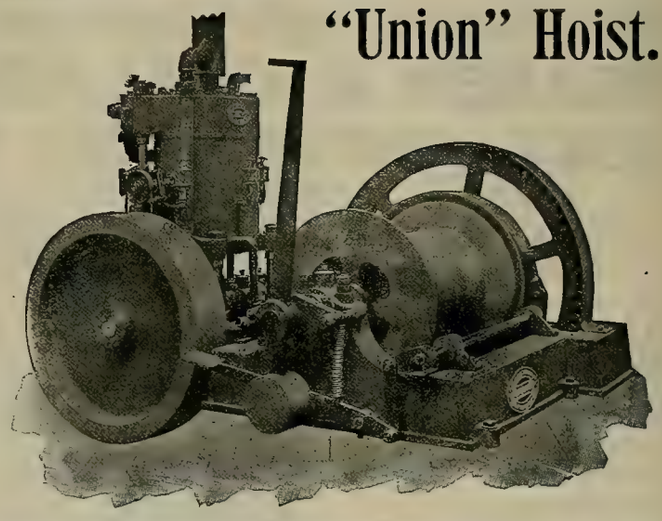

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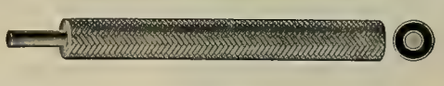

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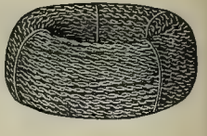

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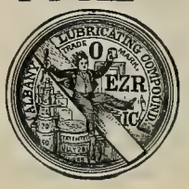

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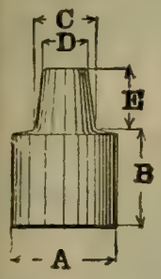

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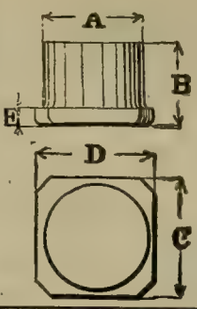

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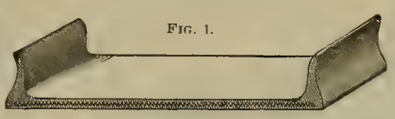
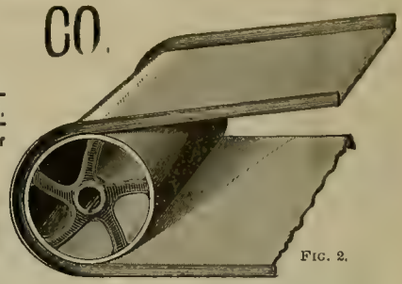


FIG. 1.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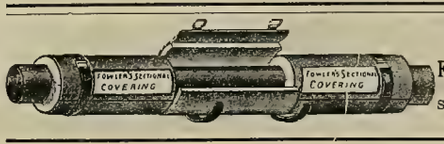

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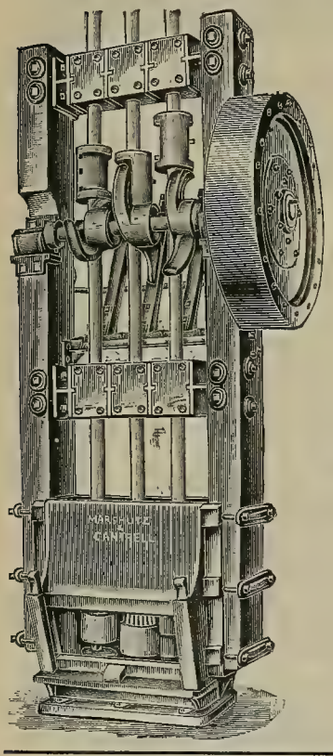

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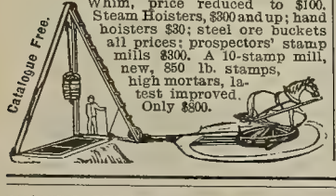

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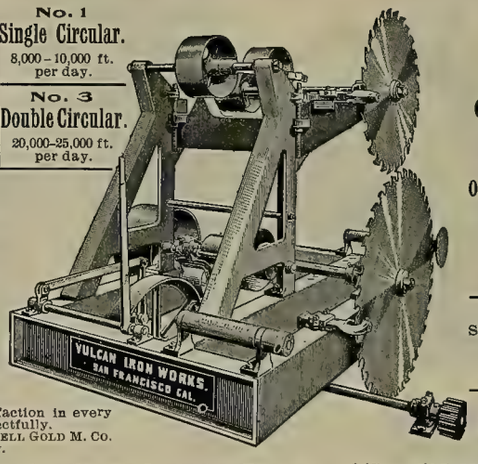

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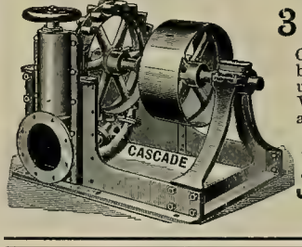

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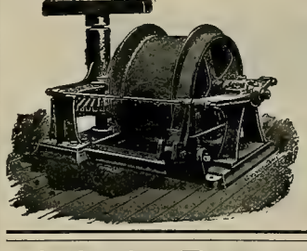

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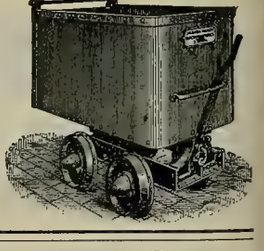

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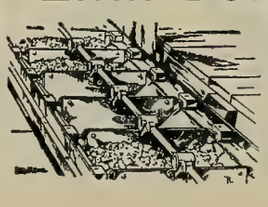

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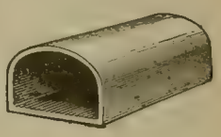

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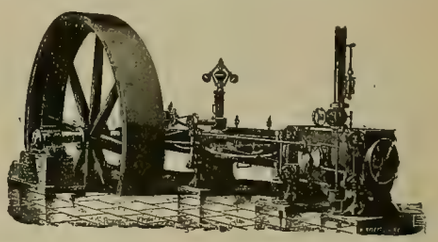

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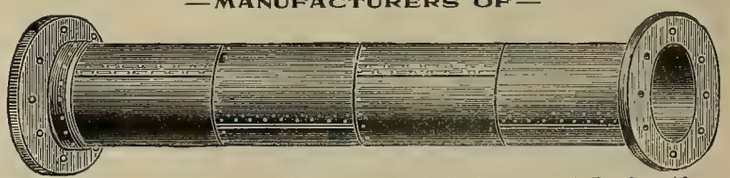

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WELL CASING.
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MINING PIPE For Hydraulic Purposes, made from the Best Sheet Steel, Single or Double Riveted. ✦ Oil and Water Tanks, Ore Buckets, Ore Cars, General Sheet Iron Work. | THOMSON & BOYLE PIPE CO., 310-314 Requena St., Los Angeles, Cal.

Market Reports.

The Markets.

SAN FRANCISCO, Sept. 30, 1897.

Importers and manufacturers' agents report the jobbing trade taking quite freely in almost all lines. They state, also, that jobbers are disposed to carry more in stock. The distributive demand in about every line is largely in excess of that ruling at the corresponding time last year. The improved business is reflected in larger bank clearings, which aggregate from 20 to 40 per cent more than at similar dates in 1896. As there is no speculative movement in anything more than last year, the increased clearings show the improved condition of trade. With manufacturers, so far as we are able to learn, the feeling is one of great confidence in the future. They hold to the opinion that their business will be larger next year than before known. Some, it is stated, are enlarging so as to better handle the expected business. Active railway construction and large improvements in other directions are favorably commented on for next year's business.

The local money market is working on easy lines. The disposition appears to be to put out more money, and therefore approved loans can be placed more advantageously than a short time ago. This, no doubt, is actuated by accumulating funds in banks, with very little call for accommodations, and the present outlook is favorable for a continuation of funds accumulating. There is nothing as yet in sight calculated to promote much of a speculative or investment demand for funds. There is a good inquiry for good to gilt edge bonds. The imports of gold from Australia cause stiff rates to rule for exchange at New York, notwithstanding free shipments of produce to the East. New York mail advices report: "The money market is quite brisk at present and the advance in rates has materially helped business in loans. The principal banks yesterday had plenty of applications for time money on a 4% basis for sixty and ninety days, which is a material improvement over rates lately ruling. Money brokers report a fair business these times, and there is no doubt that a good many people have provided themselves with time money, who two weeks ago did not appear to want any. The call money market is firm on a 3% basis at most of the banks. Borrowers quite generally have reconciled themselves to paying the higher rate and will probably prove equally docile when the rate is advanced to 4%, as many expect will be the case before very long."

New York Silver Prices.

NEW YORK, Sept. 30.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	26⅛	57
Saturday	26⅜	56¼
Monday	26⅛	56
Tuesday	25⅛	55
Wednesday	25	53½
Thursday	25¼	54¼

	Copper.	Lead.	Iron.	Tin.
Fri.	11 25 @11 25	4 35	9 50@12 25	13 60
Sat.	11 25 @11 25	4 30	9 50@12 25	13 60
Mon.	11 15 @11 25	4 32½	9 50@12 25	13 60
Tue.	11 10 @11 25	4 30	9 50@12 25	13 62½
Wed.	11 10 @11 25	4 32½	9 50@12 25	13 62½
Thur.	11 10 @11 25	4 32½	9 50@12 25	13 62½

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	15c Prem
New York Telegraphic Transfer	17½c Prem
London Bankers' 60 days	$4.83½
London Merchants	$4.83¾
London Sight Bankers	$4.85¾
Refined Silver, per oz., 1000 fine	54¼
Mexican Dollars nominal	45@46

SILVER.—The market sold lower the past week, but towards the close it strengthened slightly. It is stated that when the price went to 59½ last week it was done by short sellers covering their September contracts, and as soon as they were supplied prices shaded off. It is quite impossible to get at the true situation of the market the East and abroad, owing to so many conflicting reports put afloat. There is no question, though, that in England, Germany and France, in the manufacturing districts, the sentiment in favor of silver is growing, which, combined with farmers, is having a strong influence with the rulers in those three countries.

The best factor in the American political-financial situation, says an Eastern authority, is not the settlement of the tariff or the rise in wheat, but the fact that the silver problem has passed to the other side of the water, to become a question of continental and English-India politics and finance. We have very good authority for saying that this silver problem is troubling Lord Salisbury and his Government very much more than is generally supposed. The uprising in India is entirely in the wheat sections, and there is only one standard for bread in India and that is silver. The natives until recently have known no difference between the coined rupee and the silver bracelet when it comes to money worth or intrinsic value. The people of India have been accustomed in times of need to make coin of their silver reserves whether they were in the form of bullion or of ornaments. When silver ornaments were purchased they were weighed in the scales with rupees for balance, and the difference between their weight in rupees and the asking price was the measure of the workmanship. Now the rupee being no longer coined, has money value exceeding the intrinsic value of silver and the people in distress who find wheat selling at unheard-of prices, measured at their silver standard, are unable to go to the government with silver and return with coin. Of course the absence of rain, the two successive crop failures, the price of bread and the failure of silver to have its rupee value are all placed at the door of the foreign rulers and when it comes to instructing 300,000,000 of India men in the beauties of gold pounds, silver shillings and copper pence and their theoretic fiat and intrinsic relations, American problems become comparatively insignificant to them. It was a straight out issue here as to whether America would defend bimetallism for the whole world by throwing 70,000,000 of producing Americans upon the India side of the question, but the British Empire embraces the gold standard of the East and the silver standard of the Orient, and the question must be ever with her until it is finally settled. When the crops fail in Europe, Americans can afford to laugh over trade discussions, and if the English and continental governments will settle the silver question before the silver countries come again to the front with wheat for export, American politics and American finance will have absolutely unclouded skies.

MEXICAN DOLLARS.—The market is quiet and is expected to continue so until toward the time for the sailing of the next steamer for China. Shippers in that country do not appear disposed to anticipate their wants even on a drop in prices.

COPPER.—The market has held to fairly firm prices throughout the week. The East reports an improved demand for both home and export. The consumption abroad does not show any signs of abating, but from all information at home, it seems to be steadily increasing.

Our market is quoted as follows:

Ingot casting, jobbing	13 @—
Ingot " wholesale	12½@—
Sheet copper	— @16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½

QUICKSILVER.—The market is steady, with a light demand reported.

Our market is quoted at $38 for domestic consumption.

LEAD.—The market is strong at unchanged quotations. The East reports a fair demand at full figures.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	5 00	@	5 25
Sheet	6 25	@	6 50
Pipe	5 50	@	6 00

TIN.—The market for pig is easy and for plate it is irregularly weak. The East reports cutting in prices, with the demand light.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " light, "	4 00@—

SHOT.—The demand is increasing. The market is steady.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs		$1 40
Drop, B and larger sizes,	"	1 65
Buck, Balls and Chilled, do,	"	1 65

POWDER.—An explosion at the California Powder Co.'s plant at Santa Cruz will cut off for a short time one source of supply. The demand is active for mining purposes.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9c to 11c, according to strength and quantity.

COAL.—The demand continues to show a steady increase for all grades. Foreign are stiff.

IRON.—For the season the consumption is large. The markets at the East are reported fairly active, with more furnaces going into blast.

ANTIMONY.—The market is steady.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 8c for Cookson's, 7¼c for Hallett's and 7c for Japanese.

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4½

PLATINUM.—The market is steady.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is firm.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

NAILS.—The market is firm with tendency upwards.

Wire, carloads, basis per keg			
" jobbing,	"	"	$2 45
Cut, carloads,	"	"	
" jobbing,	"	"	2 35

Chemicals.

There is absolutely nothing new to report. The expected advances do not materialize and seem to be as remote as ever. A similar condition prevails at the East, as the following mail advices from New York show: "A quiet market for nearly all lines of chemicals is still to be reported. New features are conspicuous by their absence, and prices remain almost stationary throughout."

SULPHURIC ACID.—The demand is fair.

We quote in a jobbing way at 1½c per lb for 66%.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported firm from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is easier.

We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is steady.

Our market is quoted in a jobbing way at $1.40 a pound.

BONEASH.—The demand is fair.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is firm.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firm at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is steady at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—The market is quiet at 2½c a pound from stores.

NITRATE OF SODA.—The market is steady.

Our market is quoted from store at 4c for 95%.

Mining Share Market.

SAN FRANCISCO, Sept. 30, 1897.

The market went to still lower figures on Friday and Saturday. The decline caused outsiders to sell and it also cleaned up all the weak-margined shares. Monday it opened weak until Crown Point was reached, which, under buying orders, strengthened some, causing a steadier feeling along the entire line, but particularly in the Gold Hill group of shares. Before the day passed Crown Point doubled from Saturday's figures. The street and brokers, as a rule, were puzzled over the advance, which was brought about largely through cross orders, owing to a strike in the west workings of that mine. The rapid advance brought in sellers for a profit, which brought about a decline of about 15 per cent, but this was soon regained, and yesterday it sold up to 70 cents, with Belcher scoring an advance up to 67 cents. The upmove in these two shares strengthened the entire list. It is stated that the ore struck in Crown Point is over 2 feet wide and high-grade. It is about 40 feet from the Belcher line. It is stated that it will be found better in Belcher, which, no doubt, is the cause for the advance in it. Air connection with the 800-foot level is to be made for better working. There is no denying that at several points on the Comstock the work that is under way is of an interesting and important character, and, as shares are said to be well in hand, it ought not to cause surprise if ore strikes are reported for fully thirty days or longer to come. Whilst affirming this, the writer still maintains the belief that no large body will be uncovered, or even enough to make a good-sized deal, although they are liable to go considerably higher than they closed at yesterday. This will be done by outside buying, for the public are ripe for a mining share deal, and the pools or manipulators will gratify them, to some extent, at any rate. Considerable interest is developing in the milling of low grade ore by the Gould & Curry management. It is to be hoped that it will be so far successful as to cause attention to be given by other companies to extracting and milling this grade of ore.

From the Comstock mines the official letters filed indicate continued activity in nearly all the mines, with the outlook said to be quite encouraging. But this is always the case after the public have been made to disgorge nearly all their shares. In Con. Virginia no ore was extracted the past week, but active exploiting work is being done on the 1550-foot, 1650-foot and 1750-foot levels. Nothing of an important character was developed. In Ophir they are still going west on the 1000-foot level. They struck 50-cent quartz, which is about double the assessment that will be struck before long. On the central tunnel a west crossdrift has been started from the end of the south drift. Work in Mexican is still continued on the 1000-foot level. In Utah they are still running west. Considerable interest is centered in the work in the Layton tunnel in Sierra Nevada. It is understood that before long they will commence sinking on the ore found to the east. On the 900-foot level a west crossdrift has been started. On the 900-foot level in Union they have started an east crossdrift from the south drift. They are still drifting north on the 175-foot level in Andes. The joint work by Best & Belcher and Gould & Curry on the 800-foot Bonner shaft level has been discontinued. In Gould & Curry they are cleaning out the 400-foot level to reach the old fillings so as to extract 1000 tons of ore. The work in Savage is the same as has been heretofore reported. No work in Hale & Norcross. No change is reported in the work in either Chollar or Potosi. They are still exploiting in Alpha on the 500-foot level. They are still pegging away in the west crossdrift run jointly by Challenge, Confidence and Con. Imperial. The formation is said to be favorable. They have to run about 180 feet before striking the ledge. Nothing new is reported from Challenge or Confidence. It is reported that they are getting ready to commence work on the 1100-foot level of Yellow Jacket. Work in Kentucky to the west is continued jointly by Yellow Jacket, Crown Point and Belcher. In Crown Point they struck near the Belcher line ore which averages about $100, 3 feet wide—one foot of which goes over $200. Considerable work will have to be done before they can get to the ore, advantageously. In the shuffle they may lose it for a long time to come. In Belcher they are taking out ore and doing some prospecting work. The same remarks apply to Overman and. Seg. Belcher. Good progress is being made in Justice. The ore, as yet, is low grade.

From the Brunswick lode our advices state that in Occidental the crossdrift No. 2 shows an improvement over No. 1 and it is quite confidently expected that No. 3, which will start in about eight or ten days, will show quite an improvement over No. 2. Persons interested in this mine are quite hopeful that a big body of ore will be uncovered. In Chollar they are drifting south on the 500-foot level and expect to reach the Potosi line within the next five weeks. They will probably run a crossdrift after the line has been passed a sufficient distance to admit of it. The work in Savage is practically unchanged. They will soon be in a position to exploit the 300-foot level of Gould & Curry. The other work is reported the same as last week. The market opened strong this morning with another advance in Crown Point and Belcher. The other Gold Hill shares sympathized slightly outside of Kentuck, which hung heavily. It is stated that exploiting work has been resumed in Crown Point to find the extent of the ore. It is also reported that the Belcher management is cleaning out an old upraise from its 900-foot level so as to run for the ore

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delinq't and Sale.		Secretary.
Alta S M Co, Nev	57	10c	Sept 3.	Oct 6.	Oct 27	J E Jacobus, 309 Montgomery
Altoona Q M Co, Cal	1	75c	Aug 3.	Sept 6	Oct 11	C Allenberg, 206 Sansome
Andes, S M Co, Nev	44	10c	Sept 1.	Oct 4.	Oct 25	J W Twiggs, 309 Montgomery
Belcher S M Co, Nev	56	20c	Sept 18.	Oct 21.	Nov 11	C L Perkins, Mills Building
Chollar M Co, Nev	44	25c	Sept 1.	Oct 7.	Oct 28	C E Elliott, 309 Montgomery
Confidence S M Co, Nev	29	30c	Sept 10.	Oct 15.	Nov 5	A S Groh, 414 California
Con Imp M Co, Nev	39	1c	Sept 27.	Nov 2.	Nov 23	C L McCoy, Mills Building
Eureka Con D M Co, Cal	10	3c	Sept 14.	Oct 16.	Nov 6	D M Kent, 330 Pine
Gold Ridge Con M & M Co, Cal	5	4c	Aug 3.	Sept 18.	Oct 9	H Sylvester, 43 Sixth
Hale & Norcross S M Co, Nev	112	10c	Aug 18.	Sept 22.	Oct 28	R U Collins, 331 Pine
Marguerite G M & M Co, Cal	7	10c	July 28.	Sept 10.	Oct 11	F Mettman, 237 Twelfth
North San Juan G M Co, Cal	3	7c	July 16.	Sept 8.	Oct 4	H W Morris, 141 First St
Potosi M Co, Nev	48	25c	Sept 8.	Oct 12.	Nov 4	C E Elliott, 309 Montgomery
Red Cap M Co, Cal	1	$9	Aug 25.	Oct 1.	Oct 23	E deK Townsend, 125 Beale
Savage M Co, Nev	93	20c	Sept 2.	Oct 5.	Oct 25	E B Holmes, 309 Montgomery
Sierra Nevada S M Co, Nev	113	20c	Aug 18.	Sept 22.	Oct 12	E L Parker, 309 Montgomery
Silver Hill M Co, Nev	35	5c	Sept 7.	Oct 12.	Nov 5	D C Bates, 309 Montgomery

WILL NEGOTIATE with owners or their duly authorized agents only.

WILL INVESTIGATE only thoroughly bona-fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

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in that mine. To judge street reports, it looks as if several of the companies will cause more active work in their mines. Transactions throughout the day were quite large, with cross orders still in evidence as if to sustain prices. At the 2:30 session Crown Point, Belcher and Yellow Jacket sold a few cents higher than they did in the Pacific 2 o'clock informal session.

The following illustrates the changes of the week:

MINES.	Sept. 23.	Sept. 30.
Alpha	$ 17	$ 22
Alta Consolidated	11	12
Andes	17	
Belcher	29	72
Best & Belcher	71	73
Bodie		
Bullion	09	12
Challenge		54
Chollar	56	48
Confidence	1 00	1 30
Consolidated California and Virginia	1 45	1 40
Consolidated New York		04
Crown Point	33	76
Exchequer	05	
Gould & Curry	63	58
Hale & Norcross	1 20	1 30
Justice		35
Mexican	53	55
Ophir	1 00	1 10
Overman	20	28
Potosi	33	37
Savage	37	33
Sierra Nevada	1 10	1 20
Union	54	54
Utah	22	26
Yellow Jacket	37	47

Under date of Salt Lake City, September 24, 1897. J. A. Pollock writes:

The mining stock market this week was more active than for some time past. Fluctuations were very wide at times, and the prices of silver stocks were governed almost entirely by the quotations made on silver bullion. The early part of the week recorded some strong advances, but to-day the market eased off, with every evidence of general heaviness. The gold stocks were in strong demand and transactions were very large in volume. All of the gold stocks look like excellent purchases at present quotations.

No special change occurred in Ajax. The company is operating but lightly as yet at the mines, although some nice ore shipments have come into the market. Anchor continues regular operations and the stock remains listless. It now looks very much as though the Bullion-Beck will resume dividend payments in October, as the treasury holds a nice balance and the company is doing well again. The payment will hardly be over 20 cents when it does come. Increased inquiry made better prices on the stock. No particular change occurred in Buckeye. Light ore shipments are being made, and development work continues.

Without any special activity, Centennial-Eureka continued strong, with few sellers in the market. The properties are reported to be looking very well. Some considerable activity was displayed by Chloride Point, but prices were about unchanged. The Dalys were slightly stronger. Dexter continues to send in some very high-grade gold ore and the stock is receiving good support, with prices changing but slightly. Dalton and Dalton & Lark were inactive and stationary. Eagle is doing some development work. The stock was quiet and unchanged. Four Aces was slightly stronger, as the result of more inquiry.

Geyser-Marion has declared its September dividend of 3 cents per share, payable on the usual date. The contemplated changes in the directory have also been made, being completed yesterday afternoon. President Dern of the Mercur company will be president of the Geyser-Marion, having just secured a large interest, and Treasurer Dern of the Mercur company will be director and secretary. Stuart Stephensen, a prominent operator, will be the other new director. This removes entirely the old Marion interest and gives the company a conservative and able management. Three of the Mercur directors, the Messrs. Dern and secretary Airis, are now on the Geyser-Marion board. Some fluctuations occured in the stock, but the management had a very strengthening effect. I look for much better and firmer prices on the stock, and it certainly merits them. Galena was somewhat stronger, while Grand Central remained unchanged, with business light. Horn Silver did nothing on the market.

Offerings of Mercur were not heavy, and prices did not change materially. The properties are looking extremely well and are making a fine record. Mammoth was considerably stronger again. At the mine the ore showing is very gratifying, and some high-grade gold quartz is being taken out. Better prices governed on Northern Light, the support for the stock being fairly heavy. No changes have occurred at the mines, except for the better. Ontario was in fair demand and made somewhat higher figures. Omaha will be in the courts again this week.

Both of the Swanseas were again stronger, on dividend anticipations and reports of better conditions. At the close a slight reaction occurred. Swansea may pay a dividend on October 1st. Increased inquiry made stronger quotations on Silver King, which is always a strong stock, although seldom active. Sacramento was hardly as strong as during last week. No change occured in Sunshine. All preparations have been made for resuming operations, but the word has not yet been given. Sunbeam was inactive. Utah is looking well and making good ore shipments.

San Francisco Stock Board Sales.

SAN FRANCISCO, Sept 30, 1897.

9:30 A. M. SESSION.

100 Alpha	22	500 Justice	35
100 Alta	12	1000 L Wash	06
1850 Belcher	72	200 Mexican	55
600 Best & Belcher	73	300 Ophir	1 10
700 Bullion	12	400 Overman	28
150 Caledonia	50	100 Potosi	37
200 Challenge	54	600 Savage	33
400 Chollar	48	500 Seg Belcher	17
100 Confidence	1 30	300 Sierra Nevada	1 20
500 Con Imperial	03	600 Silver Hill	04
300 Con New York	04	350 Union	54
900 Crown Point	73	100 Utah	26
200 H. & N	1 30	900 Yellow Jacket	47
500 Julia	04		

SECOND SESSION—2:30 P. M.

200 Ophir	1 00	1800 Belcher	70
250 Mexican	59	150 Sierra Nevada	1 15
400 Gould & Curry	58	100 Utah	25
500 Best & Belcher	69	800 Seg Belcher	15
300 Con Cal & Va	1 40	600 Overman	25
450 Savage	30	500 Justice	34
600 Chollar	44	50 Union	52
300 Potosi	33	300 Alta	10
1150 Crown Point	76	100 Caledonia	50
1400 Yellow Jacket	44	200 Challenge	54
200 Con Imperial	03	300 Occidental	2 70
600 Kentuck	10	100 St. Louis	19
300 Alpha	20		

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING SEPTEMBER 21, 1897.

590,290.—DOOR OPENER—D. B. Akard, S. F.

590,291.—AMALGAMATOR—A. Allen, Milton, Or.

590,354.—FRUIT EVAPORATOR—W. K. Allen, Newberg, Or.

590,382.—SPRING MATTRESS—I. Allen, Lakeport, Cal.

590,398.—SUSPENDERS—J. J. Burke, S. F.

590,411.—SHOTGUN—H. A. Darms, Napa, Cal.

590,391.—RAIL CLIMBER—C. C Durfee, Los Angeles, Cal.

590,502.—SUBMARINE PLOW—C. B. Emerson, S. F.

590,309.—BOTTLE—H. P. Frear, S. F.

590,524.—EXTRACTING METALS FROM SAND—C. A. Hitchcock, S. F.

590,418.—DOOR INDICATOR—E. A. Langford, Washington, Cal.

590,335.—STEP LADDER—W. Price, National City, Cal.

590,423.—CEMENT GRAVEL MILL—J. M. Rademaker, S. F.

590,279.—LOG RAFT—H. B. Robertson, Alameda, Cal.

590,280.—EAR AND TOOTH PICK—F. E. Rockstroh, S. F.

590,281.—VALVE—J. N. Rundle, Santa Barbara, Cal.

590,442.—SEAMLESS TOOTH CROWNS—L. S. Skiff, Salem, Or.

590,531.—FRACTURE APPARATUS—T. W. Sloan, Seattle, Wash.

27,666.—DESIGN BED LOUNGE FRAME—L. G. Beloud, S. F.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DOOR INDICATOR.—Ernest A. Langford, Washington, Cal. No. 590,418. Dated Sept. 21, 1887. This invention relates to a device which I call an automatic doorplate indicator. It is especially designed for attachment to doors of rooms or other places, to indicate whether the same are occupied or unoccupied, and is designed to be moved so as to indicate the condition of the room by the action of the doorknob and an intermediate mechanism between the lock and the indicator. The indicator may be made of any suitable shape, preferably cylindrical or segmental, and fits into an opening which is exposed upon the outside of the door. Connections are made with the doorknob in such a manner that, when the outer knob is turned, the door can be opened without affecting the indicator, and it can also be closed from the outside without altering its position. If the occupant leaves the room, in turning the inner knob, the mechanism is so actuated as to turn the indicator plate and show that the room is unoccupied.

RIFLE ATTACHMENT FOR SHOT GUNS.—Herman A. Darms, Napa, Cal. No. 590,411. Dated Sept. 21, 1897. The object of this invention is to provide an attachment which may be used in conjunction with ordinary shot guns, so that by introducing it into the rear of the barrel it provides a short rifle barrel which is adapted to receive the rifle cartridge so that a ball may be used where game is discovered larger than a shot gun would be efficient with. This barrel is accurately centered within the shot gun barrel so that the bullet will fly straight through the latter, and the rear end is so fitted to the rear of the shot gun barrel that it will not interfere with the operation of the extracter mechanism, and this can be employed to extract rifle shell as well as that of the shot gun. Whenever the shot gun is to be used, the short rifle barrel can be again removed and carried about the person without difficulty.

DEVICE FOR FORMING SEAMLESS TOOTH CROWNS.—L. S. Skiff, Salem, Oregon, assignor to Joseph F. Twist, San Francisco. No. 590,442 Dated Sept. 21, 1897. This invention relates to a device which is specially adapted for the formation of seamless tooth crowns. It consists of an apparatus by which the disks of metal are by successive operations brought to the proper size and cup-shaped, a means by which the cups are formed upon each tooth crown, corresponding with those of the tooth where the crown is to be applied. This is effected by means of a die formed in the line of the grain and plane of the meeting faces of two united wooden blocks, the bottom of the die being pressed into exact conformity with the fac-simile of the tooth at the end of the mandrel so that the cup-shaped crown can be introduced into the die thus formed and afterwards shaped by the use of the mandrel and the wooden bottom of the die.

CEMENT GRAVEL MILL AND CRUSHER.—J. M. Rademaker, San Francisco, Cal. No. 590,423. Dated Sept. 21, 1897. This invention relates to an apparatus which is especially designed for the disintegration and separation of what is known as cement gravel or packed material which is in the nature of a conglomerate containing some gold-bearing gravel and a larger amount of rocks or cobbles to which the gravel is adherent and from which it is desired to separate the latter instead of crushing the whole mass including the cobbles. It consists essentially of parallel spaced barrels arranged cylindrically having their ends fitting in radial grooves or channels in heads situated at opposite ends of the cylinder, wedge plates by which the distance between the barrels is retained intermediate between the heads, bands by which the plates and barrels are removably secured in place; a eed opening at one end of the cylinder; openings made around the opposite end adapted to discharge the uncrushed cobbles, bearing rollers upon which the cylinder is rotatable; a trough or scraper enclosing the lower part of the cylinder adapted to receive the material which passes through the bars, hammers hinged spirally upon opposite sides within the cylinder so as to fall by gravitation and automatically act to crush the material as it passes through the cylinder. Suitable water-conducting pipes are arranged to discharge sprays of water and the loosened material is conducted to a proper place for further treatment.

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Assessment Notices.

SAVAGE MINING COMPANY.—LOCATION OF principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Trustees, held on the 2nd day of September, 1897, an assessment (No. 35), of 20 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, No. 309 Montgomery street, Room 50, Nevada Block, San Francisco California.

Any stock upon which this assessment shall remain unpaid on the 5th day of October, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

E. B. HOLMES, Secretary.

Office—No. 309 Montgomery street, Room 50, Nevada Block, San Francisco, California.

ANDES SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia City, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of September, 1897, an assessment (No. 44) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, rooms 20-22 Nevada block, 309 Montgomery street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 4th day of October, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of October, 1897, at 1 o'clock P. M., to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

JOHN W. TWIGGS, Secretary.

Office—Rooms 20-22, Nevada block, 309 Montgomery street, San Francisco, California.

FAIRFAX VILLA COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fairfax, Marin County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 10th day of September, 1897, an assessment (No. 7) of Fifty Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 56, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of October, 1897, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on MONDAY, the 8th day of November, 1897, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

J. STADTFELD, JR., Secretary.

Office—Room 56, No. 309 Montgomery street, San Francisco, California.

ALTA SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Gold Hill, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 3d day of September, 1897, an assessment (No. 57) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to to Secretary, at the office of the company, room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of October, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 27th day of October, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Director.

J. E. JACOBUS, Secretary.

Office—Room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from Horace Taber, in the Taber Gold Mining Claim near Gibsonville, Sierra Co., to deposit tailings in Gibson Creek; from Fred Smith, in the Black Oak Mine near Yankee Jim's, Placer Co., to deposit tailings in Owl Creek; from W. H. Leek et als., in the Miocene Mine near Crescent Mills, Plumas Co., to deposit tailings in Rush Creek; from Henry Conbrough, in the Ellrig Mine near Carbondale, Amador Co., to deposit tailings; and a flat; from John C. Murphy, in the Slate Creek Placer Mine near Kelsey, El Dorado Co., to deposit tailings in Dutch Creek; from John M. Jackson, in the Jamison Placer Mine near Johnsville, Plumas Co., to deposit tailings on a flat; from Sook Hung Lung, in the Barnard's Diggings near La Porte, Plumas Co., to deposit tailings in Slate Creek; and from the Jupiter Gravel Mining & Water Co., in the Jupiter Gravel Mine near Dogtown, Calaveras Co., to deposit tailings in San Domingo Creek, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on October 11, 1897, at 1:30 P. M.

Assaying Gold
AND
Silver Ores.

This work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist nor the pratical miner can mistake his meaning.

The work, like Mr. Aaron's former publications ("Testing and Working Silver Ores," "Leaching Gold and Silver Ores,") that have been "successfully popular," is written in a condensed form, which renders his information more readily available than that of more wordy writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:—Perface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of cupellation; Weighing of Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests of Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 126 12-mo pages, with illustrations, well bound in cloth; 1896. Price $1.00 postpaid. Sold by the Mining and Scientific Press, 330 Market St., San Francisco.

DELINQUENT SALE NOTICE.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 5) levied on the 3rd day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
John A. Heninger	16	250	10 00
Nils Johnson	120	100	4 00
Nils Johnson	121	100	4 00
Hattie E. Gray	124	100	4 00
Wm. Westhoff	144	250	10 50
A. O. Lindstrom	148	250	10 00
Wm. Westhoff	177	500	20 00
Richard Phelan	188	5	20
Wm. Westhoff	200	100	4 00
Wm. H. Little	202	10,500	420 00
Mark Strouse	208	5	20
P. E. Robertson	215	250	10 00
Sarah Spalding	218	100	4 00
Abe MacCreadie	220	500	20 00
Alfred H. Hogg	221	300	12 00
Abe MacCreadie	222	2 40	10 00
J. W. Brown	231	4,089	163 96
C. D. MacNeill	235	200	8 00
Paul Muller	239	50	2 00
Paul Muller	240	100	4 00
Paul Muller	242	1,000	40 00
Chr. W. Heyer	243	755	30 20
Chr. W. Heyer	246	606	24 24
Abe MacCreadie	247	200	8 00
Wm. Westhoff	250	200	8 00
Mary Ann Robertson	251	250	10 00
Mary Ann Robertson	252	250	10 00
R. H. Daley	268	1,000	40 00
C. M. Howe	273	1,000	40 00
C. M. Howe	274	500	20 00
R. H. Daley	275	1,500	60 00
Francis Brady	277	700	28 00
R. H. Daley	278	100	4 00
Dr. H Sylvester	280	51,278	1,971 12
(2,000 shares of this cert. have been paid by H. Sylvester, being part of his stock.)			
L. V. Merle	286	10	40
J. T. M. Kelly	289	500	20 00
R. H. Daley	290	100	4 00
R. H. Daley	294	750	30 00
R. H. Daley	295	185	7 40
E. Swenson	296	1,750	70 00
Mark Strouse	297	5,000	200 00
Mark Well	299	750	30 00
C. W. Heyer	300	400	16 00
Mark Strouse	301	100	4 00
Geo. Day	302	1 000	40 00
Dr. H. Sylvester, Trustee	305	1,105	44 20
Dr. H. Sylvester, Trustee	306	5 000	200 00
R. H. Daley	307	250	10 00
R. H. Daley	308	240	9 60
F. Heard	309	125	5 00
Mark Well	310	125	5 00

And in accordance with law, and an order from the Board of Directors, made on the 3rd day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Rooms 12 and 13, No. 43 Sixth St., San Francisco, California, on SATURDAY, the 9th day of October, 1897, at the hour of 12 o'clock M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

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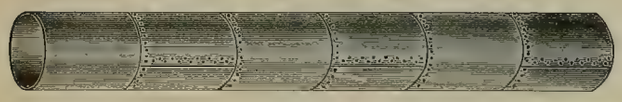

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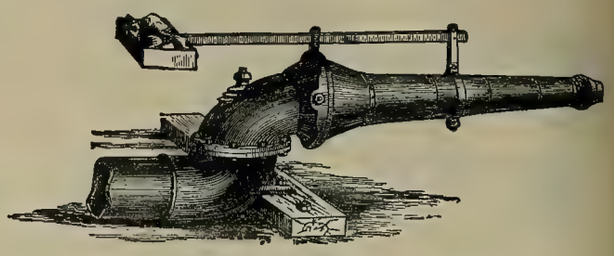

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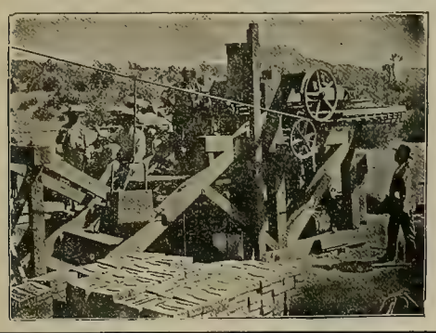

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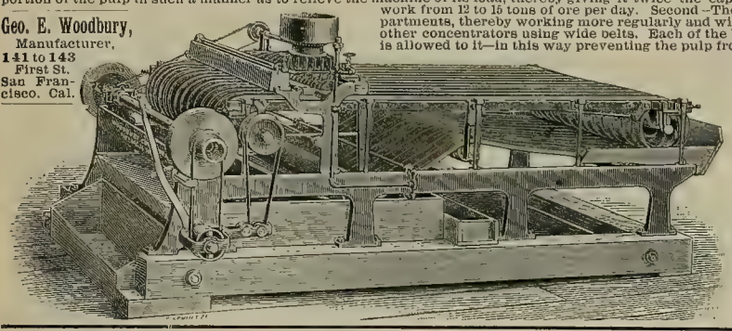
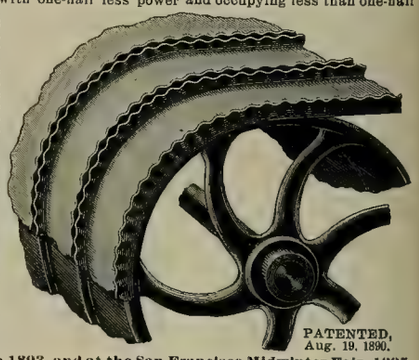
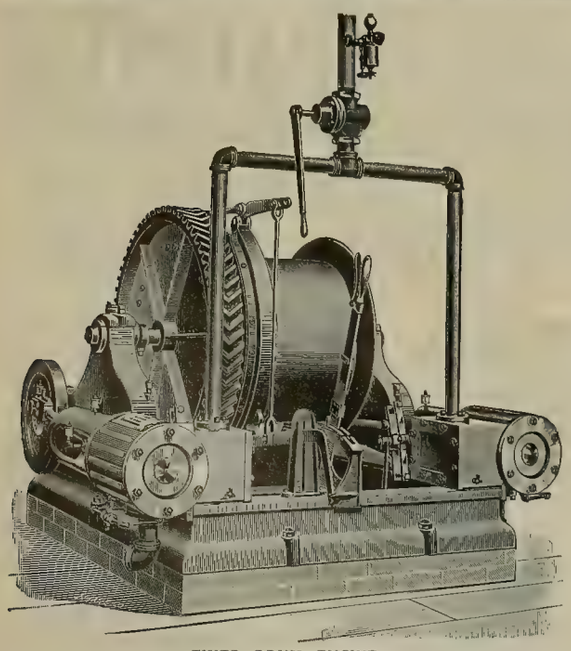




PATENTED, Aug. 19, 1890.

This Concentrator took the 1st prize at the San Francisco Mechanics' Institute in 1890, 1891 and 1892, and at the California State Fair in 1892; it took the 1st prize at the World's Columbian Exposition 1893, and at the San Francisco Midwinter Fair, 1895.



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MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1944.—VOLUME LXXV. Number 15. SAN FRANCISCO, SATURDAY, OCTOBER 9, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

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THE PARROTT MINE.

LEXINGTON MINE.

LOWER WORKS AT ANACONDA.

THE ANACONDA MINE.

THE LEXINGTON MILL.

SOME MINES OF BUTTE, MONTANA. (*See page 337.*)

Of Doubtful Value.

Chicago has already evolved a "dry washer" for use in the Klondike. G. T. Glover of that city has a plan "endorsed by Sec'y Alger at a Cabinet meeting," to get supplies into Dawson City this winter by use of a "snow locomotive," found to be of some value in Sec'y Alger's logging camps in Michigan. "The locomotive is very simple in construction. There is a steel frame of two tons resting upon the runners, fore and aft. This frame sustains a boiler and engine and other machinery necessary. A large cylinder wheel with teeth arranged about it at intervals is the means of getting traction on snow and ice. This wheel is propelled by steam. The hot air that is lost generally is utilized in the operation of the locomotive. Wood is used as fuel."

Mr. Glover and Sec'y Alger are reported to be confident that in this scheme they have a satisfactory solution of the problem of succoring starving Klondike miners, and propose to put some of those concerns on "between Dyea and Dawson" under Government auspices. The idea is too ridiculous to warrant serious consideration.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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TO THE PUBLIC.

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San Francisco, October 9, 1897.

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Assessing Mining Property.

Among the many other important subjects which might to advantage engage the attention of the coming meeting of the California State Miners' Association is that of providing by law for a more satisfactory and equitable system of assessing mining property in this State and every other mining State in the Union. The present system is admitted to be unbusinesslike and often unjust, and in the majority of cases is simply a random guess at the value of the property, made by a man who knows little of such values. Mining men seldom accept county offices and the assessor is usually a small merchant, a mechanic, clerk or professional officeholder. Rarely indeed does he go into a mine; more rare are the cases where he would know any more of its value if he did go. The result is that after standing on the dump and looking around he fixes on a lump sum based on the reported values of other properties in the vicinity. The reputed values on which such estimates are bound to be based are always far in excess of the actual selling values of the properties, and the only appeal from the assessment is to the board of equalization, whose decision differs in value from that of the assessor only in being the average of about five guesses by as many men of qualifications similar to those of the assessor. Not long ago a leading mining expert of this State, who had previously examined (and condemned) the property under consideration, was called as a witness before a board of equalization in a northern California county. The assessor (a butcher) had returned an unworked mining claim at $80,000. The owner, divided between fear of an exorbitant tax on the one hand and of depreciating a property he wanted to sell upon the other, asked for a reduction to $50,000. The board (a better than average board, too) was composed of intelligent farmers who could judge the yield of wheat per acre to a nicety, or come close to the weight of a hog, but knew as little of mining as of tea culture. What they finally decided the expert mentioned never heard, but the remark of one of their number is well remembered. Said he: "The owner can't afford to work that property, and won't sell it." Opinion as to the merit of such a policy is likely to be affected by the point from which it is viewed. The owner of unproductive mining property which he can't sell and is unable to develop has a hard enough time without having the property confiscated in the name of the law. Any fair system of taxation of mines should take into consideration the present ability of the property to pay such taxes—that is to say, its productiveness or otherwise—and the only true criterion of the value of a mine is its capacity for producing at a profit. We already recognize this principle in assessing all other real estate where a reduction is made in valuing unproductive property. Upon this idea have grown the laws of several of the mining States, which recognize three factors in arriving at the taxable value of mines: First—The land proper, generally based on a fixed price per acre, which is usually the Government price. Second—The value of buildings, machinery, etc., valued as are similar improvements in other industries. Third—The producing value of the mine, as measured by its net annual proceeds. Thus, as an instance, the great Anaconda mine in Montana is carried on the roll of the assessor at $105, while the improvements of the company are assessed in the millions, and to this is also to be added for taxation the profits of the past year, just returned as something over $5,000,000. Some such system, modified if need be to suit local conditions, would seem to be more satisfactory than the present random system, which is irrational in the extreme. Nowhere but in the conduct of public business would we intrust the valuation of properties to men admittedly without qualifications or facilities for the duty. The proposed change would place the burden of taxation on those best able to bear it and relieve such property as can barely pay expenses from a share of the load. This is not in the line of charity, but of business, for an operating mine is a large factor in the prosperity of the community where it is situated, and that prosperity is largely independent of the size of the dividends to stockholders. In the low grade ore districts of the Mother Lode belt a tax of 2% or 3% on the valuation, often exaggerated, of the property often means the difference between financial success and failure, between operating and shutting down, and, apart from the effect on the community, any loss from this source to the public treasury is more than made up by the enhanced value of surrounding property.

Another anomaly in our present mine-taxing system is that of assessing unpatented mining claims. The plain law of the case, that until patented the title rests in the general government and the land is not liable to taxation, is set aside by the legal quibble that we do not tax the mine itself but only the locator's possessory interest therein, and this possessory interest is declared to be real estate. In practice the assessor never tries to value these claims at all. He usually copies from the record a list of locations and fixes a uniform and arbitrary value on the whole lot. He does not go to see them; probably he could not find half of them on the ground if he tried to do so. Right here the "possessory interest" farce ends. If the tax is not paid (at least in every case that has come to the writer's notice), there is advertised for sale, sold and later deeded to the State not the locator's possessory interest in the A. B. C. claim but the A. B. C. claim itself. Now if the State derived any benefit from these tax sales it would be a more rational proceeding, but there is nothing in our Constitution that authorizes the State of California to go mining, and while the tax sale may ultimately deprive the prospector of his claim, the State gains nothing. The commonwealth can not do the assessment work necessary to hold the claim and in fact its title is extinct for failure to represent long before the tax deed can pass to it. Nor can the State proceed for patent even in those cases where the work done is sufficient to warrant it. The prospector is merely mulcted out of two or three dollars a year, if he refuses to pay; the State takes his property away from him, and being unable to hold it, at the end of a year restores it to the public domain. The patient prospector waits therefor and at the proper time relocates the mine under another name and the county is out the cost of advertising and selling, and the farce begins again. If the public treasury needs a few dollars a year from each claim located why not get it with dignity either from an increased recording fee or from a prospector's license similar to the Canadian system; or if claims are still to be sold to the State then by legislative appropriation they should be worked up to the sum of $500 say by our unemployed, then patented and sold on public account as opportunity offers. This may be paternalism but it is better than petty larceny. The subject is a practical one and is commended to the attention of the coming Miners' Convention.

State Mining Bureau Work.

At the last session of the California Legislature the State Mining Bureau received the usual appropriations for carrying on its work, the usual requirement being enacted that a certain proportion—in this case at least 50 per cent—be expended in field work. Last March a number of assistants in field work were authorized sent out by the newly appointed State Mineralogist to continue that work on much the same lines as had been found by past experience to be advantageous and of practical value. The policy, however, of the new administration did not seem to be in accordance with such requirements, and one by one, with the exception of Mr. Watts, these skilled assistants have been called in and discharged, in general with the work in an incomplete condition. The dropping of this work is said to have been caused by the fact that the policy of the present chief State executive officer would not permit the printing of the reports until after the next session of the Legislature, which condition would have been somewhat embarrassing were it not for the fact that the offer was made from a responsible source to publish all the reports free of cost. The State Mineralogist, however, saw fit to refuse to have prepared the results of the field work done to the present time; nor would he permit the material to be printed. His right to do this is unquestioned, though it seems a matter of regret that the good which might have been derived from the several thousand dollars already spent, and which would have been of great advantage to miners all over the State, is thus rendered inoperative.

The plans of the State Mineralogist, as they have been given out, seem to contemplate the virtual abandonment of all field work for nearly two years. Just how such arbitrary action will affect the provisions of the act under which these appropriations were obtained is, at present, an undetermined question. In thus discarding all experience of this institution, as well as that of others of a similar character, and outlining a plan which does not seem to receive the approval of practical miners in the State, the present official takes a wide departure—one which it is hoped will result more favorably to the best interests of the mining industry of this State than the present condition of affairs would seem to warrant in expecting.

The "topographical maps," which it is the intention of the mineralogist to issue, are believed to be very pretty, and would doubtless add much to the appearance of an office where properly displayed. One is to be compiled for each county in the State, using as a basis the county maps already existing, where possible. It is believed that no original surveys of any extent are in contemplation, though a fee of $100 to each county surveyor is a part of the plan; and in this regard it is also to be hoped that the old errors and methods of a generation ago are not to be perpetuated. Upon these maps, by means of an ingenious system of symbols, it is the intention to indicate the location of mining claims and different mineral deposits; and it is believed to be also the plan to use the maps as a basis of mapping the geology of the State. These maps, when so prepared, it is expected, will be sold or disposed of in some way to the county supervisors.

Without discussing the sense or business judgment of such a proposition, it is believed to be in order to state that, in the first place, county supervisors are aware that at the present day the only kind of topographical map having any value is that upon which the elevations are indicated by contour lines; and State and Federal authorities are unanimous in the assertion that such a map is the only kind of one on which it is of any practical use to attempt to portray the geological features. The accurate topographical maps of the United States Geological Survey have already covered a large part of the mineral bearing portions of this State, and are being extended to parts not mineral bearing; so that it would appear useless to reissue incorrect county maps of these areas and expect to use them as a basis for indicating the minerals as well as the geology of the State.

The maps, which it is the intention of the State Mineralogist to issue, are to indicate the desired features in the old-fashioned guess-work way, which is not up-to-date and has been discarded by those

who claim accuracy as a part of their work. To patch up inaccurate maps at considerable cost of time and labor—with all their inaccuracies and absence of contour lines—and expect to use them as the basis for future geological mapping, or to put them out as coming from the State Mining Bureau of California, is apparently not calculated to increase the high regard that is now manifested all over the mining world for the productions of the Mining Bureau of this State.

At considerable expense, as the result of intelligent individual effort, and in pursuance of wisely formulated plans, the work of the State Mining Bureau of California has been put upon a plane equal to that of any other similar institution in the world, and far superior to the most of such organizations. From every quarter of the globe has come to this journal from reputable sources, intelligent criticism, praising in most favorable terms the publications as issued from time to time, citing them as models for their governments and quoting from them at length as standard authority on the subjects of which they treated. Monographs have been reproduced in full in all the leading mining journals of the world; and the issue from the State Printing Office of the number of copies printed has in nearly all cases been unequal to the universal demand, a third edition being in some instances required.

Upon these maps the intended-to-be important data to be placed during the coming two years—to the accomplishment of which all the available funds are presumably to be spent—is the indication by symbols of the mines and mineral deposits. These are to be located from data now in the office, which is believed to be far from complete, and which could not be put into shape without considerable more field work. Under the very best conditions the maps can be looked upon only as a patchwork of inaccuracies, and so incomplete that no county board, properly informed as to the nature of the case, could be induced to view as of sufficient importance to purchase.

Recurring to the disagreeable work of pointing out what seems to be mistaken intent: admitting that the maps are perfect, or approximately correct, the manner of marking the mineral deposits does not accomplish the purpose, which in itself is misleading. The manner of designation can not distinguish the deposits of value from those of mere mineral interest; can not distinguish the valuable mines from a mere prospect; or a long defunct and worked-out property from one being operated to-day. The maps will simply show what everybody knows already—that gold-bearing quartz veins or other minerals are scattered through portions of the State. The maps do not indicate the extent nor the appearance governing their formation, and, it is believed, can be of little practical use.

Apart from California, at the present day the writer knows of no State or Governmental institution in the world which pretends to countenance such superficial methods of making known its resources. California has been liberal with the State Mining Bureau, and the plea cannot be consistently made that the funds are not sufficient, especially when one knows what has been accomplished by other States with smaller appropriations.

It would be a loss, no less to the mining industry of the State than to the prestige of the Bureau itself, were any course taken that would inure to the lowering of the high standard of the work as previously carried on. In speaking of this, more need not be said, less could not be said. So far, this journal has deemed the charity of silence the best comment on the present official course, but it would be untrue to itself and the great industry it represents to pass over what is believed to be the untoward policy of a very worthy gentleman who does not seem to grasp the requirements of his present situation.

Concentrates.

THE Garlock, Cal., Mining Bureau has incorporated.

THE Colorado Springs, Colorado, Stock Exchange has suspended.

LE ROI, B. C., shipments from January 1, 1897, to September 25 footed 41,907 tons.

THE California Debris Commission will act on sundry applications to mine on the 11th inst.

THE local bullion value of the Mexican silver dollar is now 44.6 cents, the lowest in its history.

THE present trustees of the California State Mining Bureau are "hold-overs." The terms expired last May. There are two vacancies in the board. The Governor has the appointing power.

BROWN'S VALLEY, CAL., mines are to be run by electricity. Power is to be transmitted nineteen miles.

THERE is a stampede from Skaguay, and every one who can is getting back toward civilization for the winter.

JACKSON, CAL., mining men think the facts justify the sinking of a 3000-foot shaft between the Zeila and Moore mines.

ON the 4th inst., the Yuba county, Cal., Board of Supervisors appropriated $200 to D. P. Durst "for anti-debris services."

THE Kennett Mining Co, Virginia City, Montana, W. B. Millard manager, will build a 60-stamp mill. Jno. S. Allen is superintendent.

AMONG the minerals produced in New South Wales during 1896, platinum occupies a position for the first time, the output being valued at £3479.

A LONDON mining paper, of date Sept. 18, announces the arrival of a steamer at San Francisco from the Klondike "with gold to the value of £2,500,000."

THE proprietor of a New York City "mining paper" announces that he is so busy getting up Klondike schemes that he has no time to issue his journal, which is suspended.

THE Butte *Inter-Mountain* says, concerning the reports of an Anaconda purchase of the Butte & Boston, "that B. & B. stands for bulls and bears as well as for Butte & Boston."

UTAH'S pumice stone deposits are now supplying over 60 per cent of that article in this country, and with a tariff of $6 per ton the peoned product of foreign rivals is practically shut out.

THE law requires that the surface ground used for residence and business purposes, upon a patented mining claim, must be assessed at a price approximating its value for such use and purpose.

UNDER orders from Washington 1,000,000 silver dollars will until further notice be coined monthly at United States mints, of which amount 300,000 will be monthly coined at the San Francisco mint.

EX-GOVERNOR RICKARDS has raised the amount needed for the completion of the Butte, Montana, school of mines. His list shows a total of $33,800 subscribed, the amount called for by the contract is $32,500.

THE second installment of the price for the Peacock mines, Seven Devils district, Idaho, has been paid; a 325-ton smelter is to be built by March 1st, '98, at Cuprum, and a railway built therefrom to the Snake river.

J. D. VAUGHAN, a mining operator of Denver, declares that the average profit on gold mining in all countries, is from 50 to 80 per cent, while the cost per ounce of silver production on most mines exceeds the market quotations.

THE Southern Pacific Railroad Company is running a survey presumably to connect Jamestown, Cal., with Salt Lake City, via Walker's pass. This route would be 250 miles shorter than that over the Central Pacific Railroad.

THE late Barney Barnato, who committed suicide by throwing himself into the sea from the British steamer Scot on June 4th last, while on the passage from Capetown to Southampton, left a fortune amounting to £963,865 8s 6d.

THE Nevada Co. Miners' Association has this year sent $750 to the California State Miners' Association. The entire expenses of the county association for the year were $27.50, which illustrates how economically those affairs are administered.

A 20 H. P. BOILER exploded last Wednesday at Claraville, forty-five miles west of Garlock, Cal. The boiler was used to run a small stamp mill and was owned by Hamilton & Morris. The dead body of R. Tuskin was picked up about 100 feet from the boiler.

DIRECTORS BICKFORD, CUTLER AND GROSE of Boston attended the annual meeting of the Pioneer Gold Mining Company at Helena, Montana, last Tuesday, and are now visiting their mine in Placer county, California, to obtain surveys and estimates for an addition of twenty stamps and for an electrical plant.

THE official call for the annual convention of the California State Miners' Association is received. The convention will be called to order at 10 A. M., Oct. 18th, '97, at Odd Fellows' Hall, Seventh and Market streets, San Francisco. The secretary requests a full list of delegates and their addresses by the 12th inst.

JOAQUIN MILLER claims that he named Idaho. The facts antagonize the statement. In September, 1860, Geo. B. Walker, among other miners at Pierce City, in what was then Washington Territory, favored territorial division, and he suggested the name "Idaho" for the new territory, which was so named when created, March 3, 1863.

THE Washington, D. C., Treasury Department has again declined to receive a million dollars in gold at San Francisco in exchange for currency at New York. The department will not receive gold at distant points for exchange or transportation on any terms. Officials say the gold is not needed at San Francisco and the Government is not in the express business.

REGARDING the attempted location of a part of the bed of the Los Angeles river, within the Los Angeles city limits for mining purposes, it is probably of interest to note that the State Supreme Court and the Supreme Court of the United States hold and have held since the year this journal was established—1860—that such locations can not be legally maintained.

A $200,000 LAW SUIT has begun in Stockton, Cal. The plaintiff is the Lightner Mining Company, the defendant the Utica Mining Company. Plaintiff and defendant own adjoining mines in Calaveras county; plaintiff claims that defendant unlawfully crossed over the dividing line between the properties entered upon the Lightner mine territory and took ore to the amount of $200,000.

So far this year the California Debris Commission has granted thirty-five permits to conduct hydraulic mining operations on the water shed of the Sacramento and San Joaquin rivers. The total number issued to date since the passage of the Caminetti law is 240. The miners still live in the deferred hope that those restraining dams, for which $500,000 has long been appropriated, will be built.

THE hoisting engine of the Black Warrior Copper Company, near Globe, Arizona, was blown up one morning last week by some unknown miscreant. Giant powder was placed under each of the two cylinders of the engine and exploded a few moments apart, wrecking the engine, blowing the cylinders into fragments, tearing asunder the wooden foundation blocks which were bolted to the stone beneath, and blowing the roof off the building. Supt. White estimates the damage at $2000.

AN item is going the rounds that, beside the Calumet and Hecla, the Con. Cal. & Va., the Ontario and Granite Mountain, there are no other mines with a dividend record of $10,000,000. The Belcher and Crown Point have each exceeded that amount in dividends. The Belcher Mining Company paid $15,397,200 and the Crown Point $11,898,000—both Comstock mines.

REPORTS reaching the Mint Bureau from time to time warrant the estimate that the world's production of gold for 1897 will be between $235,000,000 and $240,000,000, an increase of more than $30,000,000 over the product of 1896. The United States will probably lead all other producing countries with a total of $60,000,000. South Africa and Australasia will be close competitors for second place, with a total production exceeding $50,000,000 each.

NEARLY all the silver mines, says the *Japan Mail*, have stopped work of late owing to the fall in silver. The Innai silver mine, in Ugo Province, which employed about 5000 miners, produced about 350 kuamme of silver per month. The owner of the mine lately fitted up new electrical machinery at a cost of about 300,000 yen, in order to expand the work early in the spring, but now that silver has depreciated so greatly, he also is obliged to stop and discharge all his miners.

AN interesting case has just been decided by the Supreme Court of New Mexico of considerable importance as regards the rights of those who grubstake mining prospectors. Henry Lockhart of Albuquerque had grubstaked the original locators of the Washington mine at Cohiti, which property, when it proved valuable, became the subject of litigation between Lockhart and the locators whom he had grubstaked. It has been in the courts for several years, the result finally being in favor of Lockhart.

AS PROPHESIED in these columns, discoveries of quartz ledges of some value are reported from the Klondike. It is now stated that the North American Trading & Transportation Company will send a stamp mill to Dawson on the first steamer going up next summer. By July it is intended to have it in operation on these ledges. Development of quartz mines is so expensive on the Yukon, pending proof of their richness, that at least only big commercial companies can afford to undertake it.

THE Rossland, B. C., *Miner* asserts that "while the C. P. R. is not going into the smelter business, those who are closely identified with it will do so, and arrangements are practically completed for the erection of large reduction works at some advantageous point on the Columbia river, which will treat Rossland ores. This plan includes a scheme for gathering together ores of the different mines situated on the different mountains around Rossland at one general depot. Every shipping mine will be made tributary to the C. P. R. by lines of aerial tramways from the mines to the railway track, to the total exclusion of other roads."

IN the suit of Simpkins, who claimed riparian rights on Rogue river, Oregon, against James Savage, a miner, who was working a mine in the bed of the river by a wing dam, in the Josephine County Court, Judge Hanna decided last week: That the riparian proprietor owns the ground as far as the center of the stream and is to be protected by the court. The effect of this decision is locally interpreted to be that along the banks of a stream that have passed out of the hands of the Federal Government and become private property, the miner who proposes to mine the banks or bars of that stream must first secure a permit from the contiguous proprietor. If there is no such proprietor, then the bars and banks of the stream are open to location as any other mineral ground.

REGARDING the duties on British Columbia silver-lead ores, the Secretary of the Treasury calls attention to the fact that paragraph 181 of the Dingley law makes no distinction between silver-lead ores and other lead-bearing ores, and imposes a duty of 1½ cents per pound on the lead contained in all lead-bearing ores. "Lead ores are not, therefore, dutiable at the rate of 1½ cents per pound on the gross weight of the ore," says the Secretary, "but, on the contrary, duty should only be assessed at the rate of 1½ cents per pound on the lead actually contained therein as shown per assay. Furthermore, as paragraph 181 makes no distinction between lead ore and silver ore containing lead, it is unnecessary to take into consideration the actual market value of the lead contained in silver ore for the purpose of ascertaining whether the same is a silver ore or a lead ore, as was the practice under the provisions of the Wilson law."

A NATURAL mistake that is altogether too common, says the *Bulletin*, is for a corporation to name a bank as treasurer of its funds. Frequently the bank named is not even consulted in the matter. The appointment is made as a compliment or as a convenience. Sometimes, it is feared, the motive is less praiseworthy. As a matter of law, a bank cannot act as the treasurer of a corporation, because that involves personal liability. Corporations in naming banks as the custodians of funds should designate them as depositaries and not treasurers. The functions of the two agencies are entirely dissimilar. Those of a treasurer are personal, and usually he has no discretion whatever in the handling of funds. The functions of a bank are commercial. It can and does receive the deposits of corporations, the same as from firms or private individuals, subject to check; but it performs none of the acts of a treasurer and should never be designated as the treasurer of a corporation. They simply act as depositaries.

THE cost of producing an ounce of silver is something no one can accurately figure. Too many elements enter into the problem to render it capable of solution. Even the best estimates are tinged with personal prejudices. Thus, Ottomar Haupt estimates that the average cost of production of silver in United States mines is about 46½ cents; that where it involves extraction of silver from lead production costs about 48 cents, and from copper 46 cents, and that the treatment of argentiferous ore costs 34 cents per ounce fine. But it is probable that his estimate is influenced by his hostility to bimetallism. It is claimed that the Broken Hill Proprietary mine in Australia produces silver at a cost of 40 cents per ounce. The lowest cost ever figured by any statistician is that of production by the Bontoux mine in Spain, of 10 cents per ounce. The Austro-Hungarian mines average a cost of 75 cents. Probably were it possible to aggregate in money's worth everything expended in the effort, it would be found that every ounce of silver ever mined in the United States cost over $1 per ounce to produce.

The Cyanide Process.*

NUMBER II.

The high specific resistance, when scientifically utilized, aids in simplifying matters, rather than robbing the method of its cheapness.

The haloid salts of potassium are separated into acid and base, the electromotive force necessary to produce decomposition being much less than that required to set free the alkali metal. (*Jour. Chem. Soc.*, 1882, vol. xlii, pp. 260, 283). This being the case, we cannot well accept the theory that $AuCy_2$ goes to the anode and K to the cathode, or that gold under ordinary circumstances is deposited upon an anode of iron from an $AuKCy_2$ solution. It is rarely the case that gold is ever deposited from a cyanide solution on the anode. It is firmly deposited on the cathode.

As to the existence of the auro-cyanhydric acid, and its assimilation to the ferro-cyanhydric acids, the discussion might be prolonged; but an essential character of the ferro-cyanides is that by adding to them the salt of another metal the iron is not displaced and no cyanide of iron is separated.

This is not the case for double cyanide of gold and potassium and for auro-cyanhydric acid, because: (1) chloride of mercury separates the cyanide of gold (see pages 16 and 17 of Prof. Christy's paper); (2) the silver of the silver nitrate precipitates the gold entirely, making an interchange of metals instead of forming auro-cyanide of silver; and (3) mercury and lead act partially in a similar manner (*ibid.*, page 14, paragraph 4). It matters little about auro-cyanhydric acid, since, if it cuts any figure at all in electrical precipitation, it can be got rid of by using a sufficiently strong current. I am aware that electrical precipitation is not perfect; nevertheless, I think the present practical choice involves, in any case, electrolysis. If we take the zinc preparation of the MacArthur-Forrest process, we have voltaic electrolysis, involving one liquid and one metal, the metal depositing upon itself. This means a fouling of the solution and the resulting bullion. If we take the Kendall process of zinc-amalgam precipitation, we obtain a much purer bullion, but Mr. Kendall himself says it is precipitation by electrolysis, in which case we have the voltaic action of two metals, virtually one, in one liquid. The next alternative is the Siemens-Halske method. This is avowedly electrical, involving one liquid and two plates. It gives a good bullion, and will precipitate gold from a very weak solution of auro potassic cyanide; but it is objectionable by reason of the large amount of Prussian blue formed and the number of lead plates required.

Finally, the Pelatan-Clerici process is electrical, using one liquid and two metal electrodes. The objection to it is that it keeps in use too much mercury, although, on the other hand, practically no mercury is lost.

Alfred James, Glasgow, Scotland: Prof. Christy lays all cyanide workers under a heavy obligation by the publication of his exceedingly able paper. This record of results of careful and painstaking work and conclusions deduced from theoretical considerations are of the utmost value to the practical operator, and inspire the hope that Prof. Christy will also publish a similar paper on the mechanical side of the question.

His present paper differs from the majority of previous publications on the cyanide process in that the work therein referred to was based on considerations of theory, rather than of practice. One therefore naturally expects that results so obtained will not invariably agree with deductions from practice. Thus, the experimental use of chemically pure cyanide of potassium would lead workers in this direction, as it originally led MacArthur, to design cumbrous though ingenious plants for the admission of oxygen to the working solutions, when, as Prof. Christy himself shows, for ordinary ores the solutions carry more than enough oxygen for all practical purposes.

It is assumed that in writing of the effect of oxidizing agents the author is referring to experiments with metallic gold and not with auriferous ores, as otherwise the weight of experience appears to be entirely against his conclusions that "each of these * * * when added to a potassium-cyanide solution increased the solubility of the gold over that shown in a similar solution without such addition." The use of oxidizers has not been found beneficial in practice, except in special cases, such as those in which soluble sulphides are present; in which case, as suggested by Ellis, the oxidizers decompose the sulphides, the retarding action of which he first noticed in 1889. Even in this case it was necessary to select carefully the oxidizer employed.

Perhaps the most brilliant portion of the paper is that relating to cyanogen bromide, in which the author shows that even theoretically oxygen is not necessary for the solution of gold by potassium cyanide, and affirms the important truth that nascent cyanogen is the real factor.

The first generally known record of the proposed application of cyanogen bromide, chloride or iodide to the extraction of gold is that contained in the patent specification of Dr. Gaze of New Zealand, who applied for a patent for the use of this re-agent in 1892; but the knowledge of its real function as a most convenient means for producing nascent cyanogen is apparently of comparatively recent date; indeed, Prof. Christy seems to have been the earliest recorded discoverer.

Some time since an investigation on the subject showed that BrCy was not at all the unstable compound, when mixed with alkalies or alkaline carbonates, that Watts had declared it to be, and that even considerable quantities of caustic alkali or carbonate failed to decompose the compound, whereas, when it was added to a solution of KCy, decomposition commenced immediately.

It was also found that BrCy made by sublimation and BrCy made by the addition of bromine water to a solution of potassium cyanide behaved alike. The text book reaction, $KCy - 2Br = KBr + BrCy$, therefore appears to be correct, though with dilute solutions the reaction takes considerable time for completion.

The gradual but complete decomposition of BrCy in presence of KCy with formation of Cy_2 led to the attempt to substitute gaseous CN in solution, with results which showed a distinct improvement with metallic gold over the extraction by KCy alone; but in every case the *nascent* cyanogen proved itself superior.

A point which the author has apparently overlooked is that the decomposition of BrCy in KCy solution, instead of being immediate, is usually very gradual, extending over some hours; the rate depending, among other things, on the purity of the cyanide employed and the amount of alkali present, as it is found that while alkali *per se* does not decompose the BrCy, it generally accelerates decomposition when KCy is present. A knowledge of this important fact facilitates the addition of BrCy in small quantities from time to time, as required. On the other hand, the tendency to the formation of paracyanogen, even in very dilute solutions, was very great, and the catalytic action rapidly increased on exposure. This probably accounts for the failure in practice to obtain good results with this re-agent.

The section of the paper on the precipitation of gold from cyanide solutions abounds in interesting points; but for the present the writer wishes to confine his remarks to Prof. Christy's observations on precipitation by means of metallic zinc. At the outset, exception must be taken to some of the objections raised by the author against this process.

Objection 1 is well founded and is admitted.

Objection 2 does not appear to be well founded, either upon Prof. Christy's theoretical considerations or upon actual results in practice with *dilute* solutions. In the whole of the paper there is not a single reaction shown in which free cyanide is consumed by zinc, with the exception of the hypothetical reaction given hereafter, and the whole tenor of the previous results on auropotassic cyanide solutions shows that such free cyanide of potassium is entirely unnecessary to the reaction. In every other case it is shown that the zinc merely replaces the gold in the auropotassic cyanide, and this could scarcely be termed a "great destruction of free potassium cyanide."

Moreover, a series of determinations, taken from various plants in different parts of the world, has shown that with weak solutions, as used in practice, there is no appreciable loss of cyanide in the zinc boxes. The difference in tests taken from the head and tail of the boxes is seldom perceptible, and any difference, when found, is at least as frequently in favor of the tails as against it. (These tests are, of course, not conclusive, and a rapid correct method of determining actual free cyanide in the presence of double cyanide of zinc and potassium and caustic potash is greatly needed.) In this connection it may be noted that even if the whole of the $KAuCy_2$ present in the extractors were regenerated by the action of the nascent hydrogen and in the presence of caustic potash, the increase in the test would be only about .001 per cent—so slight is the amount.

On the other hand, the assertion that "the great consumption of zinc" is due to free potassium cyanide is untenable in face of the fact that *more cyanide* would be required for this one reaction than is at present *consumed* for the *whole treatment*—that of the ore included. The average consumption of zinc is 0.3 pound per ton treated, and this alone would therefore account for a consumption of cyanide of 1.2 pound per ton. But tailings are being regularly treated in Africa, with an even greater consumption of zinc than that shown, for an actual consumption of only 0.45 pound of cyanide per ton for the whole process.

Objection 3, as to the removal of the zinc and cyanogen residues, is partly met by the usual practice of running water through the boxes immediately prior to cleaning up, and allowing "slimes" to flow through a sieve of fine mesh. Bullion 950 fine and over has been regularly produced by this method; and when zinc is not conveniently thus separated, an acid treatment is given.

Objection 4 is met by the results of Prof. Christy himself, when he shows that perfect precipitation has been obtained even from solutions of auropotassic cyanide *containing no free cyanide*. He objects to the time taken to effect this precipitation. This might have been lessened by increasing the amount of zinc-shavings; yet it is only about the same as that taken by the electrolytic process. It is also deemed impracticable because 1200 times the theoretical amount of zinc required was present. A rough calculation shows that in all ordinary works, with easily treated solutions, each box holds about 50,000 times more zinc than is theoretically necessary for the amount of gold in the box at any one time; but one merely runs the solution through continuously until the zinc has completed its function and is replaced by fresh zinc, there being practically no precipitation limit, as with charcoal. It would appear, therefore, that with such results before him, Prof. Christy goes out of his way to assume the necessity of the presence of free cyanide of potassium.

Recent investigations go to prove that effective precipitation is to a considerable extent a question of time of contact; that solutions from which free KCy is absent require longer contact; and that this may be due to the fact that a zinc-gold couple is more energetic in KCy solutions than in solutions of KHO or $KAuCy_2$. This would also explain the greater difficulty of *starting the precipitation* when using very dilute or KCy-free solutions; whereas, when once the zinc-gold couple is formed, the action proceeds satisfactorily. In practice this difficulty is seldom encountered except when starting a new plant, and may be easily overcome by adding a little free KCy to the boxes at the outset.

Prof. Christy objects to certain equations suggested by the writer, on the ground that they bring one back to the point one wished to avoid, and, secondly, that they "fail to explain the increase of free alkali which everyone recognizes as taking place in the zinc boxes." To deal with the latter point first: In some zinc-box experiments recently carried out by the writer, the amount of alkali present was carefully determined before and after the contact with zinc, with the following results:

	Before. Per cent.	*After. Per cent.*
(*a*) Two-day test, samples taken every twelve hours—		
Alkalinity (by litmus)	0.13	0.11
Alkalinity (by phenolpthalein) less the difference from litmus test	0.01	0.006
(*b*) Two-day test, as above—		
Alkalinity (litmus)	0.22	0 21
Alkalinity (phenol.)	0.016	0.014
Three-day test—		
Alkalinity (litmus)	0.168	0 16
Alkalinity (phenol.)	0.12	0.019
Six day test—		
Alkalinity (litmus)	0.168	0.15
Alkalinity (phenol.)	0.011	0.01

This solution contained practically no free cyanide of potassium, but double cyanide of zinc and potassium was present to the extent of 0.76 per cent. Prof. Christy might give some figures in support of his contention as to increased alkalinity, as the above solution or its results may be abnormal.

As to the equations given by the writer bringing one back to $2KAuCy_2 + Zn = 2Au + ZnK_2Cy_4$, Prof. Christy even thus fails to show any consumption of *free potassium cyanide*, which was the point the writer started to avoid; but Prof. Christy only arrives at this point by making

$$(c)\ 2KC + 2HCy + K_2ZnO_2 = ZnK_2Cy_4 + 2KHO$$

into a universal reaction instead of a limited one "to a certain extent," as suggested by the writer, it being obvious that in the presence of free KHO, expressly stated to be present, the following reaction would occur:

$$HCy + KHO = KCy + H_2O$$

with regeneration of the KCy, as stated.

In conclusion, one cannot but express the hope that Prof. Christy may be induced to favor the Institute with a further account of his valuable research on this subject.

(*Later Communication.*)—Since sending the above remarks to the secretary, I have discovered, by means of experiments involving the crystallizing out of the product from saturated aqueous solutions, that zincate of potash, in the presence of excess of cyanide of potassium, may form double cyanide of zinc and potassium, as stated by Prof. Christy. It does not, however, follow that the cyanogen is thereby rendered ineffective for gold extraction, as Prof. Christy would infer. On the contrary, double cyanide of zinc and potassium, in the presence of caustic potash, has a very decided action on gold; and, in fact, the behavior of this substance in other ways is so similar to that of free cyanide that it is practically impossible to estimate either of these substances correctly in the presence of the other. The reaction is apparently similar to that occurring with simple cyanide.

$$K_2ZnCy_4 + 2Au + 2KHO + O = 2KAuCy_2 + K_2ZnO_2 + H_2O.$$

(*To be Continued.*)

* Discussion at the Chicago meeting of the Am. Inst. Min. Eng., Feb., '97, of the papers of Prof. S. B. Christy, H. Van F. Furman and G. A. Packard.

Some Mines of Butte, Montana.

Butte, Montana, is undoubtedly the liveliest mining camp in existence—though to call such a rich, solidly built city a camp is, in this instance, a misnomer. In previous issues have been given views and descriptions of different smelters and Montana silver mines, and in this issue are illustrated, on page 333, some additional bullion producers famous in mining annals and especially interesting to all residents of Montana.

UPPER WORKS AT ANACONDA.

The upper and lower works at Anaconda show a part of an immense business, which from nothing in 1881 has grown to an output of 140,000,000 pounds of copper in 1896, worth $15,000,000. Thousands of men are employed. A full description, including detailed technical account of the processes, has appeared herein.

BROADWAY, BUTTE, MONTANA, LOOKING EAST FROM LIBRARY TOWER, ANACONDA MINE IN THE DISTANCE.

The Anaconda mine is located on the apex of a hill formed by Town gulch and the panhandle of the valley, and is about 600 feet higher than Butte. It was originally bought as a silver mine by Marcus Daly for Eastern capitalists. This mine is developed to a depth of 1700 feet by a three-compartment shaft. They use a double-balance hoist with flat rope reels. It requires a battery of fourteen pairs of boilers to supply them with power for pumping and hoisting. The mine is equipped throughout with the latest appliances for economic mining, such as power drills, compressor plant, electric signals, etc. The vein at this point is so wide—over 125 feet—that even the forest of timber which they have put into the mine has not been sufficient to support the walls. The hill shows on the surface great cracks marking the course of the workings below. Their principal ores are chalcopyrite, bornite, tetrohedrite and argentiferous chalcocite. The latter occurs in huge masses of remarkable purity. Manganese and zinc are both absent in section.

In the immediate neighborhood of the Anaconda are several big mines deserving of mention. One of these, the Never Sweat, lies townward from the Anaconda, and is developed to the 1300-foot level. They have just completed installing a mammoth hoist capable of lifting two four-decked cages, capacity one ton each, 2500 feet. By this they will be able to double their former daily output of 1200 tons. The St. Lawrence, another of this group, has a daily output of 1000 tons, while the High Ore, Mt. Consolidated, Wake Up Jim and Green Mountain will each average 600 tons per day. It requires a train of 108 cars—each forty tons capacity—to carry the Anaconda's daily output to their smelters at Anaconda, twenty-nine miles distant.

The Lexington mine is one of a group comprising the Alice, Bozeman, Goldsmith and others, illustrated in a previous issue. All are developed to depths varying from one thousand to fifteen hundred feet. Their surface ores were mainly chlorides, carbonates and a considerable amount of free gold. Together with these, there was a great amount of manganese spar. As depth was reached, the chlorides and carbonates passed into sulphides, while, remarkable as it may seem, the manganese still remained as rhodochrosite. Only in one mine of this series was copper found—the 800-foot level of the Lexington. This is being prospected at the present time, in hopes that it will prove to be a cross vein from the middle zone. Nearly all of these mines have stamp and chlorination mills working on their ores. To the Lexington Company belongs the distinction of producing the first silver ore successfully milled in Butte, nearly thirty years ago.

The Gagnon mine is another pioneer. This mine is in the western part of the middle area. Its ores carry golenite, spholerite, enargite, silver sulphide, a very rich silver-copper-zinc blende, pyrites and chalcopyrite. The dip of the vein in the Gagnon is greater than in any other mine of this belt, and theirs is the only inclined shaft in Butte. They use a skip, and are working at a depth of 1200 to 1400 feet. It was either upon the Gagnon or upon the adjoining claim that the first mineral discovery in Butte was made over forty years ago. That was merely a scratch upon the surface; now the mine is opened 1500 feet deep. The Gagnon is the principal producer for the Colorado Smelting and Mining Co., though the company owns several other mines. It was the rich placers at Silver Bow, Rocker, Town, Buffalo and Missoula creeks that first attracted prospectors to the vicinity of Butte. Silver Bow is a small settlement six miles west of Butte, and is situated in the gap through which Silver Bow creek flows. Rocker lies half way between the city and Silver Bow, and is the extreme west of the producing area. Missoula gulch is on the outskirts of the town. Town and Buffalo creeks are within the city limits. It was noted that Rocker and Town gulch gold differed greatly in purity; the former being rated at "20" fine on a scale of 24, while the latter but "13." This was due to the large amount of silver alloyed with the Town gulch product. Systematic prospecting resulted in discovering several rich prospects, among them the Old Original and the Acquisition, both producers at the present time. In 1879, the struggling camp organized as the Summit Valley mining district, and by rapid strides soon became the greatest mining camp in existence. The main range to the east of the city is composed of a coarsely granular, dark, boric granite. The Butte slope, in which are all the older mines, is of the same formation, but here it has been greatly disintegrated by the vapors and other phenomena attendant upon the eruption of the "big butte." This cone is an island of rhyolite sending off arms into the sea of granite surrounding it. It bears a singular physical relation to the granites, in that a line passed through it divides the darker granite on the east from the extremely acid granite on the west. This lighter granite, locally called the Burlington, from one of the mines within its area, extends about two miles west to the low foothills at Silver Bow. The eruption of this butte bears a very important relation to the ore deposits of the district.

The veins occur in three parallel zones extending in a northeasterly direction, and, strictly speaking, are not true fissures, as they seldom show a well-defined wall. Up to 1894 this caused considerable trouble in obtaining patents from the Government, as the Montana code required the prospector to show at least one well-defined wall. Since then the code has been changed. He is now required to expose the lode to a depth of 10 feet.

Emmons accounts for the above state of affairs by saying: "The veins of Butte are fissured zones extending east and west, produced by a common dynamic movement, shattering the whole region. From their relation they seem to point to the explosive eruption of the 'butte' as their source. They are clearly not the result of a single great fault, which would tend to leave parallel walls, with crushed debris between, and accompanying slickensides on one or the other of its walls, but were originally cracks only sufficiently wide to admit mineral solutions."

This view is further strengthened by what is seen in the veins in the outlying district. In two localities adjacent to the fissured district the veins show both walls, and, moreover, are filled with angular fragments of country rock and vein material intermingled. This is the case in the Park canyon mines to the east of Butte, and in several properties north of Walkerville, which is situated one and one-half miles east and one-half mile north of the conical butte.

The hot vapors accompanying this disturbance aided the mineral solutions in altering and dissolving the wall rock, thus increasing the space within which they deposited their minerals. Thus is the great width of the Butte veins accounted for. Throughout the camp they are from 1 to 60 feet in width, their "walls" being merely commercial limits, dependent upon facilities for extraction and treatment. In the Anaconda they are frequently 125 feet wide, while in the far western section—in the Germania, Little Darling, Blue Bird and Orphan Boy—they are seldom wider than 8 feet.

Exploring and Exploiting a Gold Country.

If the mining men now in the Yukon country are wise, they will cease looking for phenomenally rich streaks in small placers, and will search for the original quartz veins from which these placers have been made. The gold of the Klondike and Stewart river countries is coarse, indicating a short journey from its original source. It was to have been expected that some important discoveries of lodes would be made before now, but it seems that all attention has been paid to the placers. As to these finds in river beds, they have very likely been equalled by those in Boise basin, in California gulch and in many other places, the difference mainly being in the coarseness of the Yukon gold. This coarseness seems to have put a queer idea into the illustrators of *Puck*, which for two weeks printed pictures of supposed gold pans with gratings in their bottoms, the scheme evidently being, to the artist's mind, to screen out the small gravel and mud, retaining only the big nuggets.

But we must not look disdainfully on the gold pan. It, or some similar appliance for testing by washing, is the only available means for estimating the value of gravel, which of course it would be absurd to assay. Although its work looks so rough, in reality, in experienced hands, it gives wonderfully accurate results, so that it is not only used with gravel, but is by many considered far better than the fire-assay for gold-bearing quartz, when the ore is pounded up, screened and washed in it. Formerly it was used wholly for getting gold; now it is used for testing and for cleaning up small lots of particularly rich stuff. It is the implement with which the future exploration of the Alaska gold fields will be effected.

Theoretically, everyone knows by this time the art of exploring and exploiting a gold country. It has been so well acquired that a handful of men can overrun a wide territory in a few days, and locate all the placer-ground worth taking up. The idea, for quartz, is simply to follow up the gulches and canyons wherever the pan shows the color; to stop when the indications cease or lessen; and then to skirmish in the side or end hills for a lode. All of which looks easy on paper. In practice, however, if one is prospecting in a "mineral" region, colors are found everywhere. Then it is necessary to use the pan, not as a mere means of finding gold, but as a means of estimating how much—that is, it becomes an assay, though closer than any assay.

After experimenting with the horn spoon, saucers, Riotte spoon, the batea, pointed tumblers, and all sorts of appliances, it is my opinion that there is nothing to compare with the old, original, California 20-inch gold pan, stamped out of one piece of sheet iron, with an angle of, say, 30° and no crease in the bend. With this tool, and a five-minute instruction, but with considerable experience, one can rapidly reach a rough estimate of the value per ton in gravel or pounded rock. This is something which the fire-assay cannot do for the prospector.

It is a great convenience to have two gold pans or else one pan and a bucket, so as to save time. In this way the rough work can be done rapidly, the small stuff containing the gold being thrown together into the other receptacle, the prospector keeping in his mind a tally of the number of pans. A heaped pan-load weighs about twenty pounds, so that one pan represents the hundredth part of a short ton. It is easy to acquire the habit of picking up uniform pan-loads. With gravel, the amount of the pan-load depends somewhat on the size of the stuff, all moderate-sized pebbles being washed and allowance being made for boulders, which requires judgment. In testing pounded quartz, the most convenient weight is ten pounds, or the two-hundredth of a ton. A larger weight of gravel can be used—fifteen to twenty pounds. The knack of gauging the quantity is easily acquired, all that is necessary being to determine on some convenient aliquot part of the ton or cubic yard, the latter ranging between one and one-half and one and three-quarter tons, so that a pan will stand for the 100th, 150th, 200th, or other fraction, with allowance for boulders. When using two pans, after taking enough samples, all the small lots of concentrates in the second pan are together washed carefully over the first pan, the overflow tailings rewashed, and the aggregate result carefully cleaned by drying, removing black sand by a magnet and winnowing off the rest of the waste. When the amount of gold collected is considerable, it is weighed in the most delicate balance available. Estimating "colors" is a different matter, as a small fraction of a cent makes a showing to mislead the novice. With a little practice and advice from an old hand, this art also is mastered.

It is by means of this sort that the Yukon country will be prospected and developed. At present it is going through the stages that early California went through. The rocker, the tom, and the short sluice are there. Hydraulicking and booming have, so far, been conducted on a small scale, and, as the open season is so short and the gravel so shallow, this kind of mining cannot last long. The future is in the quartz.

Perhaps the best way to "size up" a "rush" is to remember what has happened in others. About once in three years an excitement of this kind occurs in the mining community. That it extends now to the outside public is due to greater newspaper advertising.

It has always happened that, after a great mining excitement and its accompanying speculative fever, there has been a sharp reaction, often a crash and a temporary set-back, with a slow recovery. Afterwards a district that has been over-boomed, and then underrated, settles down to its normal level in the opinion of investors, and work goes on less feverishly and more successfully. Some of the mining corporations which will be engaged in really exploiting the new Yukon mines will doubtless pass through the same experience. As for the catchpenny schemes, the sooner they are exploded the better for Alaska. But there is little doubt of their being real and substantial merit somewhere in all that vast new area, or areas, so that it is possible there may be worthy rivals of the great Treadwell, so far Alaska's single heavy gold producer.

If there are such mines in the far north, it will require extraordinary effort to get in machinery and supplies, and to put them in shape for active production. Little, comparatively speaking, is needed to outfit a small placer—sometimes only the crudest appliances, such as some lumber whipsawed or turned out by a small sawmill on the spot, supplemented by a nozzle or two and a few hundred feet of canvas pipe. But to equip a big hydraulic mine, supposing there to be warrant in the ground for putting in an extensive plant, involves heavy expense for transporting the miles of large steel or iron piping and other metal fixtures required.

Supposing that the prospecting for the quartz lodes, from which the placers already discovered were derived, should reveal something in the nature of a big mine or mines, it is not a necessary sequence from the richness of the gravel that the veins should be small and high-grade ones, for which moderate plants would suffice, involving even in this case freight charges amounting to several times the cost of the machinery at the foundry. The famous gold quartz mines of the world have been and are of moderate down to very low-grade ore. In fact, the most productive have been of extremely low grade, but having large deposits. So, judging from analogy, if really great quartz mines are to be found and properly developed in the new regions, we shall see some achievements in rapid equipment and overcoming of disadvantages which will almost put the celebrated work on the Homestake (Black Hills) mine to the blush. In the last mentioned case a railroad—engine, rails and all—was hauled in by wagon teams hundreds of miles from the nearest railroad. A modern plant for a big gold mine is something to look at with respect, with its heavy hoisting, haulage and pumping equipment, its huge mills containing hundreds of stamps and its constant heavy renewals and supplies. Low-grade mines have to be worked on a very large scale to render a profit. So, if there are to be new Homestakes or Treadwells up the Yukon, there will be some nice engineering that is not mining.

It is a great pity that, no matter how successful the new districts turn out to be, provided they are successful at all, the public will have lost interest, and the newspapers will not devote space to describing the most interesting part of the work. Next season it will be an old story. But, if the work this fall, winter and spring reveals a small fraction of what the shouters promise, there will be some hustling in Alaska, though the general public will hear little of it.—Albert Williams, Jr., in Engineering Magazine.

Noise is Distracting.

Some one has said that the love of noise was nothing but a savage instinct; that the people who are not sensitive to noise are not sensitive to anything else—thought, argument, poetry, art or any kind of intellectual influence. The reason given is that the tissue of their brains is of a very rough and coarse quality, while on the other hand noise is a torture to intellectual people.

Schopenhauer explains the aversion to noise as follows: "If you cut up a diamond into little bits, it will entirely lose the value it had as a whole; and an army divided up into small bodies of soldiers loses all its strength. So a great intellect sinks to the level of an ordinary one as soon as it is interrupted and disturbed. Its attention is distracted and drawn off from the matter in hand, for its superiority depends upon its power of concentration. Noise is the most impertinent of all forms of interruption, and is a hindrance to this concentration; it is not only that, but a disruption of thought. That is why distinguished minds have always shown such a dislike to violent noises that break in upon and distract their thoughts. Ordinary people are not inconvenienced much by anything of the sort."

A MELBOURNE DISPATCH says the expedition of the Sydney Geographical Society under Professor David to the Ellice islands, northeast of Australia, has obtained evidence confirming the theory of Darwin as to the formation of coral islands. Diamond drilling in coral to the depth of 557 feet failed to reach bottom.

Production of Lead in 1896.*

By CHARLES KIRCHHOFF.

In spite of the fact that the year 1896 was one of general industrial depression, reflected in the case of lead by a sharp contraction of the consumption, the output of the metal from American sources showed so marked an increase that the record of 1891 was passed. In that year the quantity of lead produced from ores mined in the United States was 178,554 short tons. In 1896 it reached 180,000 short tons. Even that quantity did not cover the requirements of the country, in a year of depression, by 20,000 short tons. In years of normal consumption our requirements lie between 240,000 and 250,000 short tons.

In the following table the production has been separated into two groups—that of desilverized lead obtained from smelting argentiferous ores drawn from the Rocky mountain region and that of "soft" lead produced from non-argentiferous ores of the Mississippi valley. The latter also includes small quantities obtained from Virginia and Tennessee. In 1896 the treatment of foreign ores in American smelting works began to assume importance, and it became necessary to make allowance for the quantities involved, in order to arrive at the actual lead product of the United States. Later the refining in bond of foreign base bullion became an important industry. Varying quantities of the metal so produced are retained for home consumption, so that it became necessary to make special inquiries dealing with this feature. The growing complications make it impossible to arrive at an exact statement of the lead obtained from domestic sources, so that only a close estimate is possible. In 1894, after a careful consideration of the methods possible, the system was adopted of appealing to the smelters for a statement showing the source territorially of the lead contents of the ore worked by them. This was regarded as the most satisfactory and direct means, not alone for reaching a sound basis for an estimate of the actual lead product of the United States, but also, at the same time, afforded an opportunity for reaching precise data relative to the contribution and the total of the different States and Territories. The result of the investigations thus made is embodied in the following table:

PRODUCTION OF REFINED LEAD IN THE UNITED STATES FROM 1893 TO 1896, BOTH INCLUSIVE.

YEAR.	*Total Production. (a) Short tons.*	*Desilverized lead. (a) Short tons.*	*Soft lead (b) Short tons.*	*From Foreign ores and base bullion. Short tons.*	*Net American Product. Short tons.*
1893	*d*220,333	106,820	32,513	65,351	168,082
1894	219,090	181,404	37,686	59,730	*e*162,686
1895	241 882	201,092	39,890	76,173	*e*170,000
1896	264,994	221,557	43.537	57,612	*e*188,000

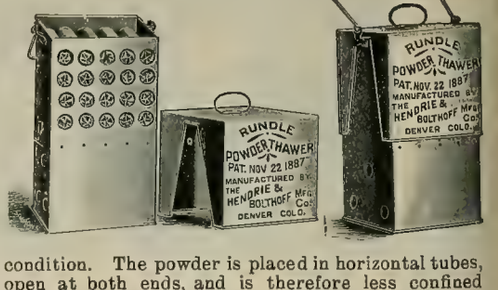
(*a*) Including foreign base bullion refined in bond.
(*b*) Including a small quantity of lead produced in the Southern States.
(*d*) Including 5013 tons of antimonial lead.
(*e*) Arrived at from direct returns from smelters.

The product of desilverized lead in 1896 includes 7507 short tons of hard lead.

* Eighteenth Annual Report U. S Geological Survey—Division of Mineral Resources—David D. Day, Chief of Division.

New Powder Thawer.

The accompanying cuts represent the Rundle powder thawer, the invention of A. J. Rundle of Iron Mountain, Michigan, and manufactured by the Hendrie & Bolthoff Manufacturing Company of Denver, Colo. The thawer is constructed of galvanized iron and keeps the powder in good working



condition. The powder is placed in horizontal tubes, open at both ends, and is therefore less confined than in most other thawers. The tubes are entirely surrounded by water, and the sticks of powder lying on their sides are not subject to the danger of melting and running into a mass, as is often the case when standing on end.

Have Been Disbarred.

John Wedderburn and John Wedderburn & Co. have been disbarred from practice before the United States patent office. The recommendations that they be disbarred were signed to-day by the Commissioner and Assistant Commissioner of Patents and approved by the Secretary of the Interior. The commissioner and assistant commissioner did not mince words in condemning the manner in which the disbarred attorneys conducted their business.—Washington, D. C., Post, October 1.

One Month's New Subscribers.

In last Saturday's issue it was stated that during the month of September, '97, there were received at this office 179 new subscriptions, mostly from Colorado and California, merely illustrating the growth in the circulation of this journal. Some doubt, however, having been expressed in one quarter as to the exactness of that statement, it has been deemed advisable to publish the names and addresses of the new subscribers received in this office for this journal during the twenty-six working days of September last, as follows:

Alaska.

W. K. O'Brien, Juneau.

Arizona.

W. H. Smith, Tempe.
J. A. Newman, Signal.
Jno. Odell, Columbia.

California.

Otto Kattenborn, Shasta.
W. A. Barnes, Fullerton.
E. A. Gilbert, cr. University of Cal., Berkeley.
Cal. Exploration Co., No. 229 Cal. St., S. F.
Phœnix M. & I. Co., Nevada City.
H. A. Stenger, Nevada City.
Samuel Drake, Grass Valley.
J. L. Glynas, Grass Valley.
John Regan, Grass Valley.
J. D. Purcell, Grass Valley.
T. J Murry, Granite Station, via Bakersfield.
S. G. Tenney, Graniteville.
L. E. Peck, Graniteville.
Richard White, Grass Valley.
Al. Hall, Grass Valley.
A. E. Williams, Grass Valley.
F. Maurer, Grass Valley.
J. T. Hooper, Grass Valley.
C. F. Maloney, Box 388, Grass Valley.
D. Aitken, cr. Empire mine, Grass Valley.
Henry Watson, Box 413, Grass Valley.
Wm. Campbell, Box 486, Grass Valley.
Geo. Stacey, Grass Valley.
F. W. Barkhaus, No. 213 Kearny St., S. F.
M. G. Eyre, No. 608 Commercial St., S. F.
Rix E. & S. Co., No. 507 Market St, S. F.
Korbel & Bros., No. 723 Bryant St., S. F.
Y. M. C. A., Mason and Ellis Sts., S. F.
Wm. Jones, Grass Valley.
Elam Biggs, Grass Valley.
R. H. Brereton, North Star mine, Grass Valley.
Thomas Noble, Descanso.
F. M. Macmasters, Daggett.
Hugh Rogers, Nevada City.
J. T. Riley, Grass Valley.
N. E. Cavanaugh, Allison mine, Grass Valley.
T. Macauley, Grass Valley.
P. J. Donovan, Grass Valley.
Taylor Bros., Grass Valley.
James Southern, Grass Valley.
H. L. Body, Grass Valley.
M. L. Kelleher, Grass Valley.
Chas. Caswell, Ferndale.
D. Harrigan, Stent.
H. A. Kuns, Forest Hill.
H. G Ponting, Auburn.
Merced G. M. Co., Coulterville.

Colorado.

W. E. Comstock, Altman.
J. G. Cohoe, Box 565, Cripple Creek.
J. T. Johnston, Victor.
W. L. Beaty O. S. Co., Goldfields.
M. R. McLeod, Goldfields.
F. R Griswold, Macon.
P. Dugger, Macon.
F. Gilpin, Macon.
F. J. Campbell, Macon.
James Worden, Box 5, Macon.
M. R. Valentine, Highlands.
Julius Visene, Cripple Creek.
L. O. Byrer, Box 66, Victor.
Thos. Davis, Anaconda.
John Switzer, Anaconda.
D. W. Jones, Anaconda.
Harry Haskins, Anaconda.
J. H. Boody, Cripple Creek.
W. S. Hatfield, Box 1521, Cripple Creek.
F. L. Wilcox, Cripple reek.
A. E. Hearys, Box 1328, Cripple Creek.
H. L. Brown, Box 315, Cripple Creek.
W. D. Thayer, Cripple Creek.
J. D. Kavanagh, Las Animas.
R. K. Humphrey, Idaho Springs.
Wm. M. Welsh, No 1713 Wazee St., Denver.
John Owen, Idaho Springs.
D. Palaoro, Box 151, Idaho Springs.
J W. Murray, Russell Gulch.
F. Dalsasso, Central City.
N. J. Pike, Idaho Springs.
J. N. Bradley, Idaho Springs.
R. H. Rickard, Russell Gulch.
Chas. Rice, Russell Gulch.
Matt Lewis, Russell Gulch.
Wm. Boardman, Idaho Springs.
J. J. Elliott, Idaho Springs.
A. D. Bullis, Idaho Springs.
Martin McHale, Box 522, Leadville.
C. H. Wood, Leadville.
Jerome Clark, cr. Sedalia mine, Leadville.
T. J. Bristow, Box 757, Leadville.
P. E. Doyle, No. 716 E. 9th St., Leadville.
C. H. Stine, Box 345, Leadville.
H. K. Brown, Leadville.
Thos. G lroy, No. 205 E. 4th St., Lea ville.
J. M. Wright, No. 214 E. 10th St., Leadville.
Henry Kilmer, Box 406, Leadville.
J. W. Cronan, No. 112½ E. 6th St., Leadville.
J. E. Perkins, cr. Index mine, Leadville.
Geo. Mackay, No. 616 E. 11th St., Leadville.
M. J. Riley, No. 528 E. 7th St., Leadville.
J. R. Amburn, No 521 E. 5th St., Leadville.
S. F. Parrish, M. E., Leadville.
J. J Fitzgerald, Victor.
W. H. Pleasants, Victor.
J. D. McIntosh, Victor.
Samuel Stearly, Victor.
T. A. Morse, Box 644, Victor.
Chas. Strickler, Box 680, Victor.
J. P. Hogan, Box 175, Victor.
Ed. Benson, Victor.
G. F. Sullivan, Box 691, Victor.
J. F. Milliken, Box 83, Elkton.
G. H. Dickson, Box 98, Altman.
Jas. Hall, Altman.
O. N. Brown, Box 383, Cripple Creek.
W. H. Leonard, Box 1663, Cripple Creek.
R. R. Kermick, Box 1601, Cripple Creek.
J. H. Laville, Box 1817, Cripple Creek.
O. A. Blockwood, Box 25, Macon.
A. B. Rankin, Altman.
G. F. Phillips, Box 83, Altman.
E. A. Clark, Box 96, Altman.
Western Chemical Co., Box 1605, Denver.
N. T. Stephens, Blackhawk.
W. J. Richard, Bald Mountain
James Haskins, Box 104, Bald Mountain.
A. O. Uren, Russell Gulch.
H. Dalley, Russell Gulch.
Wm Ryan, Central City.
Thos. Dennn, Central City
J. P. Matthews, Central City.
Thos Rowe, Central City
E. C. Ferguson, Central City
Edward Carter, cr. Saratoga mine, Central City.
D. M. Scharrer Box 302, Central City.
H. D. Hannor, Bald Mountain.
L. E. Pennock, Blackhawk.
W. B Stewart, Box 260, Blackhawk
W. S. Blaine, Blackhawk.
T. C Reed, Blackhawk.
H J. Lyon, Central City.
W. H. Knowles, Central City.
Thos. Osborne, Central City.
Sherman Poole, Central City
Temple Machinery Co., 1513 Wazee St., Denver.
J. A. Herzinger, Boulder.
John O. Clark, Ward.
J. P. Loftus, Ward.
C. Enderton, Ward.
Geo. N. Lloyd, Box 747, Colorado Springs.
E. A. Stephens, Box 132, Victor.
Jarvis & Blaney, Box 94, Colorado Springs.

Nebraska.

Henry K. Rosenberger, Bower.

South Dakota.

J. A. Greencugh, Greenmont.

Tennessee.

J. G. Smith, Hohenwald.

Utah.

H. W Gibbs, Bingham.
Dexter G. M. Co., Auerbach Bldg., Salt Lake City.
T. B. Cook, Atlas Blk., Salt Lake City.
John P. Hill, Atlas blk., Salt Lake City.

Washington.

D. J. Wyncoop, Ahtanum
Wm Butters, Spokane.

Idaho.

H. E. Hepner, Florence.

Kentucky.

H. Struby Jr., Versailles.

Maryland.

C. H. Unverzagt, No. 428 Equitable Bldg., Baltimore.

Massachusetts.

Frank M. Coe, Springfield.

Minnesota.

C. F. Potter, No. 217 7th st., Minneapolis.

Mississippi.

H. L. Moore, Corinth.

Nevada.

Wm. Painter, Wadsworth.
M. Moran, Ruby Hill.

New York.

I. L. Luckenbach, No. 215 Produce Exchange, N. Y. City.

British Columbia.

R. E. Brown, P. O. box No. 151, Victoria.
Edmond E. Barchard, Fairview.
Rossland Club, Rossland.
Phelps Johnson, No. 15 Windsor Hotel, Montreal.

Mexico.

L. H. Morton, M. E., Apartado No. 109, Monterey.
C. A. Grabill, Santa Eulalia (Muca Vieja), Chihuahua.

Foreign.

Chas. F. Hoffmann, Blagowestschensk, Siberia.
Vivian K. Spear, Santa Domingo mine, via Mollendo, Peru, South America.

Any one who has the slightest doubt as to the truth of the statement referred to is cordially urged to write to any one of the above names and ask if the statement, so far as he is concerned, is true. It is believed that no better proof can be given of the precise veracity of the little item in the issue of October 2nd than is here offered. In this regard it may be said that the policy of this paper has been to let advertisers alone and to direct money and ability to increasing the value of the paper and its circulation. So far as advertising is concerned, it may be said that an advertisement of mining machinery or anything else likely to be wanted by the men who read this paper is of value to the advertiser in exact proportion to its paid circulation. In some cases a paper is apparently published only for private distribution; and while the advertiser and a few of his business competitors may see it, it is doubtful whether any possible or probable customers will. This is believed to emphasize the chief value of this paper as an advertising medium

Without resorting to any of the usual newspaper schemes to induce and acquire large circulation lists, but solely on its merits, this paper has honestly secured what is believed to be the largest circulation of any paper of its kind in the country. It is not thrust upon anyone, but the fact that thousands upon thousands of men in all departments of mining industry in this country want it, and pay for it, is pretty good evidence of its value to them.

It will be observed that the statement in the issue of the 2nd inst. was that 179 new subscribers had been secured in September, chiefly in Colorado and California. Anyone taking the trouble to count the names in the above list will find that the statement was under rather than in exaggeration of the exact fact. The above list is published, not as indicative of any great abnormal growth during September any more than any other thirty days; but month by month the subscription lists show a substantial increase; nor is it desired that there be any parade made of this matter, but it is believed that where a thing is said it should be proved. It will be noted that the above list contains 183 new subscriptions received at this office during the twenty-six working days of September, '97, and is merely cited as a part of the reports of this office handed to the writer for inspection during that time. It is to be understood that the above are *new* subscribers, and there is no connection nor reference to the regular large list of renewals. These 183 new subscribers, it will be understood, constitute but a very small segment of a very large circle. It would require a special edition to print the names and addresses of our thousands of subscribers. It is fair to assume, also, that every subscriber means four readers.

It is further believed that this matter illustrates the fact that the MINING AND SCIENTIFIC PRESS is not a local publication, but covers a very large field in this west half of America. It shows that the attention of mining men everywhere is directed to San Francisco as a mining center, and is thus believed to be of direct benefit to this city. It is also illustrative of the great increase in the mining activity of the country. From time to time has been noticed in these columns the increase in the number of new mining journals. Those contemporaries will not take it unkindly when the belief is courteously recorded that the MINING AND SCIENTIFIC PRESS has in this field as many paid subscribers as all of them put together.

The "American Newspaper Directory," official authority on this subject, publishes the following unsolicited statements:

> Among the engineering and mining papers in California, none has credit for so large a regular issue as is accorded to the MINING AND SCIENTIFIC PRESS, published weekly at San Francisco. In fact, it fully equals five times the combined issue accorded to all the others.
>
> In all the States of the far West and the Pacific slope, consisting of California, Oregon, Washington, Idaho, Montana, Wyoming, Colorado, New Mexico, Arizona and Utah, the largest circulation credited to any publication devoted to engineering and mining is accorded the MINING AND SCIENTIFIC PRESS, and the publishers of the "American Newspaper Directory" will guarantee the accuracy of the circulation rating accorded to this paper by a reward of one hundred dollars, payable to the first person who successfully assails it.

As it was a prospective advertiser who expressed some doubt as to the accuracy of the statement made last week, it is probably in order to observe that, while it is neither the province nor policy of this paper to coax, beg or tease business men to advertise in its columns, yet it is respectfully submitted that any live business man will realize that a paper read by so many thousand probable customers everywhere is undoubtedly the best medium in which he can best advertise what he has to sell. As in other things, a good deal of good money is fooled away in advertising, usually in journals that have no circulation and are therefore of no value, whose editorial utterances are controlled entirely by its patrons, and who usually have but "one rate" for space, namely, that which is offered by the advertiser.

In connection with this entire subject of the large circulation of the MINING AND SCIENTIFIC PRESS occurs one more fact, namely, the unusual ability of this paper to hold its old subscribers. It is but the simple statement of a business fact that the discontinuance of a subscription to this paper—except from the ordinary fluctuations of life and death—is so rare an occurrence as to be remarkable.

It may appear in bad taste to devote so much space to these matters; but everything herein stated regarding large circulation has been often kindly and widely commented upon in a most complimentary way by so very many of our contemporaries that the writer may be pardoned for directing attention to a fact that has been so often and so pleasantly referred to by others.

Do You Know THAT THE

MINING AND SCIENTIFIC PRESS

HAS THE LARGEST CIRCULATION OF ANY PAPER OF THE KIND IN THE COUNTRY? : : :

. . THAT IT IS THE ONLY PAPER OF ITS CLASS . .

THAT GIVES THE EXACT FIGURES OF ITS CIRCULATION?

—♦—

It is Weekly Read by More Than 25,000 Men in Every Department of Mining and Mechanical Industry.

—♦—

IF you want your business advertisement seen by the *MEN TO WHOM YOU NATURALLY LOOK FOR BUSINESS* put it in the

MINING AND SCIENTIFIC PRESS.

ESTABLISHED MAY, 1860.

—♦—

A paper that has led in its line for over thirty-seven years must have the qualifications that entitle it to the patronage of intelligent men who realize that, while advertising pays, money is thrown away that is given for advertising in papers with no circulation and which give no results.

It is not what Advertising Costs, but what it Produces, that Determines its Value.

The MINING AND SCIENTIFIC PRESS produces satisfactory results to those who use it. : : : : : :

Economy is the judicious expenditure of money. It is sometimes economy to save ten cents; it is sometimes economy to spend a thousand dollars. Economy in advertising means to put your advertisement where it will do you good.

Success or failure depends upon profitable advertising. Our patrons find an investment in our columns a profitable one.

Electrical Progress.

Electric Metering from the Station Standpoint.*

NUMBER II.

By CARYL D. HASKINS.

The methods which are commonly practiced in tampering with meters can scarcely form any proper part of a technical paper; but as this paper may go into the hands of some who need the knowledge to guard themselves and their interests, it can do no harm to briefly state the common methods used, not only that they may be guarded against, but also that meters may be selected which lend themselves least readily to such practices. It is not unusual to place large masses of iron above, below or at the side of meters, but this practice is falling somewhat into disrepute among its advocates, since even they have in time discovered that there is a class of meter which it accelerates.

Electro-magnets, drawing their energy from the circuits under measurement and used as the iron was formerly used, are now not uncommon, and it is difficult to prove deliberate evil intent.

Meter covers and cases are drilled, and wires, broom straws and the like inserted. Covers are "pried" up and healthy colonies of spiders introduced.

Ingenious individuals have even been reported as finding profit in a clever apparatus for injecting fine iron filings into meters by means of a bellows.

All of these things need to be watched for and guarded against.

The question of installation and care of meters is a wide subject, and in connection with it I shall endeavor to mention only a few salient points, selecting those which are most commonly overlooked or neglected.

The most radical cause of trouble in connection with installation is vibration and the consequent reciprocating motion of the shaft. For this reason the most solid of foundations should be selected, the neighborhood of moving machinery should be avoided, as should also partitions of light construction in which doors are located. The rhythmic vibration of moving machinery is infinitely more dangerous than occasional heavy shocks.

Meters should be installed as near to the foundation as possible, not, as is now quite common, at the top of buildings, where the amplitude of all vibrations is, of course, much greater.

Locations where great variations of temperature occur are undesirable. For this reason, also, basements are preferable to attics.

A very common error, causing the loss of very many meters annually by the burning out of the potential circuits, occurs in connection with the metering of power delivered to motors. In the effort to save the very trivial amount of energy passing through a potential circuit it is very common to install meters on the motor side of the controlling switch. This not only exposes the meter to the full force of the field discharge, but it also results in the constant cooling and heating of the potential winding, and the resultant expansion and contraction chafes and weakens the insulation and also weakens the wire itself at the turns, opening the path for a final breakdown either by a lightning discharge or by a field discharge.

As to the care of meters, it is a fallacy to suppose, as many insist upon doing to-day, that meters should require no care whatever. Almost all meters will continue operative for a very long period without any care whatever; but the cost of a cleaning and testing visit twice annually is trivial as compared with the good results which follow such a system by reason of the better light-load accuracy obtained. It is not, I think, too strong a statement to say that such a system will have an influence for good, amounting to from 3 to 5 per cent on the meter readings annually.

Central station managements have probably given more attention to systematic methods of meter reading than to any other one point contributing to success. The old and faulty plan of reading the dials of a meter at the time of the visit to the meter is fast giving place to the better system, which provides the reader with a facsimile of the meter dial in blank upon a page of his meter book. This facsimile is roughly marked in pencil to indicate the position of the hand at the time of the visit. These facsimiles are taken into the office and are all read by one individual who is an expert in meter reading, who sets down the consumption under the facsimile on each page. Such a system commonly reduces the errors from about 10 per cent per month, where they not uncommonly stood under the old system, to materially less than 1 per cent under the new; for, surprising as it may seem, it is an extremely easy thing to make mistakes in reading meter dials.

In changing from the old and not infrequently popular contract system, a good many central stations in the earlier days made the grave blunder of going on to the new basis during the winter months, with the result that the highest bills of the year reached the customer after a long period of indulgence under the contract system, and the result at times proved temporarily disastrous.

Even to-day the pernicious influence of uniform bills the year through, which was created by the contract system, still lingers; and the proportion of customers who complain because their winter bills are materially higher than their autumn and summer bills is quite considerable.

It will be said that the explanation is sufficiently simple; but, unfortunately, however good and however simple the explanation, it has proved no simple matter to secure its acceptance and credence. I have lately been much impressed by a system which has recently been adopted by a prominent Western company to at least partially offset this difficulty. During the months which are growing darker they read their meters a day or two earlier each month, thus arbitrarily creating shorter months, whilst as the year progresses to the period of lighter days the months are lengthened. This somewhat tends to even up the bill, is apparently quite as satisfactory to the customer, and is certainly entirely just and has created a very great falling off in the complaint list, for the character of the complaint keeps pace with the period of the year. Out of the hundreds of complaints which I receive annually, I find that by far the greater proportion in the summer are of slow meters and in the winter of fast meters.

(*To be Continued.*)

*Read at the Fourteenth General Meeting of the American Institute of Electrical Engineers, Eliot, Me., July 27, 1897.

Smelting by Electricity.

D. Tommasi, in a paper published in the July number of *Moniteur Scientifique*, describes a new process of electricity for separating and refining metals, of which the following is a brief abstract:

"The anodes are either cast plates or granulated material, resting in direct contact with the positive leads. The cathode is a vertical disc, capable of rotation about its horizontal axis. Only the lower portion is immersed in the electrolyte, and the upper part is passed during rotation between scrapers that effect the removal of any spongy deposit, transferring it to channels by which it is conveyed to a convenient receptacle. The disc is constructed in replaceable sections, when a reguline deposit is to be obtained, and the sections are one by one removed mechanically as they attain sufficient thickness, and are plunged beneath a fluid bath of the metal under treatment until the deposit has been melted away and the sector is ready for use again. A solid disc is preferred for spongy deposits. The advantages of this arrangement are that polarization is prevented by the rotation of the cathode and by the action of the scrapers, and the liquid is sufficiently agitated to prevent separation into layers of different density, while the spongy deposits are removed as fast as they are produced, thus preventing oxidation by the liquid and the occurrence of local action. At the same time the electrodes may be allowed to approach more closely, owing to the impossibility of short circuiting through irregularity of deposit, and the resistance of the bath is therefore sensibly diminished."

Care of Dynamos.

From recent remarks by J. E. Bates before Los Angeles Association, N. A. S. E., on the above subject, is taken the following extracts:

Examine the entire machines thoroughly to make sure that there are no screws or connections loose or out of place. See that the machine has sufficient oil. In case of self-oiling bearings see that the rings work freely. See that the belt has the proper tension. The machine may now be started slowly and the brushes lowered to make contact with the commutator, the main switch being left open. The brushes being set properly the machine may now be gradually brought up to full speed—watching closely in the meanwhile that no faults develop. Always be ready to shut down instantly in case everything is not right. It has been customary, in some cases, to bring the generator up to full speed before lowering the brushes into contact with the commutator, but there is no reason for this other than that the engine might turn the machine against its brushes—due either to ignorance or carelessness in starting. The advantage in lowering brushes while running slow is that voltage comes up slowly and that any fault or difficulty will develop slowly and the machine can be stopped before any great injury can be done. In fact, if the machine is working alone on a system and if free from short-circuiting any other machine or storage battery in the same circuit, it may be started up with main switch closed, in which case the E. M. F. and current feel their way, so to speak, through the whole system, and any trouble manifests itself so slowly that it can be taken care of before serious injury results. If, however, a generator is to be connected to another, or to a circuit having other generators working upon it, the greatest care should be taken. Get the machine up to speed and everything going properly, voltage of machines equal; close main switch, shift brushes to neutral point of the sparking and again equalize voltage. There are various ways of coupling dynamos, but the subject is necessarily too long to treat here. After the machine is started and carrying her proper load it requires very little attention while running. Of course, if a machine has been standing idle for a long time, is a new machine, and changes have been made, or weak points suspected, it would be advisable, we might better say, necessary, to watch it closely for awhile.

It is always well to give bearings of a new machine plenty of oil at first. A new machine should be run without load—or at least a very light one for an hour or so, as it is objectionable to start a new machine with its full load—or in other words, its safe carrying capacity in amperes. If possible the machine should be shut down when any trouble, or indication of trouble, appears so as to avoid injury and give time to look up faults. Keep all tools or pieces of iron or steel away from the machine while running, as they might be drawn in by the magnetism and perhaps get in between the armature and pole pieces and ruin the machine; for this reason use brass or zinc oil cans around a generator. Never lift a brush while machine is running, as it might make a bad burned spot on the commutator, unless one or more brushes are on the same side to carry the current. Touch the bearings and field coils occasionally with the back of the hand to see if they are getting hot. To tell if the armature is running hot, place the hand in the current of air thrown out from armature. Do not handle or touch any connections, switches, binding posts, bare wires or bare metals in circuit, unnecessarily. Never use waste on commutator; always use chamois skin or a piece of clean cloth. Extreme precaution must be taken for pressures of 500 volts or over. In stopping a dynamo use the same general precautions as at starting; in addition examine machine to see if it is dangerously warm. If the armature or field coils are too warm to bear the palm of hand continuously, they may be considered to have passed the safe limit.

In handling generators there are faults liable to arise, such as sparking at brushes, heating of armature, heating of fields, heating of bearings, noise, speed too high or too low or dynamo fails to generate. We will begin at the most common fault—sparking at brushes. The most fruitful cause of this trouble is poor design, although at present electrical machinery in general is so well designed that this point could hardly be considered, except in some of the older types of machines. Some of the latter will spark more or less. If the sparking of these has been reduced to the minimum, our engineer has fulfilled his part perfectly, or as well as lies in his power. If armature carries too much current or load, brushes not at neutral point, commutator is rough, out of true, has a high bar, a flat or low bar, brushes make poor contact, a short circuited coil, a broken circuit, or weak fields, either will cause more or less sparking.

Heating in armature is caused by excessive current in armature coils, short circuited armature coils, moisture or Foucault or eddy currents in coils. Heating of the field magnets is caused by excessive current in field circuit, Foucault currents in pole pieces or moisture in field coils. Heating of bearing is caused by lack of oil, grit or other foreign substances in bearings, shaft rough or cut, shaft and bearing fit too tight, shaft sprung or bent, bearings out of line, thrust or pressure of pulley, collar or shoulder on shaft against one or both bearings, too great a load or strain on belt, armature too near one pole piece, producing much greater magnetic attraction on one side than the other, a short circuit across commutator, or bearings too close together, leaving no end play for armature.

Noise is caused by vibration due to armature core being out of balance, vibration due to armature striking pole pieces, pulley being out of balance, shaft shoulders or collars rattling against bearings, rattling due to loose parts, as screws, etc., flapping of belt, pounding of laced belt joint as it passes over pulley, slipping of belt on pulley, due to looseness of overload or humming of armature core teeth, if any, as they pass pole pieces, speed too low when belt slips, machine overloaded, a short circuit in armature, armature striking pieces, or shaft sticks in bearings.

Sometimes the speed is too high, as when load is suddenly thrown off, a fuse blows, or the field magnetism is weak. These speed changes will not take place if the engine or other driving power has a governor sufficiently sensitive to keep speed constant under the variations of load. A dynamo will not generate when there is a short circuit in machine or external circuit; *i. e.*, if external circuit is connected to machine at time of starting. When field coils are opposed to each other, an open circuit, due to broken connection, brushes dirty, safety fuse gone, or absence of residual magnetism in fields. A shunt machine will not pick up (as a general thing) until up to or nearly up to speed, whereas a series machine will pick up in the majority of cases as soon as or nearly as soon as armature begins to revolve. In some rare cases a shunt machine may be a long time, even an hour or more, in building up, due either to dirty brushes or sluggish fields, or both.

In conclusion, let me say that the one thing above all others we must bear in mind is to "keep her clean," both as to looks and working parts, as where we have dirt, trouble and failure on the one hand, we have cleanliness and success on the other.

Scientific Progress.

A Bunsen Burner for Acetylene.

An interesting item regarding the use of acetylene as a heating agent occurs in the *Chemical News*. A. E. Munby writes: "The cheap production of calcium carbide has placed a powerful illuminant within the reach of those who possess no gas supply, but so far little has been heard of the use of acetylene as a heating agent. Our laboratory is, so far as we know, the first to make use of the gas for this purpose. We employ a Bunsen burner of special dimensions, the tube being five millimeters in internal diameter. A slightly wider tube may be used, provided the mouth be curved inward, so that the actual exit does not exceed the diameter mentioned; if larger, the flame tends to strike down. The gas jet is very small, being only capable of delivering about one cubic foot of acetylene per hour under 6 inches water pressure, such a rate of consumption giving an ordinary working flame. The air holes and collar are arranged as in an ordinary Bunsen, the exact size of the former not being of much importance, provided they be large enough to admit the air required. A generator capable of giving gas under 7 inches water pressure, with the full number of burners in use, is required. The heating effect of the flame is, of course, very great, enabling one to dispense with the blowpipe for some operations, such as small fusions. * * * It would seem that in practice, for equal volumes burned, the acetylene has nearly twice the heating power of coal gas."

Scenery of Spitzbergen.

Sir William M. Conway and his companions found Spitzbergen, of which they were the first explorers, a very different country from what it was supposed to be. The general impression was that a continuous ice cap would be found, and they expected it; but "in place of a frozen surface they met with crevassed, sloppy glaciers, surrounded by miles of quaking bogs and innumerable watercourses"—a perpetual thaw produced by the perpetual day of a brief arctic summer, in a region emerging, as it were, from a glacial epoch. Of course the opposite conditions of relentless ice prevail in winter. Why should men be attracted to such countries, as Arctic explorers who have gone once seem to be time and again? Sir William gives one of the reasons. "The Arctic glory," he says, "is a thing apart, wider, rarer, and no less superb than the glory of any other region of this beautiful world. Here man has no place, and there is no sign of his handiwork. Nature completes her own intentions unhelped and unhindered by him. Such pure snows no Alpine height presents, nor such pale blue skies, nor that marvelous, remote, opalescent sea with its white flocks and yet more distant shores. No Alpine outlook penetrates through such atmosphere, so mellow, so rich."

Interest in Antarctic Regions.

The Royal Geographical Society in London has determined to take upon itself the responsibility of organizing a private expedition to the Antarctic regions. The British Admiralty has promised to assist such an expedition by the loan of instruments and by advice, and it is probable that, although unable to undertake the whole responsibility, the Government will greatly aid what would undoubtedly be a national enterprise. The uttermost parts of the earth have never been so sought out as at present, and the Antarctic is now attracting attention as well as the Arctic. A Belgian expedition sailed on July 25th for the Antarctic region. All that is known of the Antarctic at the present time is that nobody has got nearer to the South Pole than 720 miles. Icy barriers exist which eclipse those of the North Pole; mountains have been discovered of lofty altitudes, and some of them are volcanoes. The land is covered with snow at all times of the year, and no human being has been met south of fifty-six degrees; no land quadruped is known to exist beyond sixty-eight degrees, and no vegetation of any account has been seen beyond fifty-eight degrees. Andree and Peary are searching for the North Pole, and it is hoped that through the explorations in the Antarctic regions more will ultimately be known of the South Pole.

Mechanical Progress.

Forced Lubrication of Engines.

For all kinds of engines forced lubrication gives the same advantages; namely, automatic lubrication, noiselessness, economy and freedom from wear. This last is due to the working surfaces being kept apart by the film of oil forced between them. Although the pressure per square inch on the bearing itself is far in excess of the oil pressure used, yet the relaxation of pressure on the return stroke in a double-acting engine permits the oil at these times to be driven between the metal surfaces, and during the fraction of a second occupied by the acting stroke the film of oil cannot be squeezed out. This might indeed be readily taken for granted, and is clearly proved by the absence of wear in a large number of engines built. It is obvious that the oil is in the best position to take advantage of the momentary relaxation of pressure between the surfaces, if it is itself under pressure sufficient to push between the brass and the journal, so as to flood the bearing completely. If the oil is supplied by gravity alone, under the head, usually given in double-acting engines, there is not sufficient time for permitting it to penetrate to any distance. In a single-acting engine under constant thrust, no such film is possible. In both the latter cases the journal will, of course, be greased; but if friction and consequent wear of the journal are to be absolutely prevented, such a film of oil as the forced lubrication provides between the journal and brass is essential. The better the body of oil, the less chance will there be of effective lubrication without adequate oil pressure.—Marcom.

The Wear of a Locomotive.

The managers of the New York Central Railroad resorted to an expensive and painstaking method recently to find out what parts of an engine wear out most quickly, and in what ratio the several parts wear out. Their famous engine, No. 870, which, in the opinion of many railroad men, excels even the noted No. 999, was taken into the shops and completely overhauled. It was taken apart, and every piece of the engine, from the ponderous driving-wheels to the smallest bolt and nut, was separately weighed. The greatest care was taken to see that the weighing was accurate. When every part had been weighed skilled mechanics were put to work to reassemble the engine, and when complete it was again put into active service on the road. Some months afterwards it was taken back to the shops and completely dissected again. Once more every part was separately weighed, and the record was compared with the former one. Then the master mechanic knew just how much the engine had lost in weight through the wear of a known amount of work. The records of the weights of the several parts showed which parts were subject to the most wear. In both instances the small parts of the engine were weighed on a pharmacists' scales. When the exact figures have been made known they will doubtless prove interesting.

It is stated in *Machinery* that acetylene is now in use in several of the Paris omnibuses. The generator weighs about twenty-nine pounds, and is carried under the front steps. Each load of carbide is about .71 pounds, and produces about 3 cubic feet of gas, which is enough for six and one-half hours, with a light of sixteen candles.

Coast Industrial Notes.

—The ship John Ena, bound for Port Pirie, carries the largest cargo of lumber that ever went out of Puget sound.

—The Sunset Limited train, heretofore running to San Francisco via New Orleans, will be transferred on October 19th and run via St. Louis and El Paso.

—The Terry lumber plant in Shasta county, Cal., employs 150 men. Seven miles of new railroad have been completed. The plant has a capacity of 60,000 feet a day.

—Within the past two weeks thirty-one separate filings have been made in Arizona announcing notice of intention to construct 3000 miles of railroad in the Territory.

—On the 1st inst., the contractors sent 100 men and teams to Kramer, Cal., to begin work on the railroad to Randsburg. The line will be twenty-eight miles long, and is to be completed Jan. 1st, '98.

—At a recent meeting of the San Diego Yukon Mining Company sixteen young men signed the articles of the company, pledging to give $500 each and join in the co-operative effort to mine along the Yukon.

—Claus Spreckels paid $54,000 to the Custom House of San Francisco this week for duties on machinery for the manufacture of beet sugar, recently imported by him from Europe. The machinery cannot be made here.

—Yamhill county, Or., hop crop is estimated at 400 bales. It is worth, at present quotations, $100,000. The significance of this appears when it is understood that this is the product of less than 600 acres of ground.

—The statement of the earnings of the Northern Pacific for the second week in September are the most remarkable of any road in the United States. The earnings were $529,455, which is an increase of over $100,000 over the amount for a similar period last year.

—H. C. Dillon of Los Angeles, Cal., a director of the Nevada Southern railway, states that the end of the litigation which was brought about by ex-Mayor Carlson of San Diego is about to come, and that the extension of the road from Vanderbilt to Good Springs will be started soon.

—It is the intention of the Robertson Raft Company to build three big rafts next year at Stella, Wash., on the Columbia river. The demand for fir piling from the Columbia river is steadily increasing in San Francisco, which uses annually large amounts on account of the ravages of the teredo, which each year destroys many thousands of piles.

—The Los Angeles *Times* says: The thirty-day suspension of oil production has proved impracticable, and, after ten days of idleness, the pumps must be started to supply the market and fill contracts. What has become of that alleged surplus is something of a mystery. Perhaps it never existed, but was a myth invented for the purpose of keeping the price of oil below the dollar mark.

—An attempt is being made to revive the Yuma canal scheme of boom times, by which water was to be taken from the Colorado river twenty-five miles above Yuma and used to irrigate fifty miles of desert country on this side of the line and 100,000 acers across in in Sonora. The Attorney-General of California some years ago gave an opinion that the waters would not be allowed to be taken out of the United States for irrigation purposes.

—The Flagstaff, Arizona, *Sun-Democrat* says it is estimated that the Santa Fe Pacific Railroad Company will expend in the neighborhood of $500,000 in water storage dams this year in the counties of Yavapai and Coconino. The dam at Seligman is estimated at $185,000, and the ones at Ash Fork and Walnut will reach considerable over $125,000 each. This company is sparing no expense in making the western division of their line second to none.

—The phenomenal demand for lumber has depleted San Francisco yards, and many firms have been obliged to refuse orders, although mills are running full blast. In consequence, the price has advanced from $9 a thousand two months ago to $13 at present. Shingles are in great demand east of the Rocky mountains, the average Eastern shipment being 2000 carloads a month. The price of shingles has recently advanced from $1 a thousand to $1.35, with prospects of a further advance.

—Bids on a municipal water plant and supply for the City and County of San Francisco were opened last Monday at a meeting of the new Board of Supervisors. There were four bidders, who put in estimates ranging from $2,000,000 to $16,000,000. Edward Ewald proposed an artesian supply. The water rights of the El Dorado Water and Deep Gravel Mining Company were offered, a supply from Lake Tahoe was tendered, and the fourth bidder was the company which controls the Castroville lakes, in Monterey county.

Personal.

S. B. Milner has resigned the management of the Geyser-Marion, Utah, mining property.

H. Blauvelt is the new superintendent of the Gladiator M. & M. Co., Yavapai county, Arizona.

Clarence King is examining the Black Warrior and Continental properties, Globe, Arizona.

Leopold Meyer, from Belgium, is the next superintendent of the Drake and Tryon mines, Angels, Cal.

W. G. Dodd, of the Union Iron Works, has returned from a lengthened business sojourn in Montana.

Mr. Jas. W. Abbott, M. E., is now at Grant's Pass, Oregon, which he will make headquarters this winter.

J. D. McGillivray, en route for Dawson City on the C. H. Hamilton, when that steamer was stranded in the Yukon 400 miles below his destination, started in a canoe September 1st, and expected to reach there October 1st.

Major Heuer, U. S. Corps Engineers, is expected to return to San Francisco from Cincinnati about the 15th inst.

Philip Mixsell, the mill man of Idaho Springs, Colo., is in Mercur, Utah, examining the new milling plant at that place.

T. R. Warne, recently from Birmingham, England, is to have charge of the Cuprum Smelting Company's plant, Cuprum, Idaho.

H. A. Keller, who recently completed the Yerrington, Nevada, smelter, is examining copper properties on the Illinois river, Southern Oregon.

Henry Bratnober, representing the London Exploration Company, is back from the Klondike. He left Dawson City August 28th, and in an interview is made to say that "there is enough gold in that region to keep 6000 miners busy for the next three years," which he denies saying.

Jos. Ladue, "the founder of Dawson City," arrived in San Francisco last Thursday. In New York City he organized a mining and development company, and is here to get bids on mining machinery to be sent to the Klondike next spring. He expects a large city to be built on his townsite there, and says the company he represents purposes considerable work next season.

Commercial Paragraphs.

The Parke & Lacy Company, San Francisco, reports the sale of two 150x14 foot Ropp furnaces—one to Robert Lanyon's Sons' Spelter Company of Iola, Kan., the other to the Mountain Copper Company, Limited, of Keswick, Cal., and a hoisting and air compressor plant to Leopold Meyer for the Drake and Tryon property, Angels, Cal.

The Diamond Hills Gold Mining Company, located at Hassel, Montana, has just started up its plant. Embracing, as it does, the most modern practices in hydraulics, electricity and mining, a brief description will be of interest. The water is taken from Crow creek and conveyed a distance of 2¼ miles in a flume; thence it is led through a 42-inch pipe to four Pelton wheels, each 40 inches in diameter. The wheels are directly connected to a 500 K. W. three-phase General Electric generator, the power equipment being mounted on a common base and entirely self-contained. The power is transmitted electrically over 1¾ miles of wire to the mill. The mill consists of 120 stamps with rock breakers, Frue vanners, etc. The power at the mill is divided into several units, there being two motors for the batteries, one for the breakers and one for the concentrators. Thus, each unit is under individual control and the plant is readily handled. The hydraulic equipment, including the governing apparatus, was furnished by the Pelton Water Wheel Company, the electrical apparatus by the General Electric Company and the mining machinery by the Union Iron Works. The entire plant is said to be a model one in every respect and will be heard from as an economical ore producer.

The British Thomson-Houston Company of London, through its representative, A. K. Baylor, has just closed an important contract with the companies operating the tramway systems of Dublin, Ireland, and Barcelona and Madrid, Spain. The contract for Dublin includes all steam as well as the electric generating and motor equipment, and comprises six Allis horizontal engines of 500 H. P. each, six 500-kilowatt multipolar General Electric generators for direct connection to the engines, and complete switchboard and station equipment. The car equipment will consist of 150 complete motor and series parallel controller equipments, the motors to be mounted on Peckham trucks. This contract follows closely that made for the equipment of the Clontarf line of the Dublin tramway system, which will be opened within the next week or two. The apparatus for this was also supplied by the British Thomson-Houston Company. The contract signed for the Barcelona and Madrid roads covers five 400-kilowatt multipolar General Electric generators and three of 75-kilowatt each, all to be directly connected to the engine shaft. While the three latter will be lighting generators, they will also be wound for 500 volts. This contract also includes full station equipment.

President Coffin of the General Electric Co. is understood to be in London endeavoring to secure contracts for important underground electric work in connection with the new railway in London. His agents are also at work in various cities of the kingdom to secure contracts on new electric lines. The sentiment throughout the kingdom is growing stronger every day in favor of electric traction systems for surface lines. In fact, there seems to be, according to officials of the company, no end of work in sight for electrical concerns. There is a perfect revolution going on abroad in methods of transportation. The statement that the General Electric Co. has $15,000,000 worth of contracts abroad is considered within the limits of truth. There was a sensation in London quite recently, when it became known that a corporation of Liverpool sent to America for an engineer to construct about five miles of an electric system. The engineers in London have been raising a vigorous protest, which has served to stir up manufacturing concerns in Europe considerably. This may make competition with American companies more severe, but American engineers say that they are too far in advance to be beaten by foreign competitors to any great extent at present. Both the General Electric and the Westinghouse companies have large offices in London and other important centers in Europe, with exhibition rooms which attract many visitors every day.

Mining Summary.

CALIFORNIA.

Amador.

D. R. Reese, superintendent of the Amelia Gold Mining Company's work on the Muldoon mine says while they have passed through several ore bodies it is the intention to go down 1000 feet with the shaft before starting a drift. The shaft is a two compartment one of 67 degrees incline.

Ledger: Ten stamps of the Kelly mill have been hauled to the Evans mine to work cement gravel.

At South Spring Hill Supt. Tregloan is cutting a station at the 1200 level.

The Jackson Exploration & Development Company is sinking. The shaft is down 720 feet—three shifts being worked. The 500 east crosscut has been driven 250 feet, and drifting south on the ledge is in progress, about 25 feet having been made. A surface crosscut has been driven on the hill, about 550 feet south of the shaft, and a very strong and well defined ledge 5 feet wide, showing free gold, was encountered 65 feet from the mouth of the crosscut. Drifting north and south on this is in progress with three shifts.

Crosscuts at the 500-foot level of the Pocahontas have been run both east and west. The manager intends to erect a mill.

C. F. Ross has had charge of the Baliol mine since August 1st. The 40-stamp mill is kept in operation on low-grade rock, which is quarried out of an open cut and put into the mill by cars running from ore chutes. One of the chutes dumps into cars, which run direct into one of the ore bins in the mill, while one of the others is 65 feet above, and the ore is dropped that distance. The third is quarried into a chute from which cars run to the fourth level of the mill, and are hoisted to the ore bins by an elevator.

The work of drifting in the south part of the South Eureka mine from the shaft has progressed 1200 feet on the 900, 1050 and 1250 levels, and now the work of crosscutting and prospecting the south end of the property is in progress. The new shaft, which is being run to tap the ledge about 300 feet from the south line of the property, is down 290 feet. The 20-stamp mill is pounding up about thirty-five tons of ore per day.

The representatives of the Anita Gold Mining Company have paid $10,000 on account of the purchase price of the Anita mine. The last installment of $10,000 will be due Feb. 1, 1898.

Butte.

Fred Bachman of Enterprise this week sold his quartz mine, known as the Crystal Hill mine, to an Oakland company to be known as the Crystal Hill Mining Company. This mine has been developed by two tunnels, one 250 feet in length and the other 500 feet long. There is a 4-stamp mill on the property and the rock pays exceedingly well.

At Magalia about fifty men are employed at the Magalia mine. Six men are employed at the Bader mine.

At the Carter quartz mine, near Nimshew, twenty-five men are working on the eight-foot ledge. Sparks & Judson have struck gravel in the tunnel at a depth of 200 feet.

Calaveras.

(Special Correspondence).—F. McNear has bonded the Buckhorn group of four mines at Murphy's and has begun work on the same.

Lewis Lane (son of C. D. Lane) has secured the interests formerly held by F. McNear in the Mexican and Rocky Bar mines, at Murphy's, and, with Naylor Williams, formerly superintendent of the Mattison, and later of the Carson Creek mines, will continue work on the same.

(Special Correspondence).—On September 23rd the Dutch mine paid dividend No. 3 of 5 cents per share; 150,000 shares. The owners of the Greek mine, near El Dorado, have purchased the plant on the Falcon mine, near Murphys, and are moving it to the Greek. The last ore shipped from the Falcon brought the owner $400 a ton at Selby's.

The Jupiter mine, Dogtown, which has become famous through the mysterious disappearance of its manager, W. Keefer, has put several hundred miners and Chinamen to work, constructing a ditch and reservoir, with a view of operating this coming winter.

The Dora mine situated on Indian creek, north of Murphys, has resumed operations. The Taylor mines at Murphys are being developed for the California Exploration Co. The Buckhorn mine at Murphys will be developed under bond by F. McNear.

Owing to a disagreement among the owners the old Soulsby mine of Tuolumne will remain closed down indefinitely. A number of proposed Klondikers have taken their outfits to Calaveras to prospect there until spring.

Murphys, Oct. 1st.

All the water has been pumped out of the Stickle shaft of the Utica mine and a full force put to work.

Citizen: A 5-stamp mill is being placed upon the Paragon in the R. R. Flat district under the direction of Percy L. Shuman. Doe & Jackson are building an arrastra upon the recently discovered Shadyside mine in the Prussian Hill district. Lamb & Cook took out a $700 pocket last week at the Sunnyside mine, Prussian hill district. At the Petticoat mine, R. R. Flat district, drifting still continues on the 350-foot level. Two ore bodies have been cut, each 4 feet in width, which mill between $40 and $50 per ton, the assay value going much higher. A mill will be erected. Jas. Cullen, superintendent of the Thorpe mine at Fourth Crossing, has fourteen men at work drifting on the 600-foot level. The 10-stamp mill from the Starlight mine at Old Gulch has been moved to the Demarest mine, the property of Demarest & Fullen, of Angels. Upon the return of Mr. Fullen from Mexico the mill will be erected and the mine put upon a paying basis. Supplies are being hauled to the Greek mine, near Banner mill, recently purchased by Smith, Fienberg & Hetzel. A mill is to be erected at once.

The hoist of the Fellowcraft mine, near town, resumed operations last Monday. Operations on this property have been suspended for several months, owing to its being involved in litigation.

El Dorado.

At the old Limpinsel mine J. C. Diamond, who has the property bonded, will sink a double-compartment shaft, 5x8, 200 feet before prospecting to any extent.

At El Dorado Supt. Vance of the Starlight mine proposes to connect the north and south shafts by a level at the greatest depth, 270 feet. The shafts are 550 feet apart.

The Alhambra mine, or Red Bob mine, a mile east of Spanish Flat, is to be reopened and prospected. Some rich bodies of ore were found and not less than $45,000 must have been taken from the mine within 60 feet of the surface. The deposit from which the rich ore came is a pipe vein. There is a shaft on the ground 90 feet deep. The pay gave out at a depth of 60 feet and it is believed that the "pipe" of ore may have been missed by the earlier miners.

Kern.

At Randsburg the Butte Wedge is down about 400 feet, the Little Butte 350 feet, with reported good prospects in each; the St. Elmo is down 200 feet, with double combination skaft and fine hoisting works; the King Solomon is down 240 feet. Other mines vary in depth from 50 to 100 feet, and some claims, on which as yet mere prospect work has been done, have reached a depth of over 100 feet each.

G. M. Rose, who bonded the Irene and May Queen mines, two miles west of Randsburg, has paid the balance of the purchase price and has ten men at work. On the May Queen he has run a 200-foot tunnel and uncovered a ledge of ore. The Irene has been opened up with two shafts and ore has been struck in each.

The Yorkshire Lass Mining Company has organized; capital stock, $5,000,000. The Yorkshire Lass mine lies near Randsburg.

The Los Angeles *Herald* says the Little Butte Extension Mining Company has incorporated at Bakersfield; capital stock, $1,000,000. This mine is an extension of the Little Butte. It was opened up by three shafts by its former owners, and a certified assay of ore taken from one of these shafts at a depth of 20 feet shows a value of $117.18 per ton. Contracts have already been let to sink two 100-foot shafts.

The Rand Mining Company has leased the Visalia mill at Garlock and will ship their ore to that place for treatment.

Work is progressing rapidly at the new stamp mill site. The excavating is nearly finished and a cement foundation is to be laid at once. The frame for the assay office is up and the structure will be completed in a few days. All the machinery will be shipped from Los Angeles, and it is hoped to have the stamps dropping by the 1st of next month.

The Johannesburg Water Company has reduced the price of water from 60 to 50 cents per barrel. They will furnish the stamp mill, when running, with 40,000 gallons per day.

At the regular meeting of the Miners' Union at Randsburg last Saturday evening forty-five new members were received.

Mariposa.

(Special Correspondence).—In spite of disquieting Eastern rumors the Merced property is operating as usual. No work is being done except in the Mary Harrison, where about 100 men are employed in stoping, most of the work being done between the 400 and 600 levels. The ore body, which was about 10 feet wide higher up, has narrowed to about 3 feet on the 600 level, but has increased proportionately in richness, and is now said to carry bunches of very high-grade rock. A little over 100 tons per day is being hoisted and handled by the 40-stamp mill, the last cleanup of which is said to have been very satisfactory, showing a considerable profit in operations for the month. As the main shaft is down less than 200 feet, most of the ore from the stopes has to be hoisted by a skip through the old incline shaft to this level and then run in cars some 250 yards to the bottom of the main shaft. As the present output taxes this shaft to its utmost, no attempt at development is being made.

Good progress is being made at the Red Banks, and it is hoped the crosscut tunnels will cut the ledge in the Crown Peak early in December. Should this vein show as good in the crosscut as it does on the surface, it will make a valuable property.

There is considerable stir in mining circles lately and a large number of properties are under consideration. A number of well-known experts have been looking over Coulterville properties lately, including Arthur Pearse of London, J. P. Mitchell of Colorado, R. G. Brown of Bodie, and Messrs. Wiltsee, Newhouse and Ewing of San Francisco.

At the Garibaldi work has been suspended for the present.

The small test mill at the Louisiana has proven so successful that an addition of five stamps is to be made at once.

At the Selleck mine drifting is in progress on the 100 level, and sinking goes on to the 250-foot level.

It is reported that Col. Thos. Ewing of Oakland will start up the Horse Shoe Bend mines. These properties were under bond to Mr. A. Cable, but he threw up the bond in order to go to Klondike. The properties are owned by P. P. Mast of Springfield, Ohio, and others.

San Jose parties, under the direction of a Mr. Hibbish, are sinking on the Big Betsey mine, about five miles north from Coulterville.

The 10-stamp mill on the Williams property, between Coulterville and Priests, has been started up and is running satisfactorily.

Coulterville, Cal., Oct. 2d, '97.

Eastern owners report that "the Merced Gold Mining Company is making cleanups and paying its way at the present time—in fact, there is a small surplus over expenses, but the management deems it unwise to permit any figures to be known until a longer running is had upon the rock to determine more accurately its paying qualities. The annual report which the company files in Montana, where the company is incorporated, showing $1,200,000 paid-in capital, $333,330 paid for the property and an indebtedness of $23,020 gives no information, as the company is not obliged to file a report of its assets, or even its cash on hand. The indebtedness shown is the pay roll and monthly bills, and the offsetting assets are not given in this report. The company has a surplus in cash and supplies over all indebtedness."

Mono.

Register: The rich strike reported to have been made by Indians near Benton is a gold ledge west of Black Lake. W. S. Couch is developing the property, and recently worked three tons of ore from it which milled $30 per ton.

Nevada.

(Special Correspondence).—At the Independence a new pump is being placed, water having come in on the hanging wall last week. The owners (Chavanne & Fricot) are much encouraged over the indications, though they had already found a fissure previous to this.

Dr. Reely & Geo. Reilley have leased their mining property, known as the Norwich, in Boston ravine, within the city limits, to Wm. Richards and others, who have begun work. the property adjoins Massachusetts Hill.

At the old Empire the development work on the 2100 has been so encouraging that the owners feel warranted in sinking the main shaft to the 2200. Current report has it that the new discoveries make this practically a new mine.

Grass Valley, Oct. 3rd, '97.

(Special Correspondence).—The Champion Company are building an additional pipe line from one of their reservoirs to the mill. The line will be 600 feet in length and of substantial material, in keeping with everything else about this model plant.

The old Merrifield, which was closed about three years ago, when the shaft had reached 250 feet, is again the scene of active work. The shaft will be continued to great depth. This is now the property of the Champion Company.

The old Eagle Bird, in the Maybert district, which has been idle for several years, has been leased for eighteen months to working miners who have begun active operations to reopen the property.

Nevada City, Oct. 4th, '97.

Tidings: New work is progressing favorably on the Old Norambagua mine, four miles southwest of Grass Valley, owned by Wm. Campbell. This property has produced a great deal of gold, but was never worked below 500 feet. Mr. Campbell proposes to pump and retimber the shaft and go to greater depth. There is a tunnel 1100 feet, striking the ledge at 500 feet. The ore runs as high as $60 per ton and the pay chute is the longest in the district excepting that of the old Idaho. The formation is granodiorite.

Transcript: The negotiations between the syndicate represented by Thomas Mein and the owners of the Nevada City mine are said by Mr. Mein's San Francisco representatives to have been declared off. The owners would not accept the terms upon which the syndicate were willing to proceed with the development of the property, the terms of payment and the price offered both being unsatisfactory.

Transcript: Schubert & Charonnat are sinking on the McCutchan mine and are taking out some rich ore. The Mayflower is being worked by the owners with encouraging results. The mill is running steadily. The prospecting operations at the Chapman Ranch mine, which have been carried on for several months under the direction of the owners, are resulting very satisfactorily. A fine looking chute of ore is being opened up and if the favorable development continues a little longer the erection of a mill will be justified. At the Standard (formerly the Oro Fino) Supt. Joseph Thomas is putting things in good shape for thoroughly prospecting the ground this winter for Messrs. Neff & Coleman, who have the property bonded from Messrs. Caldwell & Curry. The old shaft has been cleaned out and the machinery and buildings put in condition.

The Maybert miners who have an eighteen months' lease on the Eagle Bird have an agreement that if a buyer for the mine comes along before the lease expires they will be fully compensated for the labor and materials they have expended to such time as they give it up. It is owned by L. Loupe of San Francisco. Most of the time it has been operated at a profit, but for the last year and a half has been idle. It has an 800-foot incline and the lessees will work it on the 500, 600 and 700-foot levels. There is a good hoisting and pumping plant and a 30-stamp mill with four concentrators. The machinery is run by water from the South Yuba river, brought to the works by a mile of flume.

Placer.

The superintendent of the Pioneer reports that the tunnel going north on the vein in the south tunnel was advanced 8 feet during the three days ending Sept. 18, making this tunnel 32 feet north of the cross-drift in the south tunnel. The vein in the face of the tunnel is 4 feet wide, and the ore is very good. The ore in the stopes holds out with no change in character.

Eastern directors say of Pioneer: "It is considered assured that the stockholders will receive a dividend soon. Earnings are declared very satisfactory, with better earnings in prospect, and the cash resources of the company are over $100,000."

Colfax *Sentinel*: The Azalea mine, operated by the Blue Canyon Mining and Development Company, is two miles west of Blue Canyon on the line of the Central Pacific Railroad Company. The company holdings consist of 960 acres of land. The company issued 40,000 shares of stock of the par value of $1 each. The stockholders pay in installments of 1 cent per month, making a total amount of $400 raised each month. Eighteen installments have been paid in and installment No. 19 has been called for. The company is composed of 138 shareholders, a majority of whom are railroad men. The mouth of the main tunnel is on Tunnel Creek canyon, a distance of 1500 feet south of the railroad. The tunnel has been driven a distance of 422 feet with hand drills. The company has just completed putting in an extensive plant to furnish power to run a power drill. The water is conveyed to a point above the tunnel by means of 750 feet of flume and thence to the wheel through 330 feet of 6-inch steel pipe.

The Bear River Hydraulic Company have men building the flume and laying the pipe from the South Yuba canal to Bear river, where the company will put in a hydraulic elevator to work the tailings in the river. Seven cars of lumber arrived at Secret Town siding last week and 4500 feet of 22-inch pipe has reached Colfax. The pipe line will give a pressure of 450 feet. The company hope to be able to make a trial run during the month of October.

The upraise at the big Eureka Consolidated gravel mine, above Forest Hill, has reached the 180-foot mark. The rock is very soft and some clay has been encountered. Prospects are good for breaking through very soon.

Plumas.

The Donahoo Mining Company of Fresno purpose to drive a tunnel into the lava-capped plateau two miles north of the Buckeye house, on the Quincy and Oroville road.

At the Carriboo Consolidated Mining Company's property on the north fork of the Feather river the large wing dam has been completed and two water wheels put in. There is one 40-foot pump running. A derrick is now in operation, hoisting 100 tons of gravel and rock daily. The hole is now down 10 feet in the river bed and the gravel taken out is paying well.

National-Independent: At Johnsville the Jamison mine employs thirty men. Mill and stopes are full of ore, twenty stamps dropping regularly. Superintendent, Sam W. Cheyney.

At the Plumas Eureka mine fifteen stamps are running. Ten men are employed. It is presumed that when winter comes Supt. Johns will close down until spring.

At the Willoughby mine in Gold valley returns from a six days' run with nine stamps, $1100.

Riverside.

The cyanide plant at the Good Hope mine, in operation working the tailings from the mill, employs fifteen men. Sixty tons of the tailings are treated daily, the average amount of gold extracted is $5.86 per ton.

At Paris the Gavilan Mining Company are at work on their claim seven miles west of Perris. They are down 325 feet and have run four drifts. The value of the pay rock is about $50, and San Francisco parties have been investigating the proposition for a 20-stamp mill.

Shasta.

The *Free Press* says that the men who have been working the crevices at the bottom of the Sacramento river near Redding, in search of gold, have given up the enterprise on account of the expense. A diver was employed at a salary of $25 per day, and much gold was obtained, but not enough to pay expenses and net a profit. The company operated near the Diestelhorst dredger above Middle creek.

The *Miner* hears that Simons & Weil, the principal owners of Windy Camp group of mines on Squaw creek, have agreed to give Hill and H. P. Winslow an extension of six months on the bond now held on that property. The bond was secured by Mr. Hill when he was manager of the Mountain Copper Company, Ltd., and he bonded it to the company.

The big blocks of high grade sulphurets recently brought to Shasta from the Behrens and Leivsay and the Bell and Scranton mines, on the west side of the Middle and Clear creek divide, says the Shasta *Courier*, are pretty good indications that large and valuable ore deposits honeycomb the entire ridge.

Near French Gulch, at the Three Sisters, owned by Ellery Bros., Cannon & Ellis, operations have ceased, the lessees claiming that, owing to the very brief period before the expiration of the lease, they would be unable to realize on the outlay of putting in expensive pumping works. The quality of the ore is unquestioned.

Free Press: Riordan & Shepard have recently leased from Gleaves & Baltzell the mining dredger which was built by the Shasta County Mining and Dredging Company. They cleaned the machinery and are now operating the dredger on the Sacramento river below Turtle bay.

Parties have just finished a boat at the Reid ferry for the purpose of conducting experimental mining operations at the bottom of the Sacramento river between the ferry and Middle creek. A cylinder or caisson of iron will be sunk vertically in the river and the water inside pumped out. A miner will then descend a ladder placed inside the cylinder and the gravel will be hoisted and washed for the gold contents.

Siskiyou.

Yreka *Journal*: Quartz from Morrison & Coburn's ledge in Quartz valley averages $30 per ton, the ledge varying in width from 6 to 16 inches. In one spot, a rich pocket, they found quartz which assayed over $17,000 to the ton, and may be able to strike more of the same sort as development work continues. It is known as the old Store ledge, from which the late Judge Steele realized over $50,000 in the early part of the '50 period, with very crude machinery for crushing the quartz. The quartz is taken to the new Erno mill. Great preparations are in progress for good winter work at mining all along the Klamath river,

in the Seid and Happy Camp sections, where there is an extraordinary scarcity of water at the present time, without any hope for a supply until winter rains commence.

Journal: The three years' litigation that has kept the Boyle mine closed and the entire property idle, has at last been satisfactorily settled, and the mine will be opened up immediately and put on a paying basis. O. O. Howard, Jr., of San Francisco, has settled with all creditors, and now has possession of the mine.

At the Katie May mine, on Greenhorn, Bailey & Carrick are running a tunnel and hope to strike the ledge within the next 10 or 15 feet.

Great activity is being displayed in quartz mining in the Humbug district, and some of the ledges in that section are to be developed on an extensive scale. Many of these ledges would justify the erection of a mill on them, as it has been satisfactorily proven of late, that ledges run down to a great depth. Quartz mines have not been extensively developed in this county in the past, most of the mining having been confined to hydraulic placer mining on the rivers.

All the river mines in Honolulu district from Humbug creek to Virginia Bar and Honolulu, are now worked day and night and Sundays, in order to get out all the gold possible while the river is low. Every claim is reported as yielding good pay, especially the old Phil Mott claim.

Sierra.

The mill at the Northern Belle mine is being moved to Downeville, where it will be put up on the mine at Slug canyon.

Messenger: There have been three mines bonded within the last week—the Sacred Mound, the Kentucky by R. Phalen and the Arctic near Gold lake by W. O. Peck of Loyalton. R. Phalen has men putting in a restraining dam on the Hilda. The Pride Mining Company are getting things in readiness for their spring work. The New York mine is still employing a few men.

Sonoma.

On the Stump ranch, near Bodega, Verrue & Stump have erected a separator on Mr. Stump's place, near the shore line of Bodega bay, and are washing the black sand for gold.

Trinity.

The *Journal* says several new discoveries have been made in the New River section of that county. The Jumbo mine is reported as bonded, upon which considerable development work will be done this fall. The Mountain Boomer, at New River, is yielding good ore, and the Sherwood mine is looking well. The mountains in that section at Siskiyou border are full of prospectors and many good strikes will be made. There is no better field for intelligent prospecting in the State than the section extending from East Fork through Rattlesnake and New River to the Know Nothing Creek mines in Siskiyou county. In this section are a number of paying mines, and the country has not been fully prospected.

Scarcely an echo of the Coffee Creek "boom" is heard now, says a *Bee* correspondent. If it is spoken of at all, it is with a smile. The rumors that have floated about during the past week have been as preposterous as were the reported strikes that followed so thick and so fast when the San Francisco "staff correspondents" got up to the headwaters of Coffee Creek. Coffee Creek has long since given up its hundreds of prospectors; but it received tremendous advertising for a while. Two hundred locations were filed with the County Recorder at Weaverville as a result. Nothing great has resulted from it all. The Graves brothers were made famous, and comfortably rich. Like good fellows that they are, they have gone back to their humble homes, not puffed up with pride but digging away on a good prospect just as thousands of other miners are doing in California to-day.

Tuolumne.

(Special Correspondence).—An Oakland company represented by Mr. Shanklin has bonded the Landers Ranch, adjoining the Black Oak mine, about a mile from here, and will thoroughly explore the ground with a diamond drill. This means still more for the advancement of the mining interests on the east belt, now already having such an impetus from the satisfactory way developments are showing good values in the mine.

The Black Oak, on the 800-foot level, has 25 feet of solid ore between walls—not a pound of waste to hoist. The first class is selected by hand by Chinese labor and they are experts at the business. This is shipped to Selby & Co. for treatment and returns from $80 to $106 per ton net. There is shipped 150 tons monthly. The milling ore runs $30 and 25 tons per day is crushed. The tailings run $7, of which 90% is saved by cyanide. The sulphurets are very rich. The improvements at the Black Oak the past year were on a very large scale, and the cyanide plant, which has been greatly enlarged under the direction of an engineer sent directly for the purpose, is one of the best in this county. Later on the company anticipates treating all their own ore, excepting the milling ore, by the cyanide process.

Mr. Campbell is developing a good, strong ledge on the Burns Ranch, supposed by some also to be on the Black Oak lead, for some parties in the city. He is now in the city buying better machinery.

The Gold Bug mine, adjoining the Black Oak, is taking out some phenomenally rich ore. The assays from the ledge in the bottom of the shaft, now down 50 feet, give $240 per ton gold. The concentrates taken from a soft material between the walls, about 2 feet in width, went $1087 per ton, while the washings from a panful of fine quartz picked from the hanging wall yielded $440 per ton gold and 25 ounces silver. The ore is similar to the Black Oak: lead and iron sulphurets—base but rich. The company has just completed an excellent hoisting plant—one of the most complete for its size in the county. The principal stockholders are State Senator Burns of San Mateo, Judge Fitzpatrick of Redwood City, Hon. E. L. Campbell of Palo Alto and Col. Woodrow. We do not hear of any Klondike ledges as rich.

The Carlotta and Pennsylvania, between this place and Summersville, are also turning out in a manner most gratifying to their owners. At a depth of 100 feet they have from 18 to 24 inches of $30 ore. They have a new hoisting plant.

The Yellow Jacket, also near here, has been bonded by Mr. Trittenback, president of the Dutch Company on the mother lode. They are grading for a hoist.

Capt. Hooper of Michigan has been appointed manager of the Old Soulsby, and is on his way here to open it up. There are some surprises in store about here in the near future in the way of developments of great value. How is it that this county has lain dormant so long?

The Dead Horse at Summersville, now down 1400 feet, is doing better than for years, while the Seminole at Cherokee is to have a new mill and hoist and resume operations.

Soulsbyville, Cal., Sept. 30, '97.

Independent: At the Rawhide both furnaces are running day and night to their fullest capacity. On assaying the slime saved from the pits and the tailings generally it was found that they gave a return of over $30 per ton. The management presumed that a good deal of the gold passed off in the slimes and took the precaution of tanking it. The reduction or chlorination of the above is one of the principal products of the last cleanup.

The Tarantula management is grading extensively on the east or hanging wall of the shaft so as to put in powerful machinery for hoisting purposes.

The Alameda main shaft is down 560 feet, 60 feet being allowed for the sump. Sinking will not be resumed until the pumps are replaced.

At the Rappahannock a large hoist, enabling Supt. Chute to sink from 1000 to 2000 feet, goes in.

Two hundred feet of water has recently been pumped out of the Badger. The shaft is 250 feet deep. It has been sunk through a body of ore from top to bottom. On the surface the vein is 2 feet wide and has grown in width.

Yuba.

Hibbert & Burris have secured the land upon which the Flag mine at Brown's Valley is located. The Old Flag Mining Company of San Francisco have an option on this property, which expires on the 14th instant.

NEVADA.

The Dexter Mining Company are going to put in a $100,000 plant at Tuscarora.

Virginia *Enterprise*: The Justice Mining Company are about to resume operations to thoroughly prospect the three-cornered piece of ground which the company recovered from John Barclay et al. This three-cornered piece of ground lies within the boundaries of the Justice patent. Some years ago it was jumped by Barclay and his partners, who went some 400 feet from the Woodville shaft down the canyon and sunk a winze from which they ran two drifts. In both of these drifts they struck good pay ore and had a good thing when the Justice Company instituted proceedings to oust Barclay and his partners. The case was decided against Barclay by the U. S. Court of this State, which held that the Justice Mining Company owned the ground in question because they had a deed to it from its previous owners and locators. The Justice Company has now started to erect a whim over the shaft sunk by Barclay and his partners and will sink and prospect the ground to some extent. If the result of these operations is favorable at the Barclay shaft other operations will again be resumed at the Woodville shaft, which is a good many feet deeper than any work done by Barclay and his partners. Parties who have visited the Barclay workings claim that a very good thing has been shown up there and that if the ore bodies opened up are found to go down, and that if connection is made from the lower levels of the Woodville shaft the Justice will become one of the biggest producers on the Comstock. It is about two years since the Justice Company did any work on their property.

The Dexter Mining Co. at Tuscarora will build a 40-stamp mill. Coal at $17 and $18 per ton is too expensive and electricity is decided upon as the motive power. The entire plant will cost in the neighborhood of $100,000, and it is expected that the stamps will drop January 1st, 1898.

Lyon Co. Times: The Mason Valley copper smelter has started up. Messrs. Nelson and Hardy say the plant cost them close to $50,000. It is of 40 tons capacity per day. It is understood that the price for working will be $7 per ton.

Silver Peak correspondent Hawthorne *Bulletin*: Work on the hill mines goes on day and night, and the piles of ore are increasing rapidly. The only drawback is the cost of transportation. Wood has to be hauled over the worst roads on earth for twelve to fifteen miles, while the ore is brought down hills so steep that it requires three shoes to two wagons to keep them from running on the horses.

The leaching plant started up a few days ago. The tanks have a capacity of twenty tons. A band of Comstock miners came in last week to open up the Blair mine and they will have no use for a pick. Six picks to a ton of powder is about the average.

OREGON.

The Belcher group of mines, near Sumpter, Robinsonville district, Jackson county, has been sold to H. G. Snyder and associates of Utah, by Stein, Larson & Dentor, for $25,000.

C. L. Manning and Wm. Steck of Grants Pass have sold their interest in the California and Gold Bar placer claims on Silver creek, a tributary of the Illinois river, to Geo. Phillips of San Francisco, for $11,250. Recent reports show the gravel on this claim to be from 25 to 35 feet deep and rich in coarse gold. Mr. Phillips has brought from California a complete hydraulic plant to work this new claim.

BRITISH COLUMBIA.

At the Jennie, Ainsworth, the No. 5 and another claim, adjoining the Highland mine, have been sold to Brown and Tomlinson for $15,000.

At New Denver the Queen Bess, near the Idaho, has been sold to C. K. Millbourne, representing a London company, for $150,000—$35,000 down. The new company will take charge of the property next month and will work it on an extensive scale. R. C. Campbell-Johnston is manager for the new owners.

Regarding operation and further development of the Payne mine at Sandon, the surface tramway which connects the mine with the railway is completed and in operation, increasing the output to 100 tons a day. The advance in lead has been a source of great relief to the producers in that locality, as it about offsets the duty and saves them from what threatened to result in many hardships.

At Fairview the new 20-stamp mill of the Tin Horn mine will be finished within thirty days if the present plans of the company are carried out. The Morning Star Company, operating the mine of that name, has let a contract for the erection of a mill. The Joe Dandy Mining Company has also commenced work on a new mill on its property. The Smuggler mine is running. The proprietors have rented a 10-stamp mill. There are now about 300 men working in and about the camp and there will be 200 more put to work within the next thirty days.

At the Cariboo mine, J. B. Hobson has men at work preparing for the new ditch to be built from Morehead lake, thirteen miles, and when it is completed will give the Cariboo mine sufficient water to run the mine, as at present the water is limited and they only have it for a few hours a day. Another cleanup will be made this fall. A few days ago a large blast of nearly 700 kegs of black powder was set off, knocking down about 75,000 yards of gravel into the pit.

Review: By a vote that was practically unanimous the Josie Mining Company decided at a meeting of the stockholders Oct. 1 to give to Thomas Ricards an option of sixty days on the property. Mr. Ricards was represented at the meeting by S. L. Lowe, who submitted a proposition to the meeting in writing offering to incorporate a company under the laws of England with a capital of £250,000. This company, he agrees, shall pay to the Josie Mining Company £10,000 in cash and place in the treasury £40,000 in cash as the proceeds of the sale of stock at par to that amount. The Josie Company is also to receive £100,000 in fully paid stock. The offer further stated that the details of the transfer would be arranged by Mr. Ricards with such representatives of the Josie Company as should be authorized to act.

Rossland *Miner*: The Monte Cristo mine has passed out into the possession of the new company, and on Monday thirty-five men were put to work in the mine. G. E. Pfunder is manager. The property is now owned by a syndicate of Montreal and Chicago capitalists. The new company has ample capital to carry on the development work. The Monte Cristo Company is organized under the laws of Washington.

ALASKA.

Record: The mill of the Nowell Gold Mining Company at Sheep creek will start dropping its thirty stamps soon, the new addition to the plant being completed. An ample supply of ore from the Queen and Glacier mines is now in reserve, and the 30-stamp mill will run to its full capacity during the winter.

UTAH.

Tribune: Tired of chasing silver in its ups and downs, the management of the Bullion-Beck has decided to stop the extraction of ore at once. For months the operation of the property has been at a great sacrifice. The Bullion-Beck has distributed $2,117,000 to date. Among other results of yesterday's action will be the dismissal of fifty more competent miners, who will be compelled to seek other camps for employment. Many of them have families, many lost in the failure of the bank at Eureka, and it is feared that not a few will experience hardships this winter.

IDAHO.

On the Salmon river, Custer Co., the Lucky Boy mill and mine are running steadily. The mill crushes forty-five tons per day.

The Black mine has changed hands. The new proprietors will erect a 10-stamp mill at the mine. Heretofore the ore has been worked in the Fourth of July mill, a mile away, at great expense. H. J. Jory of San Francisco has charge of the construction of the new Black mill.

The Hailey *Times* says C. M. Rolker, a mining engineer, has been examining the Crœsus group of mines. He represents an European syndicate—the German wing of the Exploration Company of London, England. It is stated the Crœsus is under bond to this syndicate.

The Newberg and Alice mines—the former better known as the Lawyer—a short distance west of Quartzburg, are sold to Wm. Church of Denver, Colorado, for $18,000 cash. Six Kincaid mills, with a capacity of ten tons each in twenty-four hours, will be put up. The ore of the Newberg and Alice is very soft and can be cheaply mined. Mr. Church says the cost of extracting the ore and conveying to the mills will not exceed 70 cents per ton. The Newberg has been developed by two tunnels, the lower one 700 feet in length, which taps the ledge at a depth of about 300 feet. Eleven tons of ore taken out and crushed in the Iowa mill, for the purpose of determining the average value of the ore, milled $6.14 per ton.

Silver City *Avalanche*: Work is being pushed on the Alpine; the promise of a good mill run this fall is almost certain. The mill run of eleven tons which was had in August went about $100 per ton.

The mortgage given by the Flint Mining Company last February to cover the attachment made for labor performed was settled in full this week by the payment of about $2800, and the mortgage was released.

The Poorman mill, which is being fitted with a new electro process, will be in running order in two weeks.

MONTANA.

The mortgage for $1,500,000, placed last year upon the Montana Ore Purchasing Company's smelter and mines, has just been discharged.

Twelve dollars a day to the man is the record of the Nelson gulch placers operated this summer by C. P. NanWar & Co. The result of the season's cleanup was announced Saturday, according to the Helena *Independent*, and the news was enough to have caused a stampede up Ten Mile if it had not been known that every inch of gold-bearing ground had long ago been claimed.

Butte *Inter-Mountain*: In line with the development work recently started at the other big copper mines of Butte, the Colorado Company has begun the development of the Gagnon shaft from the 1400 to the 1500-foot level. A hoisting engine has been placed at the 1400-foot level for the purpose of sinking, so that operations at the upper levels will not be interfered with.

At its present depth the Gagnon is, owing to its location, probably the deepest shaft in the camp. The High Ore No. 2 is 1400 feet, but its elevation is probably more than 100 feet above the collar of the Gagnon shaft. At the High Ore and almost every other Anaconda property, development of the shafts is in active progress, so that by the end of the year there will be at least half a dozen mines of a depth of 1800 feet each.

COLORADO.

According to a report from Mound City, J. Q. McDonald, manager of the Brodie mill at that place, has succeeded in cheapening the process for extracting gold from certain ores and working a larger saving of values by the addition of concentration to the cyanide leaching process. The ores now treated at the mill, whether oxidized or sulphides, are leached raw in the cyanide tanks, the principal values being extracted in that process. All of the pulp is then run over the concentrating tables, and the concentrates saved are roasted and then returned to the leaching tanks. Instead of remaining in the solution from eight to fourteen days, as formerly, the treated pulp is now kept there but four days; and by putting the pulp through the concentrators "the value is saved down to 50 cents a ton, against a loss of from $2 to $8 when the tailings were drawn off without concentration. The roasting of the concentrates is accomplished without loss, whereas the loss from fine dust in the raw ore was considerable. Before this new scheme was applied, the Brodie was losing money on every ton of ore it treated; now it is making money and has already begun to enlarge the plant. Two new solution tanks of thirty-five tons and four leaching tanks of 140 tons capacity each have been ordered, and with them two additional concentrating tables to assist the four now in operation. The mill is at present treating 3000 tons a month, against 1800 tons formerly handled by the same plant. Of course, the new system can be employed by others, and its effect should be to cheapen the cost of treatment ultimately to the producers of the ore. The mill problem has been a serious one. It is an open secret that none of the mills have been making money, even at the prevailing rates of from $6 to $8 a ton for treatment, and no reduction in rates could be expected until this situation was remedied. Millmen will find much interest in this new adaptation of the two old processes."

In northern Colorado there are about twenty-five producing coal mines. The consumption of the output is confined to Denver and northern Colorado points and is about 400,000 tons of lump coal annually—an average output of about 16,000 tons of lump coal to each mine. Of this amount probably 12,000 tons are consumed during the six summer months, or 800 tons per month, or 35 tons per day. The cost of this coal can be very closely approximated. The district price paid the miner for mining the coal is 80 cents per ton. To keep the mine in a safe and workable condition and to handle the coal dug by the miners there are required, say, two men to take coal from the mines and put it on the cage ready to be hoisted to the surface; two men to keep roads, entries, etc., in condition; two engineers—one days and one nights—one blacksmith, one dumper; these men are all paid $3 per day, or $24; two boxcar men to shovel coal in railway cars at $2 50, $5; one superintendent and one clerk, $6; making in all $35, or $1 per ton; mining, as stated, 80 cents; timber (props), 10 cents; rails, repairs, etc., 5 cents; royalties, average, 15 cents; making cost per ton, $2.10.

Salt Lake *Tribune*: The Hill Top mine is at an altitude of 12,000 feet, twelve miles from Fairplay. It is a silver and lead property; the lead values such that a good profit is realized from taking out the ore. The shaft is 500 feet deep, and from the bottom the workings extend in all directions. One ore chamber made by excavating the ore, is 22 feet wide, 200 feet long and 70 feet high. It is three miles from the mine to the railroad. The ore is conveyed by a tramway that works automatically. There is a large, endless cable to which buckets are fastened, and the weight of the ore is sufficient to keep the wire in motion and return the buckets to the mine after they have emptied their contents below. When the buckets leave the mine they gradually descend to the cars, where they are, by a mechanical contrivance, turned upside down and the ore is emptied into a bin. The buckets remain in this inverted position until they reach the pulley at the mine, around which they go before making another trip, and as

they come around they are thrown into their proper position. Then as each bucket gains a given point an ore chute reaches over the top of the bucket and travels along with it until it has filled the bucket. Then the chute returns to its original position, and is ready for the next bucket. The whole system is operated by one man, who is stationed in such a position that he can see the entire length of the cable and instantly note any irregularity in the working of the contrivance. For instance, if the ore chute should fail to travel with one of the buckets, the operator, by touching a lever, can immediately stop the machinery and mend the difficulty. Men do not work for wages, but all do piece work. Two or four men will work together, and when they have filled a car with ore it is wheeled to the shaft, placed on the cage, and drawn to the surface. There it is weighed, and the weight is registered and credited to the men who excavated the ore and put it on the car. Each set of men fastens a ticket to the car, and it is by this means that the man on top knows to whom to credit the ore. The men receive 90 cents a ton. When working by the piece this way they do more work than when working by the day. When it is desirable to drift, make an uprise, sink the shaft or do any kind of dead work, a contract is made with the men to do the work at a fixed price per foot. Many of the men make as much as $4 a day at the rate paid for taking out the ore.

Central City *Register-Call*: A visit to the mills found the following number of stamps dropping:

	Stamps.
Hidden Treasure, Black Hawk	75
Bobtail, Black Hawk	75
Mead, Black Hawk	40
Polar Star, Black Hawk	40
Eagle, Black Hawk	35
Gilpin, Black Hawk	50
New York, Black Hawk	75
Randolph, Black Hawk	50
Iron City, Black Hawk	25
Kansas, Nevadaville	40
Vendome, Nevadaville	30
Rollins, Perigo	25
Peterson, Gilpin	10
Total	570

Of the above 570 stamps, 480 are slow-drop and 90 are rapid-drop stamps, which are treating a total of 700 tons every twenty-four hours. The Rocky Mountain concentrator is treating daily 75 tons per day, while the State Ore and Public Sampling Works treat together about 125 tons per day. Therefore, including concentrators and sampling works, the daily tonnage treated throughout the county is 900 tons. Add to this the daily shipments of smelting ore which are made direct to the smelters at Denver and Pueblo, and it will be readily seen that the total tonnage is very close to 1000 tons of ore every day.

NEW MEXICO.

Hillsboro *Advocate*: Some of the owners who will not give working bonds to their mines without cash payments no doubt intend to keep them for another ten or twelve years just as they are. When a mine is idle it is a pretty fair presumption that it will not pay to work; and when parties appear willing to put their money and time into development, and are willing to bind themselves to definite work, it would seem wise to give them a chance within reasonable limits. But it is a free country and you have a right to keep on with your annual assessments for another century or so.

Silver City *Enterprise*: The Confidence mine is working about seventy men, and an abundance of ore is being extracted to keep the mill running steadily. Work is being pushed rapidly on the pipe line which is to furnish water power for the plant and to generate electric force for other work. The line will soon be in operation and everything about the mine and mill will be economically operated by water power and electricity.

ARIZONA.

Talking of the Vulture, G. W. Treadwell, who put up the 80-stamp mill on the Vulture mine, which in its time made millions for its owners, says the property is far from being worked out, and that the only reason that it cannot now be worked with profit is the fact that there is no wood within thirty miles of the mine. The mine is down but about 200 feet, and there is evidence that there are thousands of tons of high-grade ore in the mine. Sixteen miles from the mine there are never less than 300 inches of water, a fall of about 25 feet to the mile and enough to generate electric power to be transmitted to the mine. If this could be done (and it is practicable) the Vulture would employ 200 men.

At Globe the Old Dominion copper mine has now about sixty men at work mining, but has produced nothing since the shutdown, except the ore necessary to be taken out to make development. The mine is now well equipped with two horizontal 150-ton water jacket furnaces, and should produce regularly after the railroad is built 2,000,000 pounds of copper per month. The cost should not exceed 6 cents per pound laid down in New York. Supt. Garland says the railroad will be built.

Prescott *Courier*: From the mill and mines of the Sundance Company information is received that 200,000 pounds of concentrates have been shipped from that camp in September, and by the 20th of October it is expected that the output will reach 20,000 pounds a day. The ore is taken from the Aztec and Silver Trail mines. The Aztec ore is said to run $35 to $40 per ton, and the Silver Trail from $50 to $100.

MEXICO.

The Yaqui gold region is described as a rolling valley about thirty-five by sixty miles in area. The gold is found in the foothills at the edge. It is reached by road from Ortiz station on the Sonora Railway, 215 miles south of Nogales and fifty miles north of Guaymas. The gold is coarse. In the vicinity are quartz ledges with free milling gold ore.

The manager of the smelters of the Guggenheim syndicate at Monterey and at Agua Caliente has notified his men that hereafter their salaries will not be paid in gold, but will be in Mexican silver, at the ratio of two Mexican dollars for one gold dollar. It is reported that the same action will be taken by the railroads and other foreign corporations in Mexico toward their office employes.

The Recompensa mine, a silver producing property, in the Charcas district, State of San Luis Potosi, adjacent to the El Tiro General mine, has been sold to Pittsburg, Pa., men for $75,000. Assays from the Recompensa are reported to run from 33 to 142.50 ounces of silver, with 1.27 ounces gold and 40 per cent lead. But little work has been done.

The New York & Sonora Smelting Co. is the name of the corporation J. B. Magruder has formed in New York City to erect a smelting plant at Last Cruces, about thirty miles from Hermosillo. Two sixty-ton water jacket stacks are expected to be ready in February, '98.

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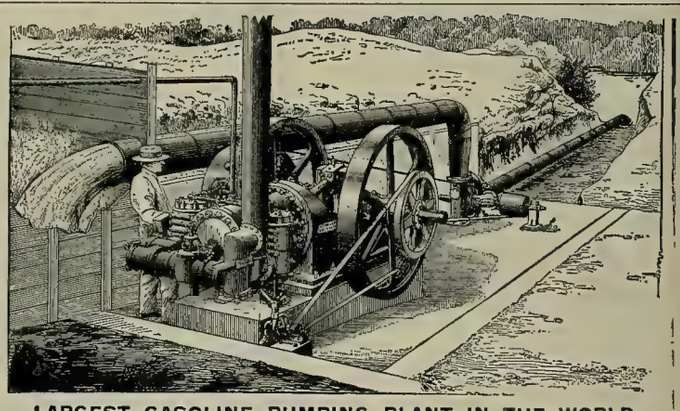

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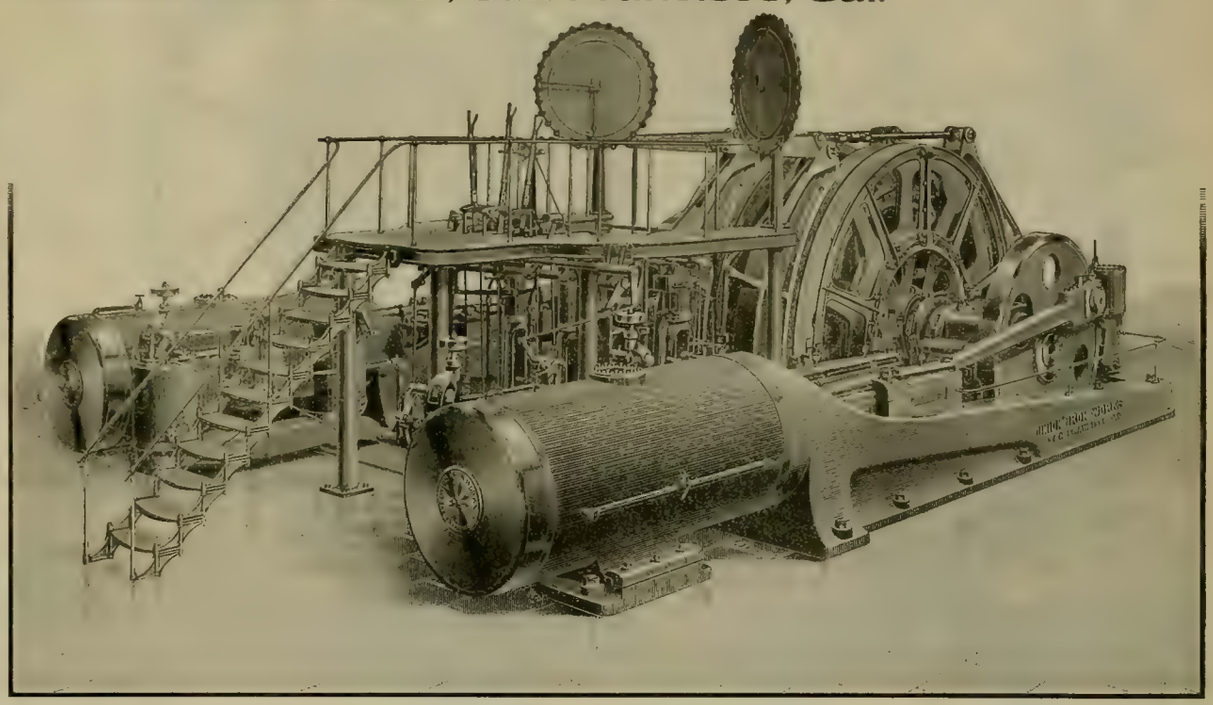

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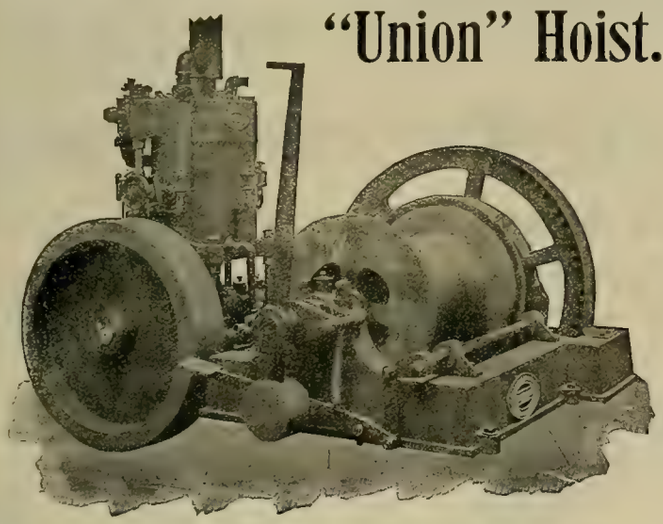

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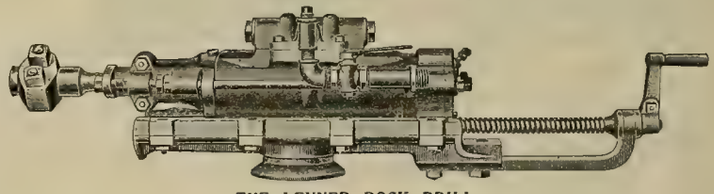

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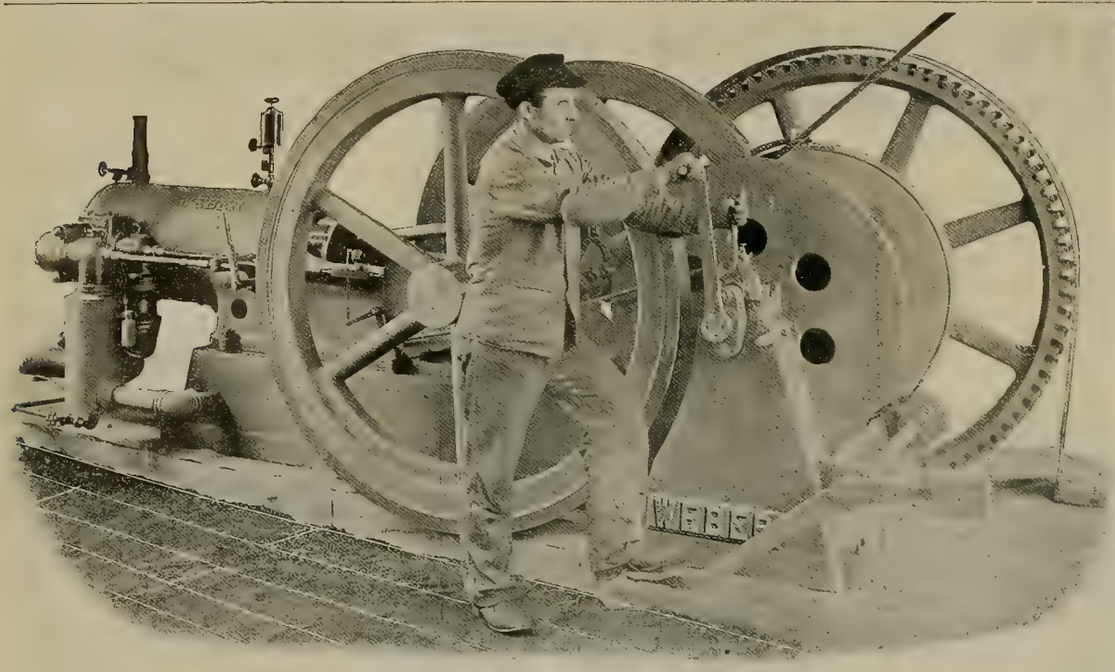

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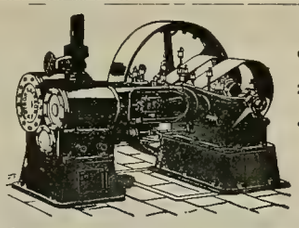

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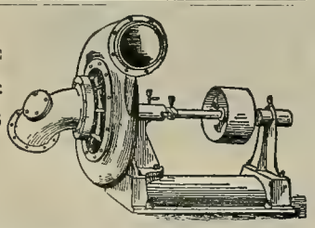

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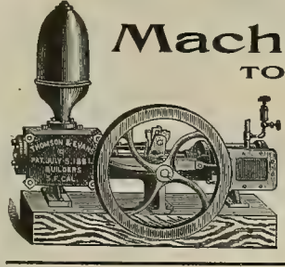

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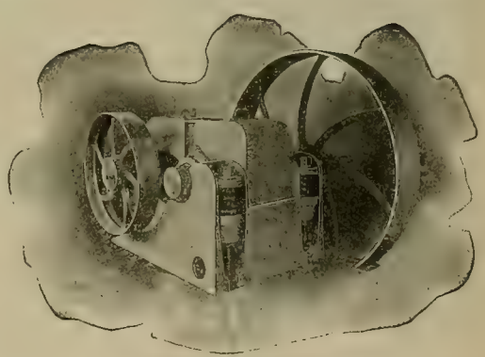

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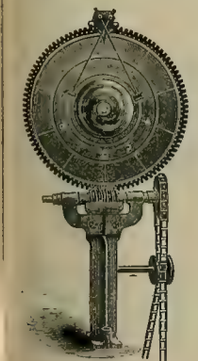

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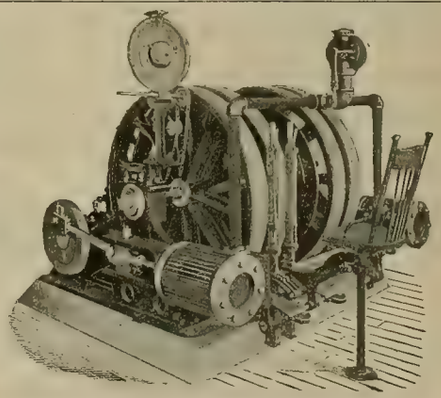

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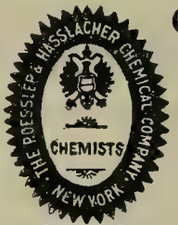

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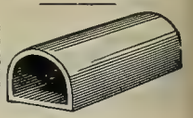
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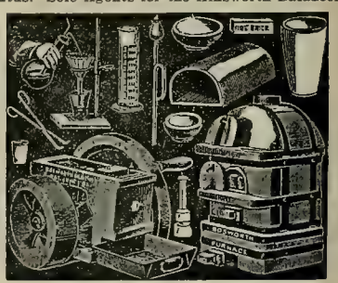
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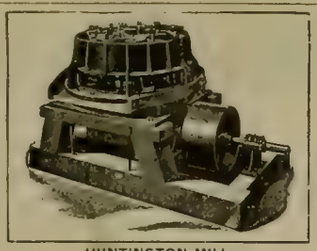

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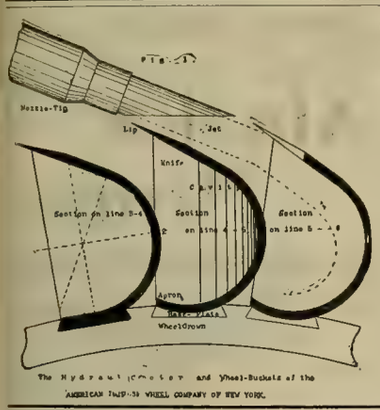

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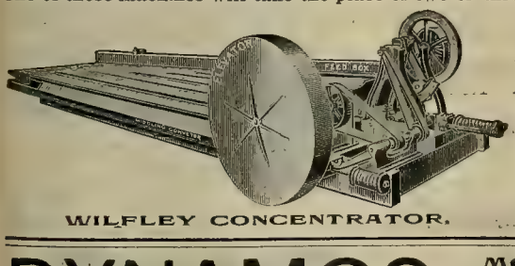

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING SEPT. 28, 1897.

590,716.—SEAL LOCK—J. G. Barron, East Berkeley, Cal.
590,876.—SPOOL HOLDER—G. H. Bliss Jr., Watsonville, Cal.
590,677.—FLANGER—Bohnenkamp & Lindsey, La Grande, Or.
590,801.—TREATING ORES—W. L. Brown, S. F.
590,824.—STAMP AFFIXING MACHINE—W. A. Carney, Santa Paula, Cal.
590,569.—STAMP AFFIXING MACHINE—W. Forward, San Diego, Cal.
590,570.—STAMP AFFIXING MACHINE—W. Forward, San Diego, Cal.
590,789.—CONCENTRATOR—G. Gates, Jackson, Cal.
590,722.—ELEVATOR GEARING—C. I. Hall, S. F.
590,723.—ANIMAL TRAP—W. B. Hargan, Stockton, Cal.
596,839.—HAT FASTENER—E. Hundhausen, S. F.
590,790.—INK FOUNTAIN—C. E. Kayser, Oakland, Cal.
590,791—BOTTLE STOPPER—C. Y. Malone, Sacramento Cal.
590,728.—IRRIGATION GATE—J. Moffatt, Rialto, Cal.
590,795.—ENVELOPE—F. V. Steeth, S. F.
590,796.—GAS ENGINE—A. J. Tackle, Oakland, Cal
590,928.—EXCAVATOR—M. A. Wheaton, S. F.
590,799.—TOOTH CROWNS—L. L. White, S. F.
27,694.—DESIGN, COUPLING FOR BATTERY PLATES—A. C. Robbins, Oakland, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong&Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

INK FOUNTAIN FOR PRINTING PRESSES.—Clemens E. Kayser, Oakland, Cal. No. 590,790. Dated Sept. 28, 1897. This invention relates to an improvement in ink fountains, such as are adapted to be used in connection with printing presses. It consists essentially in a means for adjusting the blade or scraper with reference to the roller so that the flow of ink is regulated. In distributing ink from the fountain to the point where it is to be used, and with a fountain of considerable length, the adjustment of a blade or scraper is a different matter. It is the object of this invention to make the adjustment easy and accurate. It consists essentially of the combination with the roller and scraping blade of inclined or wedge-shaped bars extending longitudinally beneath the edge of the blade, and means for removing one or other of the bars so as to accurately adjust the edge of the blade with relation to the roller. It also consists in the employment of independently acting screws extending upward through the bars with the ends pressing against the blade so that portions of the blade may be adjusted independently of the general adjustment.

MANUFACTURE OF METALLIC TOOTH CROWNS—L. L. White, San Francisco, Cal. Assignor to the L. L. White Tooth Crown Company of same place. No. 590,799. Dated Sept. 28, 1897. This invention relates to the manufacture of seamless metallic tooth crowns. It consists essentially in fitting an attachment for the crown forming a contour of the same by fitting a metallic band to the root, filling the band with wax and pressing the face of the occluding tooth and forming the cervical and opposite margins to fit the festoon of the gum, then filling the band with a substance which is given the contour of the tooth, molding the same in plaster of paris, then removing the soft imitation tooth and replacing it with a cast of fusible alloy within the mold and band and subsequently fitting a metallic crown and shell over the shape thus formed.

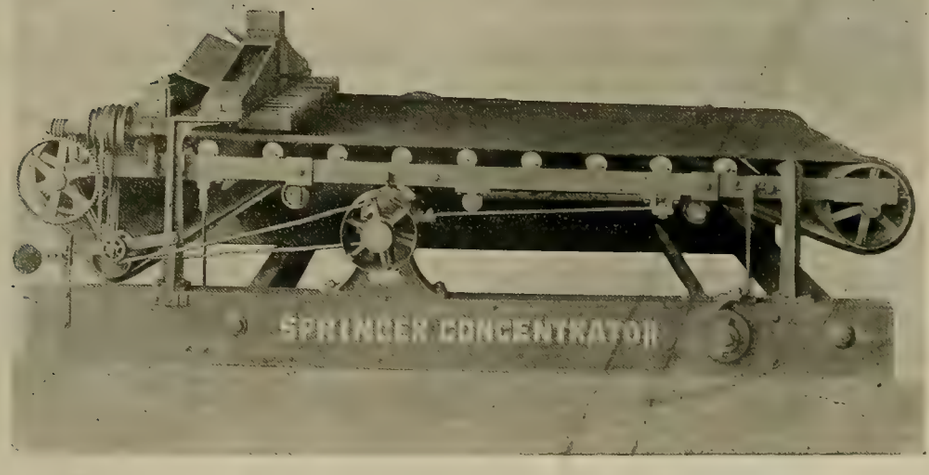
BOTTLE STOPPER.—C. J. Malone, Sacramento, Cal. No. 590,791. Dated Sept. 28, 1897. This invention relates to a device for hermetically closing bottles for the purpose of preventing the surreptitious refilling of such bottles after they have been emptied. It consists essentially in the employment of a peculiarly shaped yielding stopper in conjunction with an exterior glass stopper, the corresponding inclined faces fitting together, and a means for locking the two in place. The bottle neck is provided with a frangible section which when broken allows the outer glass stopper to be removed and exposes the inner one so that it can be removed in the ordinary manner.

GAS ENGINE.—A. J. Tackle, Oakland, Cal. No. 590,796. Dated Sept. 28, 1897. The object of this invention is to provide certain improvements in regulating the supply of explosive gas to engines of that class and in a novel means for igniting each charge so as to explode it at the proper time. It consists of a spring pressed normally closed inlet valves having heads upon the outer ends of their stems with wedge-shaped slides movable in contact therewith and at right angles with their line of movement and connections with a governor whose safety is dependent upon that of the engine, so that the slides are moved to increase or decrease the opening of the valve. The valve stems are prevented from turning by shaping them to fit the parts through which they pass. The igniting device consists of a stem slidable through a collar having a globular rounded head and a flat wiping plate fixed to a rotatable shaft turning at right angles so as to make contact with the curved surface of the globular head, thus making a perfect contact and maintaining it under any condition of wear.

PROCESS OF TREATING REBELLIOUS ORES.—Wilfred L. Brown, San Francisco, Cal. No. 590,801. Dated Sept 28, 1897. This invention relates to a process for treating rebellious ores. It consists essentially in adding a suitable compound to the finer pulverized ore, this compound containing an element which has a chemical affinity for the base constituents of the ore, then passing an electric current through the material to unite this element chemically with the base constituents and liberate the precious metals and then circulating the material over an amalgamated surface not in the electrical circuit, and finally returning the material again through the field of electrolytic action, thus continuing for any desired length of time.

CONCENTRATOR.—George Gates, Jackson, Cal. No. 590,789. Dated Sept. 28, 1897. This invention relates to improvements in endless traveling belt concentrators in which the belt travels over drums at each end of the machine. The belt has parallel endless grooves or channels formed on the surface and upwardly turned edge flanges, one edge of the belt being slightly lower than the other. A feed trough or hopper extends parallel with the upper edge of the belt and distributes the pulp upon the belt, the valves being employed to control said openings and a means for distributing the pulp upon the higher edge of the belt. Means are provided for increasing or decreasing the speed at which the belt and connected parts travel, and means for connecting the power and transmitting shafts whereby an oscillation of one part is permitted without affecting the movements of the other.

The SCIENTIFIC PRESS PATENT AGENCY herewith presents an engraving of a new concentrator invented by A. C. Springer of this city, and for which it has recently obtained a patent. A large number of these machines have been built, and are in successful use at various points from Alaska to Mexico. The following are among the many advantages claimed for this concentrator: It will do more and cleaner work than any rubber belt machine; it weighs only one-half as much as some of the other 6-foot concentrators; is the most simple in its construction of any machine in the market and only one-third as many pieces in it as in some of the others; was invented by an old miner of many years experience handling every known concentrator on the market; should any piece need repairing, it can be removed without disturbing any other part of the machine; can be set up by any inexperienced miner; its distributor is perfection itself, distributing the pulp evenly over the entire surface of the belt; grade of shaking frame can be changed while the machine is running at full speed; it is the strongest, lightest running, and most inexpensive to keep in repair, of any; will save more of the fine slimes than any other machine; is cheaper than any other 6-foot machine, costing only $350, f. o. b. cars or boat, San Francisco; will handle the pulp from five stamps better than any other concentrator; has adjustable eccentrics, and any length of stroke can be had, thereby giving different speeds per minute; the belt is very durable, being made of No. 3 canvas, woven especially for the Springer Concentrator; machine requires so little attention, that one man will easily attend to a dozen of them; it has a solid rubber flange, which no other canvas belt has; wear and tear upon this machine is not one-third as much as upon some of the other concentrators. *



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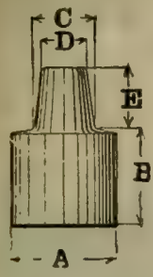

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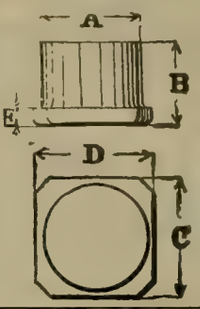

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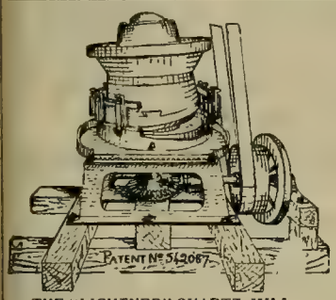

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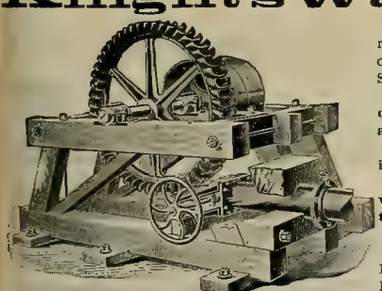

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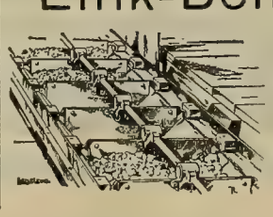

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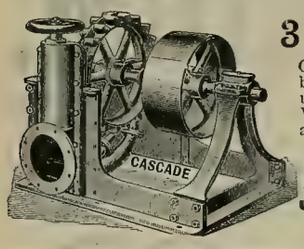

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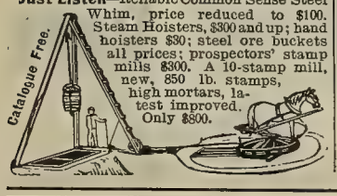

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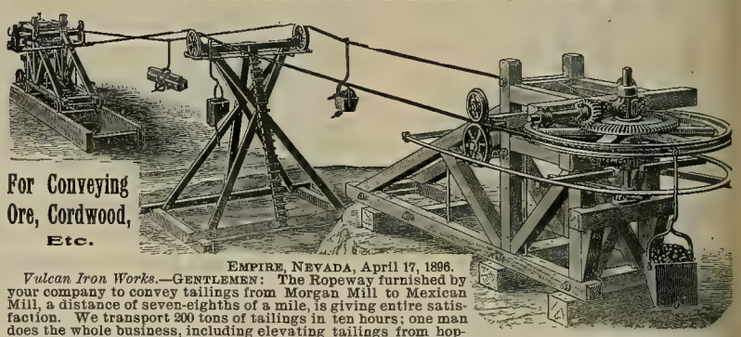

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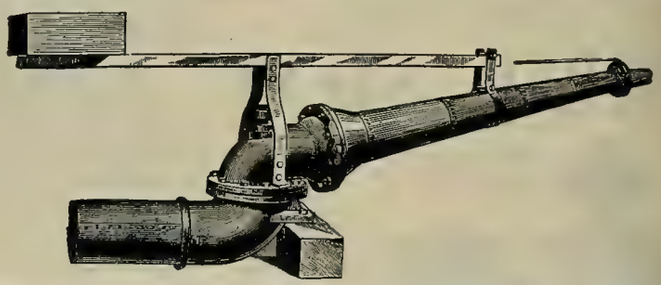

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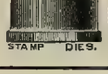
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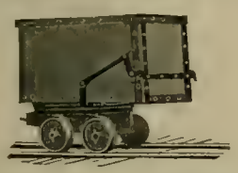

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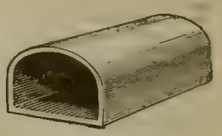

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Self-Oiling, without Oil Cups, Pumps or Tanks. Adjustable and accessible bearings. Renewable bushings for main and rocker arm bearings. Frictionless four-admission slide valve. Oil chamber entirely separated from steam. Cylinder contact. Rite's inertia governor. Perfect regulation. All sizes. Simple or compound. Belted or direct connection. High, medium or low speed. Designed for every use.

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351 and 353 N. Main St., Los Angeles, Cal.
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Hoists, Whims, Ore Buckets and Ore Cars,
Amalgamating and Concentrating Machinery,

ENGINES, BOILERS,
SINKING PUMPS,
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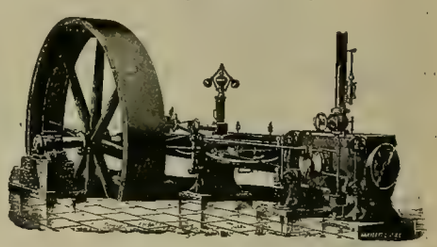

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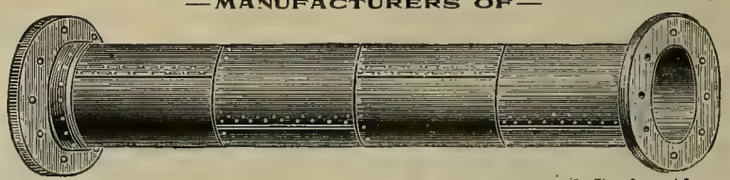

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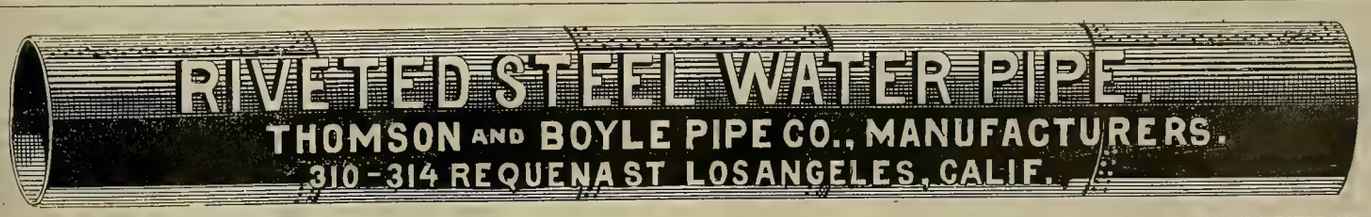
WELL CASING.
Oil Tanks, and General Sheet Iron Work.
IRRIGATION SUPPLIES.
All Correspondence Will Receive Prompt Attention.
LOS ANGELES, CAL.

DEALERS IN CAST IRON PIPE.

OFFICE, ROOM 4, BAKER BLOCK.



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For Hydraulic Purposes, made from the Best Sheet Steel, Single or Double Riveted. ✦ Oil and Water Tanks, Ore Buckets, Ore Cars, General Sheet Iron Work.

THOMSON & BOYLE PIPE CO.,
310-314 Requena St., Los Angeles, Cal.

Market Reports.

The Markets.

SAN FRANCISCO, Oct. 7, 1897.

Business was slightly interfered with the past week by the Jewish holiday; but, with this out of the way, it is expected there will be quite an increase in the volume of goods going out. It is noteworthy that, notwithstanding freer purchases by distributors, the stock carried by them is kept down, owing to an enlarged consumption by reason of non-wage earners being given employment, particularly in the agricultural and mining districts. It has been several seasons since so many hands found employment on the farms and orchards. Not only have more hands been given employment, but a better wage paid. In the manufacturing industry more hands have been at work, particularly in the textile clothing and furnishing goods. The extraordinary heavy shipments of California products Eastward attests the improved conditions here. It is said that these shipments have made a scarcity of cars.

The local money market is practically unchanged. The free marketing of farm products has caused the supply of available funds in this city to keep quite large, owing to remittances by interior merchants to jobbers here. There is very little inquiry for accommodation, and that little is readily met if approved securities are given. Country property is not sought by lenders. Probably not within the history of this State have so many farm mortgages been cancelled or else largely reduced as there have been within the past three months. This speaks well for the future. At the East there is very little change to report in the money market. The demand from the South for cotton moving continues free, but the free marketing of grain, etc., in the central States has operated against anything like a stringency in Chicago, Milwaukee and other large grain handling centers. There are all kinds of rumors afloat at the East regarding the importation of gold from Europe. It is said that liberal selling of American securities by English and other European investors is against gold importing at present. This selling is done largely for the purpose of investing in Argentina securities owing to their relative cheapness in view of very large crops.

The City of Peking took out a treasure list of $390,319, consisting of 249,814 in Mexican dollars, $2935 in gold coin and $124,400 in silver bullion, and $13,170 in silver soles.

New York Silver Prices.

NEW YORK, Oct. 7.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	26	55⅞
Saturday	26¼	56⅛
Monday	25⅞	55¾
Tuesday	25	55
Wednesday	25¼	55¼
Thursday	26	56

	Copper.	Lead.	Iron.	Tin.
Fri.	11 10 @11 30	4 35	10 00@12 25	13 65
Sat.	11 10 @11 30	4 30	10 00@12 25	13 65
Mon.	11 15 @11 30	4 25	10 00@12 25	13 70
Tue.	11 10 @11 32½	4 25	10 00@12 25	13 67½
Wed.	11 10 @11 32½	4 17½	10 00@12 25	13 67½
Thur.	11 10 @11 32½	4 17½	10 00@12 25	13 65

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	15c Prem
New York Telegraphic Transfer	17½c Prem
London Bankers' 60 days	$4.83½
London Merchants	$4.81½
London Sight Bankers	$4.85½
Refined Silver, per oz., 1000 fine	56
Mexican Dollars nominal	45@46

SILVER.—The market shaded off slightly, but toward the close it began to recover, closing strong. It looks to us as if the markets at the East and abroad are being manipulated in the interest of buyers. It is a well-known fact that several large countries are making liberal purchases of silver for mining purposes to replace silver coins in circulation which are badly worn. It is also known that the revival in business in Europe developed the fact that two or three of the countries did not have a sufficient supply of silver for commercial purposes. The conviction grows with the better-informed that there will be held in 1898 an international monetary convention to discuss and, if possible, devise ways and means looking to international bimetallism.

MEXICAN DOLLARS.—The market is steady to firm with a continued free buying for export. The stiffening in silver also induces buying.

COPPER.—The market is quiet but firm. At the East the domestic demand is only fair, but for export it is quite large. In their Liverpool circular James Lewis & Son report as follows: "The somewhat unexpected demand which has arisen for sulphate of copper has considerably increased the deliveries of Chili bars from the public stocks, which have diminished 479 tons to Sept. 16, and sales of high-conductivity copper have been made for shipment to the Continent. The sales are estimated to amount to fully 12,000 tons for forward delivery, chiefly for Italy; £17 per ton has been freely paid for delivery next year, and £17 5s is now generally asked. The shipments to Sept. 1st amount to 49,200 tons, against 45,988 tons in the same period last year.

Our market is quoted as follows:

Ingot casting, jobbing	13 @—
Ingot " wholesale	12½@—
Sheet copper	— @16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½

QUICKSILVER.—The market is steady. Shipments by water the past week were 100 flasks to Mexico and 4 flasks to Victoria, B. C.

Our market is quoted at $38 for domestic consumption.

LEAD.—The market is easier but not quotably lower, although it is stated that concessions are obtainable by large buyers.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	5 00 @ 5 25
Sheet	6 25 @ 6 50
Pipe	5 50 @ 6 00

TIN.—The market is practically unchanged. Last week's remarks will cover this week's reports.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

SHOT.—The market is steady with a good call reported.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 40
Drop, B and larger sizes, " "	1 65
Buck, Balls and Chilled, do, " "	1 65

POWDER.—The demand is good with no change in quotations.

COAL.—The market is reported unchanged. The consumption of steam shows an increase of fully 10 per cent over last year at this time. The demand for domestic is increasing.

IRON.—The market is firm for both American and foreign. The East reports active markets, with a large increased consumption.

ANTIMONY.—The market is steady.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 8c for Cookson's, 7½c for Hallett's and 7c for Japanese.

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4½

PLATINUM.—The market is steady.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is firm.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

Chemicals.

In our market there is nothing new to report. The demand is fair at unchanged prices. A cargo of nitrate of soda came in this week. It was sold for shipment to this port. The East reports nitrate of soda easier but crude bluestone higher, with no change in anything else.

SULPHURIC ACID.—The demand is fair. We quote in a jobbing way at 1½c per lb for 66%.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported easy from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is steady. We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady. We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is steady. Our market is quoted in a jobbing way at $1.40 a pound.

BONEASH.—The demand is good for export. Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is firm. We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firm at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is steady at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—The market is quiet at 2½c a pound from stores.

NITRATE OF SODA.—The market is steady. Our market is quoted from store at 4c for 95%.

Mining Share Market.

SAN FRANCISCO, Oct. 7, 1897.

Trading has been quite active the past week with cross orders still in evidence, but not to so large an extent as at the commencement of the present upmove, or, as some call it, brokers' deal. The lead shifted from Crown Point to Belcher, owing to reporting a discovery of ore in the former, causing the majority of shorts to fill, and it also brought in many gudgeons who swallow any kind of story put out by the manipulator through tools and cappers. Belcher being somewhat problematic as far as regards ore was jumped on by short sellers after the Crown Point jump of last week, and as a consequence the more timid have been made to fill on the jump of Wednesday, but the larger ones have not, so far as we can learn, filled, owing to a belief that the ore strike in Crown Point was exaggerated and that it will not be found to be any better in Belcher. While the market looks as if it will, under manipulation, go higher, yet outsiders should exercise caution and not be left loaded up with shares, for from all that can be learned there is nothing of a legitimate character to cause higher prices, and when they are advanced above the value of ore in sight and a fair percentage for further developments, then the market is dangerous, and it is much safer to be out than in. The flurry in the market has brought in more operators from the outside who, like flies swarming around molasses, can not resist the temptation to try and make a "big killing" within a few days—but the big killing nearly always is on the wrong side for them. While the writer does not see or hear of anything to cause dealers to go wild over the situation, yet there is no telling what may be found, for there is active exploiting work in several which may lead up to the finding of more ore in one or two of the mines than has, as yet, been reported by officials.

From the Comstock mines both private and public advices report a fair degree of activity in nearly all. The flurry in the share market gives officials more encouragement that money will be forthcoming through assessments for more work than has been done for fully one year. The advance in prices has allowed the selling by several companies of treasury shares. In some instances the number of shares went into the thousands. This not only helps to fill the exchequer, but it also gives assurance that one or more assessments will be paid by outsiders. In Alta the work is being pushed with a fair degree of activity, with the formation said to show an improvement. In Justice they are getting ready for more active exploiting. The management express themselves very hopeful, which will not be changed so long as a large quantity of shares are held by them. Caledonia has levied a 10-cent assessment, which will admit of starting work. From Overman no change is reported in the work or quantity of ore extracted. Some ore is being raised by Seg. Belcher, as there is by Belcher. From the latter mine it is reported on the street that there is an improvement, and the outlook is very promising for finding something better than was found in Crown Point. It is rumored that there is an improvement in Crown Point, but the official letter does not give it, although it reports favorable work. Kentuck, it is stated in official letters, has taken up the crossdrift and is running it in its own ground.

News from Yellow Jacket is hard to get, but it is stated that important work has either been started or is to be very soon. From Confidence and Challenge nothing new comes to hand. In Con. Imperial they are crossdrifting on the surface level, while running jointly with Confidence and Challenge a west crossdrift. They are still fooling around the 500-foot level in Alpha. There are favorable reports on the streets from Bullion, but we fail to have them verified. They have made air connection in Potosi, which admits of better exploiting work. They save a few tons of pay ore each day. In Chollar air connection and other repairs are being made on the 450-foot level and in the main incline above and below the 1100-foot level. No work in Hale & Norcross. The work reported in Savage is about the same as has been under way for some time past. They expect to commence extracting the 1000 tons of low-grade ore in Gould & Curry within the next ten or fifteen days. The Gould & Curry and Best & Belcher joint east crossdrift has been turned into the latter's ground, so that company takes full charge of it. Active work, but with no good results as yet, is being done in Con. Virginia on the 1550-foot, 1650-foot and 1750-foot levels. No ore is being extracted. The Kinkead Milling Company has purchased the remainder of the 700 tons of low-grade ore, paying $2 a ton for it. In Ophir they are running west on the 1000-foot and Central tunnel levels. They are still running an east crossdrift on the 1000-foot level of Mexican. In Union they are also running east on the 900-foot level. In Sierra Nevada the west crossdrift on the 900-foot level was at last advices in favorable ground, with a seepage of water coming in. There is no change in the work on the Layton tunnel level, so far as official letters go. They are still crossdrifting west in Utah. They are drifting north in Andes on the 175-foot level.

From the Brunswick lode our advices are practically unchanged so far as work is being done in Occidental, Chollar, Savage, Gould & Curry and Best & Belcher. The work in the first two is being pushed quite energetically, as it is in Gould & Curry. They are about ready to open up the 300-foot level in the latter mine, while in Chollar, and also in Occidental, they will start within a short time several crossdrifts on the levels reported last week. Good results are looked for on these crossdrifts.

The market opened this morning active at a decided decline for the Gold Hill shares on yesterday's prices. Belcher, which sold up to $2.15 yesterday, closing at $1.50, sold down to 90 cents this morning. Crown Point and Yellow Jacket broke also, the former 50 per cent and the latter 30 per cent below the highest prices yesterday. The middle and north-end shares only went off about 10 per cent. The market acts very much as if it will move to much higher figures, and the sharp ups and downs are preliminary to it, but before it gets well under way again it may sell slightly lower. What will be taken up next it is hard to say now. The up in Belcher was a report of an ore strike in the upraise and the break on reports of its being a failure. These reports can be taken for what they are worth, for they are put out for a purpose. They will find ore in Belcher when they want to, and high grade, too.

The following illustrates the changes of the week:

Mines.	Sept. 30.	Oct. 7.
Alpha	$ 22	$ 21
Alta Consolidated	12	23
Andes	..	30
Belcher	72	1 00
Best & Belcher	73	75
Bodie	..	..
Bullion	12	14
Challenge	54	54
Chollar	48	71
Confidence	1 30	..
Consolidated California and Virginia	1 40	1 55
Consolidated New York	04	06
Crown Point	76	94
Exchequer	..	06
Gould & Curry	58	63
Hale & Norcross	1 30	..
Justice	35	34
Mexican	55	56
Ophir	1 10	1 16
Overman	22	32
Potosi	37	39
Savage	33	58
Sierra Nevada	1 20	1 20
Union	54	56
Utah	26	25
Yellow Jacket	47	77

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied, Deling't and Sale.			Secretary,
Alta S M Co, Nev	57	10c	Sept 3.	Oct 6.	Oct 27.	J E Jacobus, 309 Montgomery
Altoona Q M Co, Cal	1	75c	Aug 3.	Sept 6.	Oct 11.	C Allenberg, 206 Sansome
Andes S M Co, Nev	44	10c	Sept 1.	Oct 4.	Oct 25.	J W Twiggs, 309 Montgomery
Belcher S M Co, Nev	56	20c	Sept 18.	Oct 21.	Nov 11.	C L Perkins, Mills Building
Caledonia S M Co, Nev	47	10c	Oct 6.	Nov 10.	Dec 2.	A S Groth, 414 California
Chollar M Co, Nev	44	25c	Sept 1.	Oct 7.	Oct 28.	C E Elliott, 309 Montgomery
Confidence S M Co, Nev	29	30c	Sept 10.	Oct 15.	Nov 5	A S Groth, 414 California
Con Imp M Co, Nev	39	1c	Sept 27.	Nov 2.	Nov 23.	C L McCoy, Mills Building
Eureka Con D M Co, Cal	10	3c	Sept 14.	Oct 16.	Nov 6.	D M Kent, 330 Pine
Gold Ridge Con M & M Co, Cal	5	4c	Aug 3.	Sept 18.	Oct 9.	H Sylvester, 43 Sixth
Hale & Norcross S M Co, Nev	112	10c	Aug 18.	Sept 22.	Oct 28.	R U Collins, 331 Pine
Marguerite G M & M Co, Cal	7	10c	July 28.	Sept 10.	Oct 11.	F Mettman, 237 Twelfth
Potosi M Co, Nev	48	25c	Sept 8.	Oct 12.	Nov 4.	C E Elliott, 309 Montgomery
Red Cap M Co, Cal	1	$9	Aug 25.	Oct 1.	Oct 23.	E deK Townsend, 125 Beale
Savage M Co, Nev	93	20c	Sept 2.	Oct 5.	Oct 25.	E B Holmes, 309 Montgomery
Sierra Nevada S M Co, Nev	113	20c	Aug 18.	Sept 22.	Oct 12.	E L Parker, 309 Montgomery
Silver Hill M Co, Nev	35	5c	Sept 7.	Oct 12.	Nov 5.	D C Bates, 309 Montgomery

San Francisco Stock Board Sales.

SAN FRANCISCO, Oct. 7, 1897.

9:30 A. M. SESSION.

500 Alpha	21	600 Justice	28
500 Alta	23	800 Kentuck	10
4400 Belcher	1 00	1000 L Wash	05
1250 Best & Belcher	74	200 Mexican	56
100 Bullion	14	200 Occidental	1 65
250 Caledonia	45	250 Ophir	1 16
900 Challenge	50	300 Overman	33
600 Chollar	71	800 Potosi	39
500 Con Cal & Va	1 55	500 Savage	58
1000 Con Imperial	03	700 Seg Belcher	20
500 Con New York	06	1050 Sierra Nevada	1 15
4750 Crown Point	94	100 Union	56
200 Exchequer	06	600 Utah	24
800 Gould & Curry	62	3850 Yellow Jacket	75
200 Julia	04		

SECOND SESSION—2:30 P. M.

100 Gould & Curry	63	400 Utah	25
350 Best & Belcher	75	13 0 Seg Belcher	17
60 Con Cal & Va	1 55	200 Overman	32
600 Chollar	71	200 Justice	34
100 Potosi	39	500 Union	57
600 Crown Point	80	100 Silver Hill	03
900 Yellow Jacket	77	300 Challenge	54
450 Kentuck	10	200 Andes	30
100 Alpha	21	300 Mexican	56
1250 Belcher	93	100 Caledonia	45
300 Sierra Nevada	1 20		

WILL NEGOTIATE with owners or their duly authorized agents only.

WILL INVESTIGATE only thoroughly bona-fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

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Marquette, Mich., U. S. A.

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Assay and Chemical Work Done on Reasonable Terms.

Have best of bank and other references. Use McNeill's or A B C Telegraphic Codes.

DO ALL OUR OWN EXPERT AND CHEMICAL WORK.

Working Capital for Mines.

PACIFIC EXPLORATION COMPANY

Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from Horace Taber, in the Taber Gold Mining Claim near Gibsonville, Sierra Co., to deposit tailings in Gibson Creek; from Fred Smith, in the Black Oak Mine near Yankee Jim's, Placer Co., to deposit tailings in Owl Creek; from W. H. Leek et als., in the Miocene Mine near Crescent Mills, Plumas Co., to deposit tailings in Rush Creek; from Henry Conbrough, in the Ellrig Mine near Carbondale, Amador Co., to deposit tailings on a flat; from John C. Murphy, in the Slate Creek Placer Mine near Kelsey, El Dorado Co., to deposit tailings in Dutch Creek; from John M. Jackson, in the Jamison Placer Mine near Johnsville, Plumas Co., to deposit tailings on a flat; from Sook Hung Lung, in the Barnard's Diggings near La Porte, Plumas Co., to deposit tailings in Slate Creek; and from the Jupiter Gravel Mining & Water Co., in the Jupiter Gravel Mine near Dogtown, Calaveras Co., to deposit tailings in San Domingo Creek, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on October 11, 1897, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from Sam Ahtye, in the Emerton mine, near Gibsonville, Sierra Co., to deposit tailings in Slate creek, and in the Doherty mine, near Table Rock, Sierra Co., to deposit tailings in Slate creek; from Victor Montre, in the Grizzly Canyon mine, near Pike City, Sierra Co., to deposit tailings in Grizzly canyon; from B. F. Atkinson, in the Homestake mine, No. 2, near Sierra City, Sierra Co., to deposit tailings in the impounding basin of the Homestake mine, and from G. E. Scott, et als., in the Gold Nugget mine, near Gibsonville, Sierra Co., to deposit tailings in Canon creek, gives notice that a meeting will be held at room 59, Flood building, San Francisco, Cal., on October 25, 1897, at 1:30 P. M.

Recent California Mining Incorporations.

Blue Star G. M. and M. Co., San Francisco; E. McGettigan, T. McGrath, J. Suderoski, J. F. Moroney, D. T. Cole; capital stock, $1,000,000; $240,020 subscribed.

Burlington M. Co., San Diego; capital stock, $1,000,000; $800 subscribed.

Ogden M. Co, San Diego; capital stock, $1,000,000; $1000 subscribed.

Helene M. Co., San Diego; capital stock, $1,000,000; $900 subscribed.

Denver M. Co., San Diego; capital stock, $1,000,000; $1000 subscribed.

Centipede M. Co., Los Angeles; H. B. Ellis, A. W. Davis, L. G. Parker, F. D. Bullard, Z. T. Cole; capital stock, $500,000; all subscribed.

Gold Standard Hydraulic M. Co., San Francisco; S. Klein, W. J. Bevan, A. F. Collins, A. D. Allan; capital stock, $100,000; $50 subscribed.

Assessment Notices.

FAIRFAX VILLA COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fairfax, Marin County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 10th day of Septemb r, 1897, an assessment (No. 7) of Fifty Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 36, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of October, 1897, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on MONDAY, the 8th day of November, 1897, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

J. STADTFELD, JR., Secretary.

Office—Room 36, No. 309 Montgomery street, San Francisco, California.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 28th day of September, 1897, an assessment (No. 8) of 4 per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, Room 44 Phelan Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of November, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 29th day of November, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—Room 44 Phelan Building, San Francisco, California.

PATENTS

Our U. S. and Foreign Patent Agency presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American reports, with full copies of U. S. Patents since 1872. All worthy inventions patented through DEWEY, STRONG & CO.'s Patent Agency will have the benefit of a description in the *Mining and Scientific Press*. We transact every branch of patent business, and obtain patents in all countries which grant protection to inventors. The large majority of U. S. and foreign patents issued to inventors on the Pacific Coast have been obtained through our agency. We can give the best and *most reliable* advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and circulars free.

DEWEY, STRONG & CO.,
PATENT AGENTS,
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Assaying Gold
.....AND.....
Silver Ores.

This work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist nor the pratical miner can mistake his meaning.

The work, like Mr. Aaron's former publications ("Testing and Working Silver Ores," "Leaching Gold and Silver Ores,") that have been "successfully popular," is written in a condensed form, which renders his information more readily available than that of more wordy writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:—Perface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of cupellation; Weighing of Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests of Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 126 12-mo pages, with illustrations, well bound in cloth; 1896. Price **$1.00** postpaid. Sold by the **Mining and Scientific Press**, 330 Market St., San Francisco.

Recently Declared Mining Dividends.

Pennsylvania M. Co., Grass Valley, Cal., No. 10, 5 cents per share, $5150; payable immediately.

Morning Star M. Co., Colfax, Cal., No. 82, $8 per share; $19,200.

Dutch Mine, Calaveras Co., Cal., No. 3, 5 cents per share, $7500; payable immediately.

The Standard Consolidated Mining Co. of Bodie, Cal., 10 cents per share, $20,000; payable October 20th—a total of $3,757,868 to date.

Swansea, Utah, $5000; payable Oct. 9.

Le Roi, B. C., $50,000; payable immediately—a total of $625,000.

DELINQUENT SALE NOTICE.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.— Location of principal place of business, San Francisco, California; on of works, Nevada and Sierra Counties, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 5) levied on the 3rd day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
John A. Heninger	16	250	10 00
Nils Johnson	120	100	4 00
Nils Johnson	121	100	4 00
Hattie E. Gray	124	100	4 00
Wm. Westhoff	144	250	10 00
A. O. Lindstrom	148	250	10 00
Wm. Westhoff	177	500	20 00
Richard Phelan	188	5	20
Wm. Westhoff	200	100	4 00
Wm. H. Little	202	10,500	420 00
Mark Strouse	208	5	20
P. E. Robertson	215	250	10 00
Sarah Spalding	218	100	4 00
Abe MacCreadie	220	500	20 00
Alfred H. Hogg	221	300	12 00
Abe MacCreadie	222	250	10 00
J. W. Brown	231	4,099	163 96
C. D. MacNeill	236	200	8 00
Paul Muller	239	50	2 00
Paul Muller	240	100	4 00
Paul Muller	242	1,000	40 00
Chr. W. Heyer	243	755	30 20
Chr. W. Heyer	246	606	24 24
Abe MacCreadie	247	200	8 00
Wm. Westhoff	250	200	8 00
Mary Ann Robertson	251	250	10 00
Mary Ann Robertson	252	250	10 00
R. H. Daley	268	1,000	40 00
C. M. Howe	272	1,000	40 00
C. M. Howe	274	500	20 00
R. H. Daley	275	1,500	60 00
Francis Brady	277	700	28 00
R. H. Daley	278	100	4 00
Dr. H. Sylvester	280	51,278	1,971 12
(2,000 shares of this cert. have been paid by H. Sylvester, being part of his stock.)			
L. V. Merle	286	10	40
J. T. M. Kelly	289	500	20 00
R. H. Daley	290	100	4 00
R. H. Daley	294	750	30 00
R. H. Daley	295	185	7 40
E. Swenson	296	1,750	70 00
Mark Strouse	297	5,000	200 00
Mark Weil	299	750	30 00
C. W. Heyer	300	400	16 00
Mark Strouse	301	100	4 00
Geo. Day	302	1,000	40 00
Dr. H. Sylvester, Trustee	305	1,105	44 20
Dr. H. Sylvester, Trustee	306	5,000	200 00
R. H. Daley	307	250	10 00
R. H. Daley	308	240	9 60
F. Heard	309	125	5 00
Mark Weil	310	125	5 00

And in accordance with law, and an order from the Board of Directors, made on the 3rd day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Rooms 12 and 13, No. 43 Sixth St., San Francisco, California, on SATURDAY, the 9th day of October, 1897, at the hour of 12 o'clock M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

DELINQUENT SALE NOTICE.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 25th day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
Harvey M. Binckley	2	1	9 00
Alice F. Binckley	20	4	36 00
Alice F. Binckley	23	20	180 00
Alice F. Binckley	24	20	180 00
Alice F. Binckley	25	20	180 00
Alice F. Binckley	26	20	180 00
F. de Kay Townsend	4	1	9 00
F. de Kay Townsend	26	2	18 00
Caroline S. Townsend	18	20	180 00

And in accordance with law, and an order from the Board of Directors, made on the 25th day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, 125 Beale Street, San Francisco, California, on SATURDAY, the 23rd day of October, 1897, at the hour of 3 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

H. H. MARTIN, Secretary.

Office—125 Beale Street, San Francisco, California.

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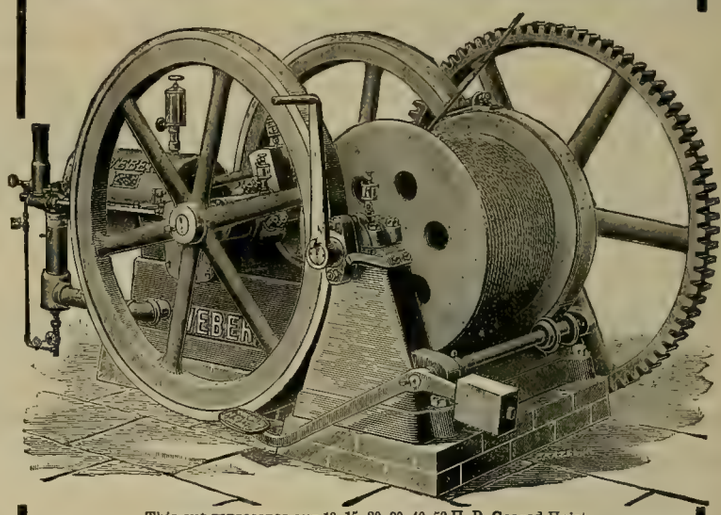
Costs to run One Cent per Horse Power per Hour. No Coal or Wood and very little water required.



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We also build **Single and Double Drum** Hoisting Engines, both **Geared or Friction**, and furnish Wire Rope, Ore Buckets, Cars, Shives, etc., making complete outfits. "Weber" Hoisters and Engines use **Gasoline, Naptha, Distillate, etc**, for fuel. They can be used **Underground** or on the dump. **Altitude** makes no difference in the operating of the "Weber."

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TUTTHILL WATER WHEEL.

The Best Jet Wheel in the Market, BARRING NONE.

Wheels, Buckets and Nozzles Designed to Suit Special Requirements. When Head and Conditions Are Given.

Theoretically as Well as Practically Perfect. Highest Efficiency Guaranteed.

We have a Sensitive, Simple Governor that will positively regulate speed of wheel. Specially adapted for electric railway and lighting plants.

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SHEET IRON & STEEL PIPE
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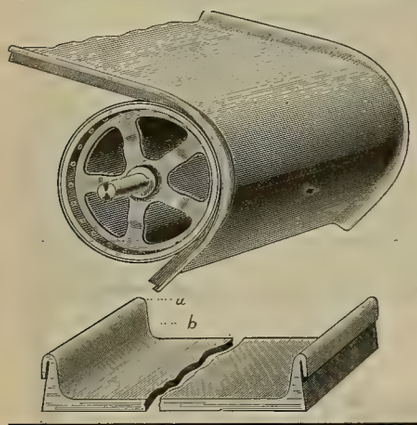
Iron cut, punched and formed, for making pipe on ground where required. All kinds of Tools supplied for making Pipe. Estimates given when required. Are prepared or coating all sizes of Pipes with Asphaltum.

THE BROWNELL "PATENT LIP" FLANGE FRUE VANNER BELTS.



It has taken years of ceaseless testing and experimenting to produce the superior belt which we now offer, with elastic flanges and pliable body reinforced with specially woven duck. Every belt is manufactured by experienced workmen, and carefully tested on machines especially built for that purpose; consequently we are to-day manufacturing the best belts that mechanical ingenuity, combined with honesty of construction, can possibly produce.

ORIGINAL EMPIRE MILL & MINING COMPANY,
GRASS VALLEY, NEVADA CO., CAL., Feb. 20, 1897.

JAS. S. BROWNELL, ESQ., San Francisco, Cal.—DEAR SIR: The Brownell Patent Lip flange belt for ore concentrators, which I bought of you nearly two years ago, has been in constant use and is in good order and gives us perfect satisfaction. We have several other kinds of belts in the mill, and your belt and flange I consider the best of all. Yours respectfully, ROBT. WALKER, Superintendent.

ROANOKE MINING COMPANY,
MOKELUMNE HILL, March 4, 1897.

MR. JAS. S. BROWNELL, 132 Market St., San Francisco, Cal.—DEAR SIR: We have in our 20-stamp mill at this place five Frue vanners; three of these are equipped with the Patent Lip flange belt and two with the plain flange belt. We certainly consider the former a great improvement on the latter. They will certainly wear much longer, as cracking now seems out of the question. Any one purchasing the Frue vanning machine should see that it is equipped with the Patent Lip flange belt. Very truly yours, ROANOKE MINING COMPANY,
Per G. M. WILDE, Acting Superintendent.

For any information regarding Frue Vanner or Belts, call on or address

JAS. S. BROWNELL, Western Agent FRUE VANNING MACHINE CO.
(Successor to Adams & Carter.) 132 MARKET STREET, ROOM 15, SAN FRANCISCO.

RISDON IRON WORKS,

Office and Works: Cor. Beale and Howard Sts., San Francisco.

READ WHAT MINERS THINK OF THE BRYAN PATENT ROLLER QUARTZ MILL AND JOHNSTON CONCENTRATOR.

OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO.,
SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

RISDON IRON WORKS, San Francisco—Gentlemen: Our company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60 mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screens 12 tons in 24 hours; through 50-mesh, 15 tons; and through 40 mesh, 18 tons. This proportion has been continuous.

One set of dies will crush from 1500 to 1600 tons.
One set of tires will crush 1500 tons.
One ring plate will crush from 2200 to 2300 tons.

The mills require very little attention. At our mill an ordinary "peon," earning one dollar per day, has complete charge.

In regard to sliming, in comparison with stamps, by reason of the discharge surface and the continuous agitation by the scrapers, a MUCH less amount of slime is created. A three years' experience teaches me that, in every respect, the mills are a complete success, and of material benefit to the mining world. They can be set up and running in forty-eight hours and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator it is unequaled by any mill now in existence. Yours truly,
D. M. BURNS, Superintendent.

BULLION-BECK AND CHAMPION MINING COMPANY,
EUREKA, UTAH, August 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz., capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK, Pres.
SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec't'y.

BULLION-BECK AND CHAMPION MINING COMPANY,
EUREKA, UTAH, Aug. 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly, JOHN BECK, Pres.
SIMON BAMBERGER, Director. W. J. BEATIE, Sec't'y.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY,
S. BAMBERGER, President and Manager,
SALT LAKE CITY, UTAH, October 10, 1895.

B. R. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly,
[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO,
C. C. McIVER, President; D. CUSHMAN, Secretary,
MISSION SAN JOSE, CAL., Oct. 17th, 1895.

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year. CHAS. C. McIVER, President.

THE HALLIDIE ROPEWAY

Stands pre-eminent for the transportation of Ore, Fuel and other materials over mountainous and rugged country.

Parties desiring to remove large quantities of Sand, Gravel, Earth, Ore, Rock, to construct Dams, Levees or Embankments, etc., can do more efficient work at less cost by the

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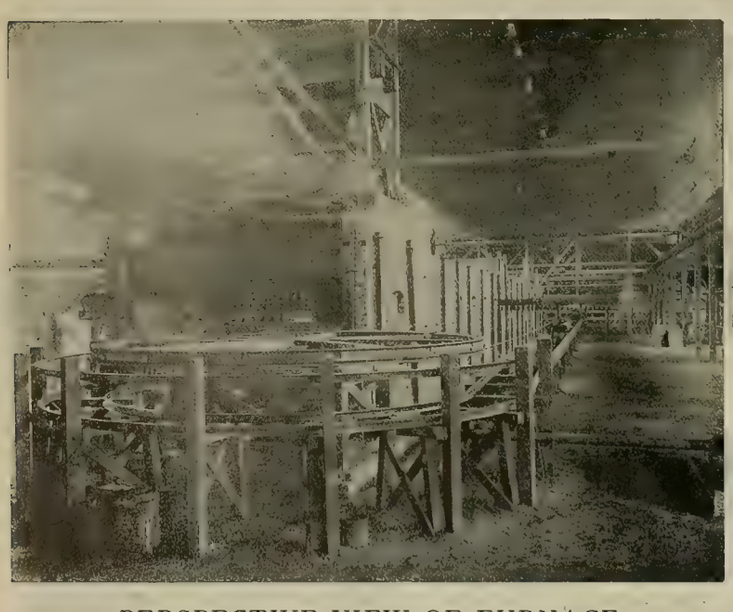


PERSPECTIVE VIEW OF FURNACE.

PARKE & LACY CO.

21 & 23 FREMONT ST., SAN FRANCISCO., CAL.

Mining Machinery & Supplies.

Sole Licensee for the Manufacture and Sale of the

ROPP STRAIGHT LINE FURNACE

FOR ROASTING, CHLORINATING AND DESULPHURIZING ORES.

Extracts from Letters Received from Mr. Philip Argall, Manager the Metallic Extraction Co., Cyanide, Colorado:

January 2, 1897.

"The roasting is invariably good. We can do 80 tons per day to 0.13% sulphur, when everything runs smooth. Our month record which, of course, includes all delays, is 1700 tons, from 1.94% sulphur to 0.16%."

February 19, 1897.

"Our furnace is now running very nicely indeed, averaging 90 tons per day to 0.10% sulphur, and doing excellent work; in fact, it has improved right along and we are highly pleased with it.

"For 24 hours ending 7 A. M. to-day 102 tons were roasted."

The ROPP FURNACE is now in successful operation at the following reduction works: The Hanauer Smelting Works, Salt Lake [illegible], Utah (one furnace); The Metallic Extraction Co., Cyanide, Col[illegible] furnace); The Colorado-Philadelphia Reduction Co., Colorado C[illegible] (three furnaces); The Selby Smelting & Lead Co., Selby, Cal., (one furnace); The Mount Morgan Gold Mining Co., Rockhampton, Queensland (one furnace); and Broken Hill Proprietary Co., Broken Hill, New South Wales (two furnaces).

Cal State Library JAN 19 '97

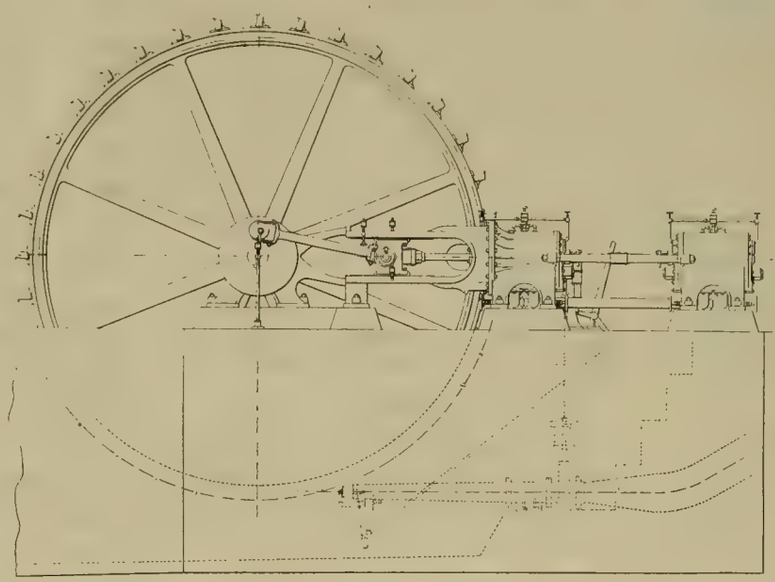
Catalogue on Application.

MINING AND SCIENTIFIC PRESS.
AND PACIFIC ELECTRICAL REVIEW.

No. 1945.— VOLUME LXXV. Number 16. SAN FRANCISCO, SATURDAY, OCTOBER 16, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Direct Connected Air Compressor.

Herewith is shown a cut of a 500 H. P. air compressor, with direct connected Pelton water-wheel, recently furnished to the Gwin mine, Calaveras Co., Cal., by the Rix Engineering and Supply Co. The air cylinders are 18x24—four in number. The water-wheel is 19 feet in diameter and operated under a head of 420 feet. The compressor is one of the latest design, operates at 80 revolutions and furnishes air at 90 pounds pressure. This air is conducted a mile and a quarter and will be used by the Gwin Company in running a double 10-inch hoister on the surface and also for pumping out the old Gwin shaft to the depth of 1500 feet. This pumping will be done by compound pumps and will be done in three stages.

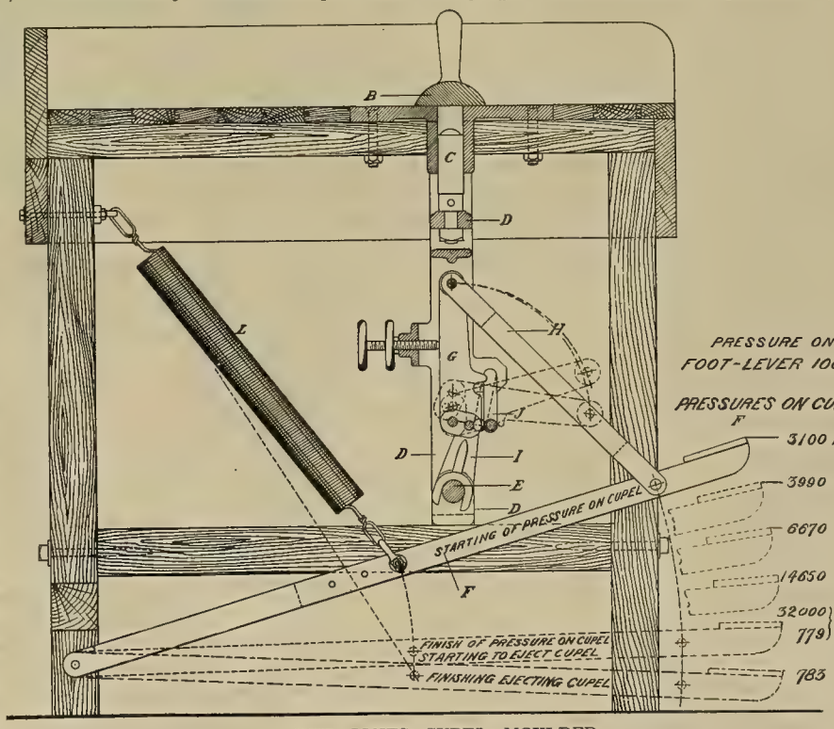


DIRECT CONNECTED AIR COMPRESSOR.

This plant is situated on the Mokelumne river, 420 feet vertically below the 40-stamp mill running at the mine. The water which is used to drive the mill and hoisting works is carried through a 15-inch pipe 4500 feet to the river and there used upon the wheel, so this water furnishes power for the second time at practically the same head. A plant similar to this, but smaller, has been recently placed in operation at the Black Oak mine, Tuolumne county, operating under a similar head of water, using a 14-foot direct connected wheel. The compressor is making 100 revolutions and is meant for the operation of six rock drills. Incidentally, the plant furnishes air to the cyanide plant and also to run a small hoister.

The Jones Cupel Moulder.

Assayers and others will be interested in the new patent cupel moulder illustrated herewith. The old way of making cupels by hand is not wholly satisfactory, the texture of the bone ash being ofttimes destroyed by the successive blows of the mallet. Some are large, some are small, some are hard, others soft, the edges are rough and imperfect and cracks sometimes appearing, rendering them useless. To get satisfactory work by the hand process considerable skill is required to give just the right density and have them all alike. In the new moulder the cupels are formed by a steady, continuous and increasing pressure, applied by the foot through the medium of a system of levers and toggles so arranged that the pressure is gradually increased as the increasing density of the bone ash requires. A heavy final pressure is thus secured without additional effort on the part of the operator. When the compression is completed the leverage is automatically changed and the finished cupels are expelled (two or four at a time) with a slight pressure and movement of the foot. Every cupel is the same size and density, they present a good appearance, and are less likely to crack in drying. The manufacturers claim that with this machine a boy can make from 250 to 300 cupels per hour. The exclusive right to the manufacture and sale of the Jones cupel moulder, under the United States and foreign patents, has been granted by the inventor to the Parke & Lacy Co., San Francisco.



THE JONES CUPEL MOULDER.

River Improvement.

Regarding the river improvement—upon which considerable has been said in and out of these columns—it is to be observed that the half million dollar joint appropriation, which is under the direct supervision of the United States Debris Commission, will suffer no depletion this year. It is the opinion of the United States Debris Commission that preliminary surveying and determination of the point at which operations shall begin may occupy all the present available season. It appears to be now a question of choice between De Guerre Point and the Narrows as to where the restraining dam shall be built.

The Federal government in these affairs moves slowly and doubtless wisely. It cannot be said in regard to this matter that any rash or hasty inception of work will ensue. As to the expenditure of the $300,000 State appropriation for dredging, etc., some of the many attaches of the State public works department are still engaged in surveying and reviewing and reporting; and doubtless after some of these surveys and reviews and reports are published some estimates of the probable cost of dredging and the possible cost of jetty construction will be in order. Then there are also possibilities of surveys and estimated costs of easements, and, in general, the whole work of how not to do it may be considered in a favorable state of progress.

THE canal, 160 feet wide and twenty-eight miles long, from the south branch of the Chicago river to Lockport on the Desplaines, will be completed this year, at a cost of $30,000,000. Over twenty-six million cubic feet of glacial drift and nearly twelve million cubic feet of solid rock have been excavated and removed; in addition to this, the work of making a diversion channel for the Desplaines river to carry off its waters in great freshets. Three hundred thousand cubic feet of water a minute will flow from Lake Michigan through this new river. The boldness and novelty of the specially constructed machines to handle the material was noticeable. The great cantilever crane—a bridge 600 feet long spanning the channel and extending far on each side, and carrying endless belt pans in which the rock was loaded—was noteworthy. It was mounted on trucks so that it could be moved parallel with the channel.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

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J. F. HALLORAN.....General Manager

TO THE PUBLIC.

No one is authorized to solicit business for this paper unless in possession of proper credentials and regularly numbered and stamped blank subscription receipts.

San Francisco, October 16, 1897.

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An Imperative Necessity.

Every collection of miners, large or small, when in consultation, now agree that there should be an additional departmental officer in the national Cabinet—the Secretary of Mines and Mining. The idea is steadily growing in popular favor; its justice is conceded and public sentiment favors the idea. The tremendous impetus given to the industry of mining in the last few years has hastened the time when such a move will be consummated, and the growing importance of the mining industry of the nation justly demands such recognition. At the risk of repetition it may be said that for several years the MINING AND SCIENTIFIC PRESS has favored the creation of a new department in the Cabinet—a Secretary of Mines and Mining—and the increased interest in the mining industry throughout this west half of the nation in the past four years has renewed the hope of realization of miners' requirements. The hard deal that the miners had been getting at the hands of arrogant and ignorant department heads is of itself sufficient reason for the establishment of a Bureau of Mines—the creation of a Cabinet officer whose sole business it shall be to attend to that great industry. With no more than passing reference to the dignity of the mining profession, or to the fact that upon the prosperity of the mineral industry primarily rests the prosperity of any country, it is but necessary to cite the present value and extent of the mining industries of this nation and their increase. The total value of the mineral and metal production of the United States for the year 1894 was $581,211,258; for 1895 it aggregated $678,001,934; for 1896 nearly $725,000,000; for the present year nearly $800,000,000. An industry that represents an annual output of the value shown by these figures, and an investment of nearly four times that amount, can justly demand the recognition asked.

It has been said that we as a nation have too many departments and secretaries now. As our Government is constituted, it is necessarily a part of governmental functions that the affairs of the country shall be administered by a Presidential Cabinet, and it is in order for the miners of California, of the coast and of the entire nation to recognize this fact and unite in a manful request for just recognition. It is by and through Cabinet officers that justice is secured and interests fostered, and it is the way those things will be done. The creation of a Cabinet officer to be known as the Secretary of Mines and Mining is in direct line with the policy and outgrowth that has made the Cabinet. At first the Cabinet of the President of the United States was composed only of a Secretary of State, a Secretary of War and a Secretary of the Navy. As the country's growth required, there have been added, successively, a Secretary of the Interior, an Attorney-General, a Postmaster-General and a Secretary of Agriculture. In the order of evolution of development, the time has now arrived for a Secretary of Mines and Mining.

Any intelligent man in or out of the mining business who will note the trend of affairs during the past decade will be likely to give affirmative echo to the statement that the creation of a Cabinet officer, to have charge of the country's mining industries, is not only of immediate necessity to the miner, but of pressing importance to the interests of the nation in its entirety. This great mining industry is, so far as Government charge is concerned, a little dump in the corner of the office of the Secretary of the Interior. The ignorance displayed by that department has been lamentable. With no disposition to find fault or to blame, with the most merciful standard of criticism, it is to be said that, as at present constituted, the only Cabinet connection this Government had with its greatest basic industry for the four years preceding May, '97, had been a prejudiced subordinate official in the Land Department, who, left to his own devices and questions of personal privilege, allowed unworthy influence to govern his actions, and who made absurd and injurious rulings, in ignorance or defiance of the plainest requirements of the mining public. This man and his attendant satellites knew nothing of mining. It was not their fault, but inured to our misfortune.

The common experience has been that every day came up a point involving interpretation of the mining laws of the United States. A letter to the Secretary of the Interior brought a construction or ruling on a disputed point, and a letter to the Commissioner of the General Land Office elicited a ruling or decision on the same point exactly opposite to that of his superior. Were the matter pushed, or the divergence of opinion pointed out, the impression was conveyed in subsequent official correspondence that the miner is a nuisance, always bothering and disturbing official ease. With the present Secretary of the Interior and Commissioner of the General Land Office matters are more justly and intelligently managed; but we need a new department of the Federal Government—the Department of Mines and Mining—with a competent man in charge as a Cabinet officer of equal standing with the other members of the Cabinet. It is of little consequence whether he hails from California or Colorado or North Carolina, so that he has sufficient knowledge and authority to correctly conserve the mining interests and administer the great affairs with which his office would be charged. There are a great many things in the mining world that need straightening out, and they never will receive due attention or proper solution till there is a Cabinet officer of mines and mining. It is hard enough at best for the miners of this country without having things made harder still. Between the grab of the corporations and the merciless ignorance of those occasionally in power the miner has had little show for justice. If the miners of this country (and that term is meant to include every one directly connected with the mining industry) will work together in a united demand for such recognition as that originally suggested by the MINING AND SCIENTIFIC PRESS—a Cabinet department for the Government and fostering of the mining industry—it will be forthcoming.

The United States Government has done less for mining than for any other industry. There is not to-day to be found in Washington, D. C., even a single clerk to represent that great industry. The miners do not ask that the Government in this matter render any assistance to mining; only that it awaken to present requirements and assist itself. All the miners ask is that such action be taken as will decrease rather than increase the expenses of the Government. The Geological Survey, aside from its educational value, is of little use to any industry except mining, and that is under the Treasury Department. So with other bureaus that miners have to do with. Anything that affects the miner is in a detached condition under the heads of different departments that are not in active sympathy with or interested in practical mining work.

The miners are the cause and primary factor in the building up of the country westward from the 104th meridian. But for them this whole region would not be even so far developed, and the other great industries of this part of the nation would be but little advanced to-day from their rudimentary condition in the early '50s. A sense of gratitude should induce the United States Government to grant such a request as that embodied in the resolution unanimously endorsed at the Nov. '96 convention of the California State Miners' Association, and which will doubtless be re-adopted next Monday. The miners have contributed more to the wealth of the country and done more toward its development, with less return, than any other class of people. They have gone ahead as pioneers, asking no aid nor subsidies, and to-day we pass in palace cars across the way they blazoned white with their bones. Nor do they ask for any assistance. They do not appear as beggars; but without trespassing upon any of the prerogatives of other industries they with dignity suggest to the Federal Government what the business requirements of the time demand.

Our country leads in many important respects, yet in this we are behind other civilized nations. In Great Britain, France, Russia and Germany, with less reason than in ours, are Government departments of mining, ministers of mines, whose business it is to look out for that industry, and the effects of such governmental supervision are too manifest to require more than allusion.

It is the duty of the Government to see that the great sources of national wealth are not wasted. Yet the United States Government has been almost criminally negligent in this respect. Countless millions have been irretrievably lost in mining enterprises by reason of such neglect. At a comparatively small national cost for gathering information and supplying it to miners, securing modification and adjustment of conflicting laws, much of this loss could be prevented.

The horizon of the future widens. It is manifest that however deferred this matter may be it must come. Nothing is ever settled till it is settled right. The task is not an easy one. It will take concerted effort, unity of interests, a combination of forces East and West, education of the public mind, favorable consideration of officials in and out of Congress, and a general realization of the justice of the proposed measures. Miners can secure favorable public opinion and show cause for maintaining this idea and practical reason for its fulfillment. It is the province and should be the purpose of the convention that meets in this city next Monday to do more than merely pass perfunctory resolutions favoring the idea. An active committee should be appointed to influence public sentiment, bring the matter to the attention of Congress, and get every Representative and Senator to fully realize that this is an imperative necessity.

The Wedderburn Disbarment.

A brief notice was made last week of a recent decision of the Commissioner of Patents, in the case of a firm of patent attorneys in Washington, who have after a long trial been convicted of fraudulent practices, and have by this decision been debarred from further practice before the department. The testimony showed that the firm referred to was guilty of grossly unprofessional conduct. The report of the assistant Commissioner says: "The facts brought out in the record show that the firm of Wedderburn Co. carried out in their practice a skillfully planned scheme of deception, misleading their clients without regards to the dictates of truth, justice or decency. By false high-sounding promises, they played upon the credulity of their clients, and led them on by a misrepresentation and concealment of material facts to send money, using the Patent Office and the business of patent soliciting as an agency to practice their schemes."

The evidence showed that clients were charged for

examinations which were never made, and favorable reports were made upon clearly unpatentable inventions. When the inventor sent his money to apply for a patent, he was usually given a silver medal worth about 25 cents.

"It will be noted," says the Commissioner, "that the name of the genius does not appear on the medal, but that of John Wedderburn & Co. does; nor is the invention mentioned, so that the medal could be worn by a man or a dog with equal propriety, and would serve the same purpose as a cheap advertisement for the respondents.

"But the client, the 'sucker,' as Wedderburn facetiously calls him, is played still further along the line, thus: About the time that the sterling silver medal reaches the supposed inventor, he or she receives a communication without date from the National Recorder, which announces that the Recorder has learned that the party addressed has been placed upon Wedderburn's 'roll of honor,' and has received a 'sterling silver medal' as a 'reward of genius,' and the National Recorder appears to the reader of the letter to be wonderfully wrought up over the discovery of a budding genius of such rare merit, and the Recorder proposes at once to write up, or to have written up, the individual who has won such distinction." This he shows is done for $5.

"And so," the Commissioner continues, "the Recorder comes out with a whole page of the pictures of these credulous and duped mortals who have paid $5 for a boost up the ladder of fame, and the postoffice department of the United States and the patent office were for nearly two years the agents and instrumentalities used for carrying on these schemes, to the disgrace of the Government. And the brilliancy and pecuniary profit of the achievement have hitherto purchased absolute immunity and even favor. If in the future with reference to the respondents or any other company, combine or persons adopting and using such methods (and there are many of them), it will be due to gross neglect of duty on the part of Government officials who are charged with the administration of the law.

"It is well known that the methods and schemes here condemned are becoming common as a result of the supposed immunity the delinquents find in the money they make, and the influence and power the money so obtained will purchase and control. It is proper to say here that as to the practices, methods and conduct under consideration, no matter by whom practiced, we are at the parting of the ways."

The Commissioner recounted that the Wedderburn Company had a nominal capital stock of $100,000—$90,000 of preferred stock and $10,000 of common stock, but the common stock had the control. "This stock," he says, "according to the showing of the respondents, seems to have been carefully placed in the hands of over 3000 newspapers or newspaper men throughout the country, so that the 'plain people' throughout the Union, who reside away from the great commercial marts and highways of commerce and manufacture, could be put in communication with Wedderburn & Co. and be advised touching the great opportunities to make a fortune by little inventions and be induced to believe that they would be advised free of cost as to the patentability of their conceptions and endeavors in the inventive line."

In many of these newspapers the following has been published: "It is a remarkable fact that the firm of John Wedderburn & Co. to-day embraces more than three thousand well-known newspapers, *all of which are stockholders*, and whose *vital interest* it is, not only to spread abroad the fame of this firm, but also to *guarantee to the public* the skill and integrity of its management."

The Commissioner says commenting upon this: "The newspapers now have an opportunity to vindicate the integrity of its management. We will see with what promptness they vindicate."

The assistant Commissioner says of the practice of the business of selling patents:

"The propriety of an attorney or solicitor of patents combining the business of soliciting with that of selling patents is, in my opinion, questionable. Doubtless it may be done honestly, but the respondents' methods are shown to be such as to sell the clients rather than their patents. These respondents, in their pamphlet, 'How to Get a Patent,' on page 31, publish a 'warning' against those concerns which offer to sell patents in language which describes with scrupulous exactness the reprehensible methods which they themselves practiced to deceive their clients, and conveys a correct estimate of the moral quality of their practices."

The decisions of the Commissioner and assistant Commissioner will form a general declaration of what constitutes proper practice before the United States Patent Office, and in that respect are regarded as the most important documents that have ever been issued from the office.

Concentrates.

DURING September, '97, there were milled 21,354 tons ore at the Alaska-Treadwell; during the same period 417 tons sulphurets were treated.

THE Colorado *Chieftain* says some of the lead crystals found in the Rex mine at Hillsboro, N. M., sell for $15 each to New York specimen dealers.

THE Bay Horse mine, Mesquite district, San Diego Co., Cal., gives some evidence of value, as a rival claimant, "the original locator," has appeared.

DURING September, '97, the Chollar Co. disbursed $5367—the largest amount of any mine on the Comstock—next to the Con. Cal. & Va., which expended $7994 50.

BY May 1st, '98, there will be two large and regretful contingents composed of those who are sorry they didn't go to the Klondike and those who are sorry they did.

ALL who claim the title of "mining engineer" are not possessed of the requisite knowledge; though it is to be hoped that the claimant has the capacity to become one.

THE Government of the colony of New Zealand has purchased the MacArthur-Forrest cyanide patents, for the public welfare, subject to the approval of its Parliament, for the sum of $150,000.

THE Northwestern Mining Association, which closed its session at Spokane, Wash., last Saturday, elected G. B. Dennis president, A. P. Curry vice-president, W. J. C. Wakefield treasurer, L. K. Armstrong secretary.

OF the United Verde, Arizona, Copper Company's mines it is locally asserted that "the copper that pours from the immense smelting furnaces is known to be exceeded in value by the gold contained in the bullion and matte."

IN a New York paper appears the advertisement of a firm of perfumers, who offer a share of mining stock for every dollar's worth of goods purchased. The mine is located in Arkansas, and it is announced that the stock sells "at par" $1 per share.

THREE men were instantly killed by an accident in the Homestake mine, Lead, S. D., on the 6th. They had set off two blasts which did not explode. The men went to investigate and the blasts went off. The bodies are buried under a mass of ore 36 feet deep.

THE National Irrigation Congress, which last week concluded its labors at Lincoln, Neb., chose Cheyenne as the next place of meeting and endorsed the Herman bill, now pending in Congress, providing for cession to the States of millions of acres of arid land.

THE hydraulic season in the northern and eastern part of California has not been satisfactory. More than the usual quantity of rain fell last winter, but less than the usual amount of snow, there being thus a scarcity of the usual supply nearly all through the season.

THE Winnipeg, Manitoba, *Free Press* reports a resident of that place "buying black sand at 6 cents a pound." There ought to be enough of that material on the Saskatchewan to create considerable of a local industry at that price, if transportation charges can be arranged.

LAST Saturday an explosion of giant powder occurred in the 600-foot level of the Virtue mine, Baker City, Or., resulting in the death of J. P. Maddox and the injury of several other miners. The cause of the explosion was the dropping of a lighted candle in the powder magazine.

A TRANSACTION in the Flagstaff, Arizona, bank last Saturday shows an interesting phase of the silver question. A Chinese came in with $470 silver and with it bought a silver draft on San Francisco for $1000, to buy 1000 Mexican dollars, as the wily heathen explained, "to be coined into China money."

FROM the best information that can be obtained, an acetylene-gas flame of 30-candle power consumes twenty liters of gas and costs three-fourths of a cent per hour. This contemplates the use of carbide of standard purity and productive power, and, in this respect, the carbides of commerce vary considerably.

R. F. BROWN reports the finding of "a 5-foot ledge" of uranium twelve miles from Peshastin station, on the Great Northern Railway, Wash. It is one of the rare metals, is produced mainly in Austria and Germany, and is worth about 75 cents per gram. The Washington find, if authentic, is probably a silicate.

FOUR-DOLLAR GOLD PIECES turn up occasionally. They are called "stellas" and were coined at the Philadelphia mint about twenty years ago. They each contain 6 grams gold 1000 fine, three parts silver, seven parts copper. There were about 450 struck, and are worth their face value, and a little more as curiosities.

IT is estimated that the gross output from the Cœur d'Alenes this year (from both the silver-lead and gold belts) will reach $15,000,000, of which, approximately, one-third will go for transportation and treatment, one-third for labor, repairs, material and new machinery, and one-third as profits to the mine owners.

REGARDING the appointment of Government employes at different frontier sampling works, the Secretary of the Treasury has ordered the preparation of regulations for the sampling of imported ores, and states that when these regulations are promulgated the question of appointing additional assayers will be considered.

JUST what is "the biggest and most profitable gold mine in America" is not possible to be exactly stated. Probably as big and profitable as any is the El Oro, 100 miles from the City of Mexico, seven-tenths of which are said to be owned by J. B. Haggin and Marcus Daly, the remaining 30% in London. Men who claim to know say it is now paying a net profit of $400,000 per month.

"THE greatest, grandest, richest and best gold prospect in the United States" has at last been definitely located. It is "on the Seine river in Ontario, due north of Duluth;" the Rainy Lake, Minnesota, *Herald* says so. "An English syndicate is going to buy it" for either $700 or $7,000,000. Besides being in the United States and Ontario, the mine's surrounding scenery is also reported to be superb.

THE only suggestion this paper has to make regarding the selection of officers of the California State Miners' Association next Tuesday is to keep out politics, and corporate influence and plans for private gain. These have been guarded against all along, and should be. The Association is not for the furtherance of any one's political hopes, nor is it a place for any one who expects to make anything for himself out of it.

A VANCOUVER, B. C., dispatch says: "The offer of W. H. Remington of Salt Lake City to put up a 300-ton double-stack ore smelter near Vancouver, in consideration of a municipal bonus of $100,000, payable by the city at $1 a ton on the output, has induced the Rothschilds-Evans Syndicate of London, England, to 'go one better' and offer to put up a 350-ton smelter near Vancouver, on the harbor front, if the city will grant a bonus of $65,000, payable at $1 a ton."

IODIDE OF COPPER has been found in the Broken Hill Proprietary mine, New South Wales. The Georgetown, Colorado, *Courier* says this compound has never previously been found. Iodide is found in but few mineral compounds. It occurs with chlorine, bromine and silver in the mineral iodobromite, found near Dernbach, Nassau. With silver it forms the mineral iodyrite, or iodic silver, which is the most abundant of the iodide minerals, and is found in New Mexico, Arizona, Mexico, Chile and Spain. Combined with silver and mercury it forms the mineral tocornalite, found in the mines of Chanarcillo, Chile. With mercury it forms the mineral coccinite, found in Mexico. Iodide of zinc has been found in Silesia, along with other zinc minerals, though not distinguished.

THE Denver *Republican* wants Colorado to beat California's output of gold this year, and says: "Of late we have upon several occasions directed attention to the need of making Colorado's gold output as great as possible this year. It is probable that Colorado will surpass California, but it should do it with figures so great that there would be no room for Californians to dispute the record. Every owner or operator of a gold mine should determine to help make the victory doubly sure. Let Colorado this year go away ahead of California, and public attention in the East and also in Europe will be strongly attracted to the district that makes the best showing." Colorado is making strong efforts in that direction, and Colorado's railroads do all possible to advertise their State. California's railroads seem afraid that some one will find out what the State is doing in mining and never have a line about the leading industry of the State from which they expect support.

WHAT is claimed to be a new precipitation process for cyanide solutions is thus described by the inventor in the London *Mining Journal*: "The principal feature of the Cowper-Coles process is an aluminum cathode, which overcomes one of the chief difficulties appertaining to the economical recovery of gold from weak cyanide solutions by electrolysis. In the Siemens-Halske process lead foil or lead strips are used, the cutting up of which is a tedious matter. If several sheets are cut superimposed the strips cling together, and have to be carefully spread out one by one, so that the surface may be exposed to the solution. A clean-up is made every seven or eight weeks, when the wood frames carrying the lead strips are withdrawn, the lead strips removed and new substituted, the auriferous lead being ultimately melted down and conveyed to a central works to be cupelled. This method is both crude and expensive, the labor of fitting the strips into the frames is considerable, and the consumption of lead is a large item, having been computed by Mr. Von Gernet, at the Worcester mine, at one-tenth of a penny per ton of ore treated. The Cowper-Coles process overcomes these difficulties, aluminum plates being substituted for the lead foil, advantage being taken of the fact that a loose oxide is formed on the surface of the aluminum, which enables the deposited gold to be readily stripped or wiped from the cathodes as pure gold. Gold by this process has been successfully extracted from cyanide solutions, containing only .01 per cent of cyanide of potassium, 2½ dwts. of gold to the ton of solution. The substitution of aluminum for lead foil or strip enables the gold to be obtained as pure gold and also daily returns to be made of the amount of gold recovered.

AS BETWEEN upraising and winzing between levels in metal mines, the former is the cheaper method. Gravity assists in the removal and blasting of the ore. Two men will upraise from 4 to 6 feet in hard rock in a shift in a hole 4x4 feet. The work is much easier on the men, as they have no ore to shovel, while in the winze two men with the aid of two men at a windlass will only sink from 2 to 2½ feet in a shift in fair rock. The serious objection to overhand work is the great danger from falling rock and the liability to guard against it. These upraises or winzes serve several purposes of ventilation, subdivision of the vein and, when mining operations are begun, the upraise is timbered and becomes a chute for the delivery of the ore. In the overhand method of working out a vein, after the levels have been driven and the vein blocked out by the upraises into blocks of 150 feet in length and the width of the vein, then the workable blocks of vein matter are stoped from the upraise both ways for a distance of 75 feet. The miners begin at the upraise and break away a slice as wide as the vein and 6 or 7 feet high. The ore is then picked over and delivered at the level below. After a slice has been removed, the mill hole is timbered, the height of the slice removed, with close-laid, round logs of about 6 inches in diameter. One slice after another is removed until the upper level is reached and the block is exhausted. It is not uncommon in the working of veins which are entirely pay dirt to allow the broken ore to gather in the waste space to such convenient height as will give the miners a footing. The excess is removed, and the whole accumulation is removed as soon as the stope is exhausted. The ore which accumulates in the chute is drawn off as rapidly as circumstances will permit. The chute is never emptied, but is relieved only of the excess. This plan prevents the rolling of the ore down the chute, and so prevents an excessive pulverization of the ore. As rich ore is usually brittle, the loss induced by such pulverization would be great.

The Cyanide Process.*

NUMBER III.—CONCLUDED.

Francis L. Bosqui, Bodie, Cal.:—Ever since the cyanide process was found to be an efficient means of gold extraction, efforts have been made to supplant the original zinc precipitation method by something "cheaper," "more thorough" and "less inconvenient," in practice. Grave objections have been urged against this mode of precipitation by nearly all writers on the subject, and very recently by Prof. Christy, in his excellent paper on "The Solution and Precipitation of Cyanide of Gold."

The readers of that paper will be chiefly interested in the author's account of his own method of precipitating gold by means of cuprous salts, and in the procedure which he suggests for the recovery of cyanide from strong solutions. While the discovery of this method is unquestionably a very great advance in the chemistry of the cyanide process, it can not, in all cases, be assumed to possess the practical advantages over the filiform-zinc and electrolytic methods, which the author claims for it.

Prof. Christy's four main objections to zinc precipitation are all, with one exception, unqualified. He dismisses the first three as "having been sufficiently emphasized by everyone who has described the practical application of the cyanide process." The fourth he qualifies thus: "4. The failure, in certain cases, to precipitate the gold." It may be safely inferred here, I think, that Prof. Christy means his first three objections to be taken as universal.

It will be of some importance to those interested in the practical development of the process to know that these objections are not universally tenable; and that, notably in cyanide practice at Bodie, California, a pretty exhaustive experience of two years almost completely refutes them.

At Bodie the cyanide process has been very successfully operated for two seasons of about eight months each. During the summer and fall there are five plants in actual operation, whose capacities range from 900 to 4000 tons per month; the total capacity of all the plants in the camp being about 11,500 tons per month. These plants are operated on the same general principle, zinc precipitation being used in all.

The tailings are derived from new accumulations impounded as they run from the mill batteries, and from old isolated beds in the neighborhood of the town, which have been spared by spring freshets in the long mining history of the camp.

No attempt has been made to keep a record of cost of treatment in all these plants. But such a record has been kept on a total run of 52,665 tons; and to this I shall refer in attempting to show that we have not been embarrassed to any extent in Bodie by the disadvantages which Prof. Christy claims for the zinc precipitation method. I assume, of course, that all the tailings in Bodie are of about the same general character as those of which a record of treatment has been preserved, and that, approximately, the same results have been obtained from all.

I shall take up Prof. Christy's objections in the order in which they appear in his paper.

"1. *The great consumption of zinc compared with the amount of gold precipitated.*"

The record of zinc used at Bodie in the treatment of 52,665 tons of tailings indicates a consumption of 0.22 pound per ton, at a cost of about 3 cents per ton; assuming the price of sheet zinc laid down in Bodie to be 9.3 cents per pound, and the cost of cutting it about 4 cents per pound. To be more pertinent, there is a consumption of 1.39 pounds of zinc at a cost of 18.4 cents, per ounce of gold recovered. Theoretically, this consumption is enormous, for it should require only about one pound of zinc to precipitate six pounds of gold; but economically it is very small, since it means a cost of only 3 cents to the ton of tailings.

"2. *The great destruction of potassium cyanide to no useful purpose.*"

It has often been contended that zinc precipitation calls for the use of stronger solutions than might otherwise be resorted to. Prof. Christy stoutly claims for his, and for the electrolytic method, the one paramount advantage that they admit of the use of very dilute solutions of potassium cyanide. At Bodie exhaustive experimental tests were made by Mr. B. W. Merrill to determine the proper strength for a cyanide solution, *i. e.*, with respect to its extracting power on Bodie tailings; and the conclusion was reached that a solution containing less than 0.1 per cent cyanide was not so available as a stronger one. The fact, then, that solutions containing less than 0.2 per cent cyanide were found unavailable for the best extraction in Bodie, would nullify the chief advantage claimed for both the newer methods of precipitation, at least so far as this particular camp is concerned.

We know that, theoretically, there is a consumption of cyanide during precipitation—that is, during the flow of solution through the zinc boxes. Some writers have laid particular stress upon this, as being one great source of cyanide consumption. I have often tried to determine just what this consumption is by making comparative titration tests on a solution flowing into and a solution flowing from the same zinc box, the two samples being taken at the proper interval of time. I am aware that the reliability of the silver-nitrate test, as a delicate method of determining the amount of cyanide present in a given solution, has been called into question. But even assuming that the presence of zinc in the solution does vitiate the test to a certain extent, it is hardly probable that the amount of zinc accumulated during a single flow through a zinc box would be sufficient to destroy the validity of a comparative test. In fact, the quantity of zinc present in eighty tons of strong solution, determined quantitatively at the end of one of our first season's run, was so infinitesimal as to preclude any such conclusion.

There is still another reason for supposing a comparative silver-nitrate test on in-going and out-going solutions to be reliable, namely, the remarkable coincidence that in each case the well known precipitate came down at precisely the same point in the two test tubes. In other words, the density of the precipitate was exactly the same in the two tubes, when a common point was reached on the burette. This would hardly occur with such invariable precision if the test on out-going solution were really vitiated by the presence of zinc accumulated during a single flow through a box.

The silver-nitrate test is a very simple and serviceable one, and, so far as I know, has been generally retained in practice. Even if it be, in the long run, somewhat vitiated by the presence of zinc in the solutions, it still indicates what might be called a "dissolving strength," and, therefore, for all practical purposes, efficient.

The amount of cyanide present in our strong-solution sumps average from 0.14 to 0.16 per cent. As there is no perceptible consumption of cyanide in the zinc boxes, it is safe to assume that this deterioration of strong solution is due to the action of "cyanicides" during leaching, and to its dilution by the original moisture in the tailings and by the final wash-water.

All solutions containing more than 0.1 per cent of KCy are run directly into a "strong-gold tank;" those containing less, into a "weak-gold tank." The excess of this weaker solution over and above what is used in the preliminary leaching is run through a series of "waste zinc boxes," and then to waste. This waste solution averages in strength about 0.05 per cent KCy. There are approximately fourteen tons of it run to waste in twenty-four hours. This may look like an enormous consumption of cyanide, but the system, on close examination, will be seen to have one great advantage. It prevents an excessive and unwieldly accumulation of strong solution, while the amount of cyanide in the waste is really small, in comparison with what would be required to raise it all to standard strength. This accumulation of weak solution is unavoidable where there is an abundance of water available for wash-water, and where practically all the cyanide solution in a vat of tailings is displaced before sluicing.

The consumption of cyanide at Bodie on a total run of 52,665 tons of tailings was 0.41 pound per ton; on the first 41,730 tons it was 0.38 pound per ton. The latter figures represent a treatment of seventy-eight tons per day for a period of 535 days. From these data we might indicate approximately just what the consumption of cyanide is in each stage of the process. On a daily treatment of seventy-eight tons the consumption was thirty pounds. The loss of cyanide in spent solution (assuming that fourteen tons per day go to waste, containing 0.05 per cent of KCy) is about fourteen pounds. This leaves sixteen pounds per day still to be accounted for. It was ascertained by tests made in percolators on average samples of tailings treated that the loss of cyanide in actual leaching is about 0.2 pound per ton, or 15.6 pounds per day. This leaves a balance of 0.4 pound per day, or 0.005 pound per ton, which we may assume as the loss of cyanide during precipitation, a very insignificant amount.

The results are summarized as follows:

	Per day. Pounds.	*Per ton. Pounds.*
Consumption of KCy in spent solution	14.0	0.179
Consumption during actual leaching	15.6	0.2
Probable consumption in zinc boxes	0.4	0.005
Total consumption of KCy	30.0	0.384

Of our success in precipitating gold from weak solutions I shall speak in its proper place.

"3. *The great difficulty of removing zinc and cyanogen residues from the gold, thus causing loss in melting, and the production of an unclean bullion.*"

I will admit that this was a great difficulty with us at first, and one which for a time seemed insurmountable. It was necessary to devise some means of separating the zinc-sulphate residues from the gold slimes, after the regular treatment with sulphuric acid. Various forms of filter were tried. A perforated false bottom of wood, packed with sand, was discarded after several trials, on account of the impermeability of the layer of slimes which formed on top of the sand. A filter of asbestos cloth was resorted to, but was likewise discarded. It not only proved to be an imperfect filter, but was found completely disintegrated after the subsidence of the action of the acid, a result probably due to the mechanical untwisting of its fibers during the reduction of the zinc. We were obliged at this time to use a succession of washes, in order to dilute and gradually eliminate the zinc sulphate—allowing the slimes to settle completely each time. This method, however, was slow and laborious. A Johnson filter-press was next introduced. It seemed to act fairly well on the slimes before acid treatment, but after the destruction of the zinc the gold precipitate apparently became too finely divided to admit of filtration. A film of not more than ⅛-inch in thickness on the canvas disks of the press seemed to offer a very complete obstacle to the passage of the clear liquid. The pressure against the disks would run up to over 100 pounds; the press would then have to be opened and the disks scraped. This method was found too tedious, and was finally abandoned.

After many discouraging failures, the following *modus operandi* was adopted, and has since been followed with perfect success:

The slimes and fine zinc are discharged directly from the zinc boxes into a redwood vat, 6 feet in diameter and 2 feet deep. This vat is protected on the inside by several coats of paraffine paint, has a slight bottom incline for drainage, and is provided with a 2-inch discharge valve. Here the slimes are treated with sulphuric acid. After the destruction of the zinc, the zinc-sulphate and the slight excess of acid present are diluted by filling the vat with warm water. Within an hour the bulk of the precipitate will have settled to the bottom. The supernatant liquor, to the amount of about 400 gallons, which still contains a small amount of gold slimes in suspension, is then siphoned off into a ten-ton settling vat.

The gold slimes are treated with a succession of these washes, the supernatant liquor being each time drawn off into the settling vat until the amount of zinc sulphate remaining in the slimes is insignificant. The liquor siphoned off into the settling vat, which contains only a very small quantity of slimes in proportion to the total quantity obtained, is left to settle between clean-ups. The clear liquor is drawn off just before a succeeding clean-up, and at long intervals the precipitate is gathered from the bottom and melted.

The bulk of the slimes is finally discharged from the acid vat into a filter box. This box is provided, about a foot from the top, with a perforated partition, which is closely covered with two thicknesses of ordinary mill blanketing. From the compartment beneath this filter the air is withdrawn by means of a steam ejector, and the water is thus removed from the slimes by suction. At the bottom of the box is a 1-inch discharge valve for drawing off the accumulated clear liquid. By occasionally scraping the filter blankets the passage of water through them is greatly facilitated. These blankets are removed and washed after each clean-up, and clean ones are substituted. The partially dried slimes from the blankets are then completely dried over a furnace and melted in crucibles. The zinc residues being thus pretty thoroughly removed from the slimes, the difficulties in melting are reduced to a minimum.

Prof. Christy lays some stress upon the losses in melting. There is sure to be some loss from "dusting," especially where there is a high draft in the furnace flues, and where the pots are carelessly charged with the dried slimes.

For some time a considerable value went into the slag, which had to be shipped to the smelting works; but, after a good deal of experimentation, a very suitable flux has been found, which reduces the slag value to almost nothing. A dust chamber has been constructed in connection with the melting furnace, and an effective damper introduced in the course of the flue. The latter is closed at each charging of the crucible, and "dusting" is thus almost entirely avoided.

Our loss in melting has never been more than barely appreciable; and now, since the introduction of a dust chamber and damper, is wholly insignificant. The wonderfully close correspondence between our actual bullion yield and the extraction indicated by careful assays of charged and discharged tailings would in itself weaken the supposition of any considerable loss in melting. To be sure, our bullion is low-grade, but we suffer no inconvenience from this, except the small increase in cost of transportation and refining in proportion to the value of the bars.

"4. *The failure, in certain cases, to precipitate the gold.*"

Prof. Christy probably alludes here, more particularly, to the difficulty in precipitating gold from a weak cyanide solution. He says that "in the case of zinc shavings it is practically impossible to precipitate the gold from such a solution unless it contains one or two-tenths per cent free cyanide of potassium."

In Bodie practice it has been found perfectly practicable to precipitate gold completely from solutions containing as little as 0.05 per cent of cyanide. Our weak solutions are run through a series of zinc boxes, of ten compartments each, before going to waste. Each compartment has a capacity of about eight pounds of zinc shavings. The solution, after

* Discussion at the Chicago meeting of the Am. Inst. Min. Eng., Feb., '97, of the papers of Prof. S. B. Christy, H. Van F. Furman and G. A. Packard.

passing through about 160 pounds of zinc shavings, is found to be practically free from gold, repeated assays indicating merely a trace.

At the Victor plant, of fifty tons per day capacity, considerable difficulty was experienced in precipitating gold from weak solutions; but by the addition of a third box, making an aggregate of thirty compartments, the trouble was corrected, and most satisfactory precipitation was obtained.

The following table of assays, made at random on solution samples from various zinc boxes at different intervals in the season's run indicates a high percentage of precipitation in both strong and weak solution boxes. These results were obtained by evaporating 250 c.c. (about eight assay tons) of the solution in each case, and assaying the residues:

	Strong or Weak.	Value of the Incoming Solution per Ton			Value of the Outgoing Solution per Ton.		
		Au	Ag.	Total.	Au.	Ag.	Total.
1	Strong (.14-.16%)	$4.24	$.45	$4.69	$ .05	$.02	$.07
2	" " " "	4.39	.43	4 82	.10	.03	.13
3	" " " "	4 03	.44	4 47	Trace	.....	.....
4	" " " "	4.13	.46	4.59	Trace.	.....	.....
5	" " " "	3.32	.38	3 70	10	.06	.16
6	" " " "	3 05	.39	3.44	.26	.07	.33
7	Weak (.04-.07%)	1.24	.14	1 38	Trace.	.....	.....
8	" " " "	2 90	.45	3.35	.07	.07	.14
†9	" " " "	3 82	.57	4.39	.25	.07	.32
†10	" " " "	4.13	.64	4.77	.21	08	.29
†11	" " " "	1.14	.16	1.30	Trace.	.....	.....
†12	" " " "	.52	.15	.67	Trace.	.....	.....

† We have occasionally been puzzled by the appearance in our zinc-boxes of a yellow, aluminous (?) precipitate, which seems to be thrown down in the gold-tanks as soon as the solution leaves the vats. Whenever this accumulates to any extent it interferes somewhat with precipitation. Assays Nos 9 and 10 were made on solutions taken from a box containing a considerable amount of this aluminous slime. The slightly lower percentage of precipitation is apparent. The two following assays (Nos. 11 and 12) were made on a low-grade solution flowing through the same box, after a complete elimination of the aluminous material, and indicates a normal precipitation.

The method which Prof. Christy suggests for recovering cyanide from solutions by means of sulphate of zinc might be very satisfactorily applied to spent solutions containing only a trace of gold. The virtual absence of gold from this waste solution might greatly simplify such a method of gold recovery.

I do not wish to be understood as condemning the objections which Prof. Christy urges against zinc precipitation. I am aware that in many cases this method has been found an imperfect and expensive one. I simply wish to call the attention of those interested in the cyanide process to one very pronounced exception to Prof. Christy's statements, namely, the conditions which obtain in our Bodie practice.

An English View of It.

To the Editor:—The letter in your last edition "British Comment on American Mines," called to my mind one I had recently seen bearing on the same question, extracts from which I now take the liberty to send you. Its suggestions appear to me singularly pertinent to the mining situation at the present moment.

"The only practicable plan for the owners to pursue, in the event of their desiring to insure themselves against—or to minimize—the contingencies inseparable from mining and to derive an adequate consideration for their property, is for them to become their own promoters and retain the management so long as they are the largest holders of shares. To do this would entail only a moderate expenditure on this side (London), and owners in incurring such would only be running the risk that they expect others to do for them *free of cost*. No one wishes to handle mining property, or indeed any kind of property, without making a profit, and it is this profit that stands between mine owners and financial agents to the detriment usually of both, though possibly to the advantage of the unwary—as well as wary—investor. The mine owner requires to recognize that the financial agent has to live, and the latter needs to realize that there is a difference between profit and plunder and when each becomes reasonable in respect to a particular property, then both are likely to be benefited."

San Francisco, Oct. 6, '97.

The strongest solid rectangular beam which can be cut out of a round log is one in which the proportion of breadth to depth is as five is to seven. To ascertain the strongest section that can be got out of any given log, the method is as follows: Describe a circle equal to the section of the log. Draw line ab (a diameter) across it and passing through the center. Divide this line into three equal parts, ac, cd and db. At one of the divisions on one side of the line, as at c, make a line (ce) perpendicular to ab, which will pass through the circumference of the circle at e, on the other side of ab, and at the other (d) make another line perpendicular to ab, cutting the circle on the opposite at f. Join the points ae, af and be, bf, which will give a rectangle showing the strongest section that can be got out of the log. This is the section which all unbraced beams, placed on edge, should have, in order to use the timber to the best advantage. Where timbers are braced, however, the strength is increased by increasing the depth.—Coachbuilder.

The Miner's Wealth.

Robert McIntyre, a Methodist minister of Chicago, has stirred some of his brethren because he grubstaked a miner for the Klondike. The Chicago *Tribune* interviewed Mr. McIntyre on the subject. He says:

Conscientious scruples against such an undertaking? No scruples entered my mind then, nor have they since. It was purely and simply a matter of principle. The Sermon on the Mount and the Ten Commandments don't come into the matter, and theology needn't.

The fact is, I admire a miner's wealth. It's clean. There are no blood or tears on it. It is acquired away from the scheming and the cut-throat competition that characterize ordinary business ventures, where the success of one man so often means the disaster and downfall of some other man, or perhaps a number of men. Nobody has been pinched. Nobody has been wronged. The miner who digs a fortune out of the ground has the satisfaction that he hasn't robbed a soul, even though he become a hundred times a millionaire.

Then, too, there is another factor to take into consideration. The man who makes a fortune on the Board of Trade, or on the Stock Exchange, or in building up a gigantic business house, adds nothing to the world's store of available wealth. The world, in other words, is no richer because he is richer. He is rich, rather, because somebody else is poorer. The miner, on the other hand, whether he digs out $100 or $100,000, adds that much to the world's wealth, and, with the added wealth, he contributes just that much to the possible amount of the world's comforts and pleasures.

As I look at the matter, there are few producers of wealth. The many live on the few. The only man comparable with the miner is the farmer. He gets what he has direct from Nature, but he produces perishable wealth. While he meets a want, his contribution to the world's wealth therefore is not a permanent one like the miner's.

The gold miner is to-day the king wealth producer of the country, and I honor him above all others. It is no dishonor, it needs no apology, to emulate his example or assist him in his efforts. There's the whole question in a nutshell.

It isn't a church matter. The fact is God put the gold in the valley of the Yukon for His children. Any man, consistent with such regulations as are necessary for fair play and the protection of individual interests, has an undeniable right to go there and dig and delve all he chooses. If he pulls out $100,000 he simply makes a draft, not on somebody's bank account but on Nature's treasury. There is no more wrong in that, therefore, than there would be in a man sowing wheat or planting corn and trusting to Nature to yield twenty, fifty or hundred fold. It's a private matter between man and his Maker. There's scriptural authority enough for a man to plant and reap a harvest of grain, and I don't see why there isn't authority enough for a man to dig and delve and reap a harvest of gold dust and nuggets.

As I look at the matter, therefore, the minister who doffs broadcloth and dons a miner's garb and faces the perils of the wilderness, and gets a draft cashed on Nature's treasury for a few hundred thousand dollars or a million or two, is doing humanity a good turn. I don't know by what course he could do more good or add more to the sum of the world's comforts or pleasures. If he can't go to the field of operation himself, it's an honorable thing, I believe, for him to grubstake somebody else.

I can't quite see why a clergyman, if he chooses, should not be a wealth producer. Christian ethics are not against it. There is only about so much wealth in the world, anyway, and life now-a-days is a scramble to get as much of what does exist as possible. I should rank a benefaction above a benediction. But on the miner's wealth, as I just said, there are no blood, no tears, no groans, sufferings, sorrows caused to others.

A minister has just as much right to mine gold or grubstake somebody else as the man who listens to his sermons and helps to pay his salary. It's a foolish notion that a minister, because he is a minister, must apologize for doing openly what he commends others for doing. I have said that the miner who actually adds to the world's wealth is a public benefactor, and that his wealth is the cleanest in existence. Believing that, why should not I offer to grubstake Mr. Gaston?

The cast plate-glass of which mirrors, shop-windows, etc., are made is prepared from the whitest sand, broken plate-glass, soda, a small proportion of lime, and a much smaller amount of manganese and cobalt oxides. The glass, when perfectly melted, is poured upon an iron table of the size required, and the thickness is regulated by a strip of iron placed down each of the four sides of the table. Immediately after it is poured out, the molten substance is flattened down by an iron roller, which lowers the glass to the thickness of the strips at the sides. It is then annealed, or tempered, for several days, after which it is ground perfectly level and polished to a transparent brilliancy.

Petroleum in Texas.

Corsicana is a town of 7000, fifty miles southeast of Dallas. The discovery of oil there was purely accidental, through the efforts of the Corsicana Water Development Company to get a supply of water for the city. An artesian well was put down in the city. The drill pounded its way through a formation known to geologists as ponderosa marl, but familiar to every well digger in Texas as "joint clay," to a depth of 1040 feet, when it seemed to enter a much softer formation, which, when brought to the surface, proved to be a bluish sandy shale, saturated with a fine quality of petroleum. The drill quickly sank through this streak of shale, which was 20 feet thick, and from which oil flowed in large quantities. A few oil wells were put down, and, at a uniform depth of from 1020 to 1050 feet, the sandy shale containing the oil was struck. There was no change in the character of material passed through; it was an unbroken stretch of ponderosa marl, bluish in color and crumbling to dust when exposed to the air. The oil sands vary in depth from 20 to 36 feet. These developments attracted considerable attention in the oil world, and soon other experts and prospectors came in; they looked, pronounced the oil of excellent quality, and wondered how it came there. There was no similarity between the conditions there and those elsewhere where oil had been found, they said, and hence there was nothing upon which to base a reasonable estimate as to the extent of the oil area or the term of its flow. There was no rock penetrated on the way to the oil, none below the oil, and there seems to be no hard casing immediately covering the oil, as had been invariably found in all other fields—still there is the oil, and it is in paying quantities, and the flow has continued with undiminished strength for nearly two years, regardless of the number of wells or their proximity to each other. According to experts, the conditions are entirely new and difficult of satisfactory explanation. The Texas Petroleum Company, organized six months ago, has three flowing wells, the latest of which is said to be producing about twenty barrels per day. The Corsicana Oil Development Company has a well which is flowing twenty-five barrels.

Rates in Europe and America.

The Chicago *Record* gives the following facts bearing on the question of railway rates in this country and Europe:

	Miles.	Hours.	Railway fare.	Sleeper fare.
New York to St. Paul	1314	40	$31 50	$ 7 00
New York to Denver	1937	64	48 75	11 00
Paris to Constantinople	1875	65	71 00	28 00
Paris to St. Petersburg	1600	59	56 00	25 00
Calais to Brindisi	1380	56	66 00	26 00
New York to Omaha	1400	41	32 75	7 50
Paris to Lisbon	1175	48	48 00	22 00
New York to Chicago	960	27	20 00	5 00
Leipsic to Rome	945	35	44 00	15 00
Washington to Chicago	921	24	18 00	5 00
Ostend to Vienna	821	29	33 00	10 00
Paris to Madrid	810	28	34 00	15 00
Paris to Vienna	790	26	30 00	7 50
Washington to Jacksonville	760	20	21 00	5 00
Paris to Rome	775	34	33 00	10 00
Paris to Berlin	663	20	24 00	8 00
Paris to Frankfort	375	15	19 00	5 00

From this it appears that the first-class rate is uniformly almost twice as high in Europe as it is in America.

A correspondent of the Birmingham (Eng.) *Post* states on the authority of a high Russian official that the scheme for a vast canal to connect the Baltic and the Black seas, upon which a number of French and Russian engineers have been engaged for nearly two years, is shortly to be carried into effect. The canal, it is estimated, will have the most colossal effect upon the internal and external trade of Russia, and the writer's authority, who is certainly in a position to speak, gives the following particulars regarding it: The canal will cost $55,000,000 and will be 1110 miles long, 215 feet wide and 27 feet deep. It will be designed to give free passage to the largest ironclad afloat, and at Riga, where the Baltic mouth of the canal is proposed to be, a great naval arsenal will be constructed. The Russian government, it is understood, will contribute a large proportion of the expense, and the governments of the districts through which the canal will pass the remainder.

The tremendous force of the sea was illustrated by an object lesson ashore in New York City last week when five large tanks, built to contain 120,000 pounds of soap, but temporarily filled with water, and situated on the fourth floor of a large building on West Fifty-second street, collapsed and completely wrecked the whole structure, killing three men and doing a large amount of damage. The tanks were each 15 feet high and about 13 feet diameter, and contained 161,703 pounds of water, but the floors and supporting beams proved altogether inadequate to stand the strain. A wave of the dimensions of one of these tanks is not at all unusual at sea, and when such a wave breaks on a vessel's deck the force of the blow can only be estimated by the amount of damage it does in spite of the elasticity of the water beneath the vessel to ease her in receiving the stock.

The Tin Deposits at Temescal, Southern California.

By HAROLD W. FAIRBANKS.

Several years ago, shortly prior to the final suspension of work upon the Temescal tin deposits, the writer was given exceptional facilities for a careful examination of the mine and the country immediately surrounding it. Subsequently a brief description was published, but owing to the political importance of the question at the time no thorough report was attempted. Descriptions of the tin veins occurring here have been given by Blake and Hanks, although little has been published concerning the conditions under which the veins occur and the nature of the ore bodies. In the present paper the writer will add to what is already known, a more detailed description of the veins and the country in which they are found. The report of Hanks referred to above contains an outline of the history of the discovery and the excitement following it, the purchase of the old Mexican grant and the final development by the English company, so that this part of the subject will not be touched upon.

General Geology of the District.—The Temescal tin mine is located in the northwestern portion of the San Jacinto grant about five miles southeast of South Riverside. This portion of the grant consists of rolling hills having an elevation of nearly 1,000 feet, and formed of a great variety of rocks. To the west, separated by the Temescal valley filled with late Miocene sediments, is the Santa Ana range, the most striking topographic feature of the region. It is high and steep, contrasting strongly with the rolling though sometimes quite mountainous country to the northeast. Its elevation is doubtless due to a great fault line, the northern portion of which passes through the Temescal valley. Immediately adjoining the valley on the east is a more or less connected strip of highly metamorphosed rocks associated with porphyries, but the most of the country in that direction is granite.

The tin deposits lie nearly in the center of a rudely semi-circular area of granite about two miles in diameter and connected on the east with the great body of similar rock extending indefinitely in that direction. The sedimentary rocks along the edge of the granite area consist of quartzite, mica schist and conglomerate of unkown age. A part at least of the slates and limestones of the Santa Ana range are carboniferous, but further than that we have no information. Extensive bodies of porphyry also border the granite. They vary much in appearance, in some places being of a grayish color and almost devoid of distinct crystals, but more generally the rock presents a groundmass almost black in color in which are sprinkled white feldspar crystals and more rarely those of quartz. It is difficult to say which is the older, the granite or the porphyry. In the neighborhood of the junction both rocks change their character somewhat, although each is distinct. With perhaps one exception, none of the fine-grained granitic dikes abundant in the coarse granite were noticed penetrating the porphyry, but there are bunches and dike-like protrusions of the latter in the granite near the contact.

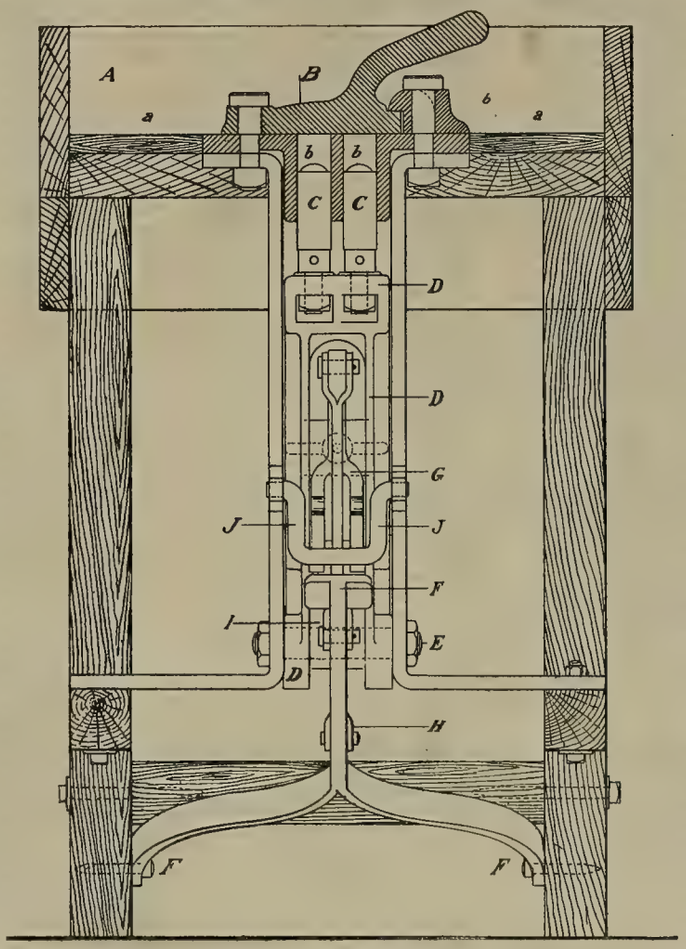
The granite is distinctly intrusive in the metamorphic rocks, as bunches of it project up through them here and there. The granite varies considerably in texture although the main body has a uniform composition. Macroscopically it shows two kinds of feldspar, one a pale brownish color and the other white, abundant quartz and a small amount of dark silicate. Under the microscope it is seen to consist of plagioclase, orthoclase, and quartz in nearly equal proportions, with a much less amount of biotite mica. Towards the outer edges of the granitic boss in which the mine is situated are numerous dikes of a very fine-grained granite consisting almost wholly of quartz and orthoclase in interlocking grains. The proportion of quartz seems to be greater in some of these dikes than in the coarse granite to which they are genetically related.

The Vein System and Tin Deposits.—The semi-circular area of granite and portions of the adjoining porphyry have been fissured in a general northeast and southwest direction along almost innumerable lines and a black vein matter deposited. The veins are generally small, varying from one-fourth to a few inches in thickness, but in the case of the main tin-bearing vein an enormous size is reached at Cajalco hill. As the hill is approached the veins become larger, and finally culminate in this elevation, which is about 300x250 feet in diameter at the base. The veinstone of which it is mostly composed rises in prominent and bold croppings. With one or two unimportant exceptions the material of which this as well as the other veins is formed consists wholly of tourmaline and quartz, with which the tin ores are locally associated. The larger veins, and the Cajalco in particular, are very irregular in size, sometimes appearing to be mere bunches in the granite. A few hundred feet northeast of the hill the vein has narrowed to 6 or 8 feet, and it is here that the large body of tin was first discovered and the main shafts sunk.

A slide prepared from one of the smaller veins, which in the hand specimen appeared to consist wholly of tourmaline, showed bunches of tourmaline crystals radially arranged and embedded in interlocking quartz grains. The crystals are recognized as tourmaline by the hexagonal cross section, parallel extinction, polarization and frequent presence of fibrous terminations, although the terminal crystal faces are sometimes present. In the most of the sections prepared the tourmaline appears to be exceptionally opaque, sometimes the border is opaque while the center is feebly translucent. With the blowpipe the material fused easily with slight intumescence and became magnetic. The reaction for boron was pronounced.

The large Cajalco vein consists of tourmaline and quartz in almost equal proportions. This aggregate breaks up quite easily, as it is porous, the spaces being lined with drusy crystals of both components. The deposits have evidently been formed in fissures through a gradual replacement of the granite walls. Judging from an examination of the seam-like veins the silicates appear to have been attached easier and removed first. In places the larger veins seem to blend into the granite and it was first though that some of the quartz might be a remnant of the granite, as it is rarely if ever segregated in bunches. A microscopic examination showed that this view was undoubtedly false, as the grains interlock in a different manner from those in the granite, and in addition contained fluid and liquid inclusions. The relative proportions of quartz and tourmaline in the Cajalco vein are so constant that it presents a uniform appearance. Although the mine reports speak of the occasional presence of arsencial pyrites and copper, nothing of the kind came under the observation of the writer. The bunches in these veins, and especially the enormous one forming Cajalco hill, could have been formed in no other way than by replacement, although it is difficult to conceive of its having taken place on such a large scale.

With the earlier reports upon this property nearly all the veins were considered tin-bearing, but at the time the writer made the examination shortly before the mine closed, after diligent prospecting the company had succeeded in finding traces of tin in only one or two veins besides the one worked. Tunnels had also been run into Cajalco hill, but in this great body of vein matter nothing was found. The narrower portion of the vein to the northeast furnished all that was ever milled. At the time of examination the vein had been opened to a depth of 180 feet by two working shafts, exposing the vein horizontally for 300 feet. Here the vein has a width of 8 feet or less. The main ore body occurs in the center of the mine between the two shafts and extends down on the dip of the vein. The tin oxide is distributed either through the vein matter or in stringers and bunches. In the latter case it is sometimes found in nearly pure condition. The average of the ore milled was however only about 5 per cent of the oxide. Seams of clay are generally found on or near the sides of the vein, showing some movement since the deposition took place. The walls are quite irregular and sometimes bunches of granite are found wholly inclosed in the vein. The analysis of the ore made by Genth, and quoted by both Blake and Hanks, shows silicic acid 9.82 per cent, tungstic acid .22, oxide of tin 76.15, oxide of copper .27, oxides of iron and manganese, lime and alumina 13.54. This must have been an exceptionally pure specimen and wholly free from tourmaline.



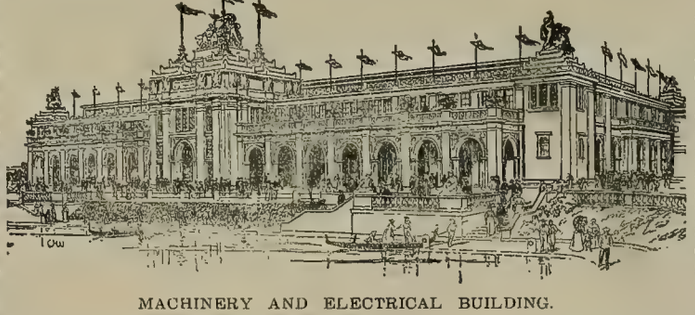
THE JONES CUPEL MOULDER.—(See page 357.)

The tin ore occurs in two forms; the more important and common variety is either massive and of a brownish color, or in clear reddish brown crystals lining cavities; the less common variety is that of "wood tin," which appears uncrystallized and in the form of thin layers.

It is not known to the writer whether the ore body which was being followed down finally ran out or not, but at any rate it appears that it was unprofitable to work. The great richness of the ore in places is one of the remarkable features of this deposit when compared with most of the other known occurrences of tin. Another remarkable fact is the great size of the main vein as shown in Cajalco hill and its uniformity and simplicity of composition. It appears that the contents of the veins represent the entire replacement of the granite bordering what were originally narrow fissures. The agent which accomplished this was probably heated water carrying various minerals in solution, the economically valuable one, tin, being deposited only in places under exceptional conditions.

Machinery and Electricity Building, Omaha Exposition.

The Machinery and Electricity building is in the northeast corner of the Grand Court, east of the Mines building and across the lagoon from the Manufactures building. It is 304 feet front by 144 feet in depth. At each of the four corners are groups representing the early supremacy of man over the untamed forces of nature. These forces are represented by wild animals. Men in their youth are seen subduing them for the simple purpose of escaping injury and the preservation of their own lives at the sacrifice of the natural forces. A higher supremacy is shown by the center group, which is the dominating feature of the entire design. In this, man developed beyond the youthful stage, having wisdom, takes these same untamed, unharnessed forces of nature and harnesses them to his chariot, making them do his bidding, symbolizing in a direct way the service which machinery does for man in using the powers of steam, fire, electricity and gravity.



MACHINERY AND ELECTRICAL BUILDING.

TO FACILITATE the transportation and preservation of hay an apparatus has been devised at Buenos Ayres for compressing it to one-tenth its normal bulk. In this form, as "hay biscuits," it can be preserved dry and sound an indefinite period, without losing its flavor or value as food.

Temperature Below Ground.

In the issue of Sept. 25th appeared an article on "The Deepest Well in the World," now being bored near Pittsburg, Pa. Some data therein showed that theoretically the temperature at a depth of 10,000 feet would be 228° F., practically 167° F. The question of the temperature that is found at great depths underground is an interesting one, and is a frequent subject of discussion among mining men. By some the temperature is estimated to increase one degree for every 45 feet of depth, until a depth of 2000 feet is reached, and below that as much as one degree for every 25 feet of additional depth, though this is not in accordance with the generally accepted theory, which is that the temperature increases one degree for every 60 feet in depth. In this regard it may be said that it is impossible to obtain accurate records with an ordinary thermometer, in an open well or shaft. Most of these estimates in regard to underground temperature have been obtained from a deep salt well in Austria.

An exact investigation was made at great depth by Charles Forman of Los Angeles, Cal., in the Forman shaft on the Comstock to a depth of 3200 feet. Mr. Forman obtained underground thermometers from Europe, then, while the shaft was being sunk, he had holes drilled into the sides every 50 feet or so, in which the thermometers were placed, closing the holes with clay, and leaving the thermometers in for twelve hours. The experiment attracted much attention among European scientists. Following are the temperatures of the ground from the surface to a depth of 2300 feet. It will be noticed that the increase of temperature is by no means regular:

Depth.	Temperature. Degrees.	Depth.	Temperature. Degrees.
100 feet	50½	1300 feet	91¼
200 feet	55	1400 feet	96¼
300 feet	62	1500 feet	101
400 feet	60	1600 feet	103
500 feet	68	1700 feet	101¼
600 feet	71½	1800 feet	105½
700 feet	74½	1900 feet	1 6
800 feet	76¼	2000 feet	111
900 feet	78	2100 feet	119½
10 0 feet	81½	2200 feet	116
1100 feet	84	2300 feet	121
12 0 feet	80½		

At a depth of 2300 feet the temperature of the water was 130°.

On this subject W. L. Watts, a field assistant of the State Mining Bureau, tells the Los Angeles *Times*: "Below the stratum of invariable temperature, i. e., below the depth at which the temperature of the rocks are sensibly influenced by the change in temperature at the surface of the earth, experiments have shown that there is a rise in temperature equal to about 1° Fahr. for every 60 feet in depth. In different localities this ratio of increase has varied from 1° for 45 feet to 1° for 60 feet in depth. This variation is probably owing to the difference in the conductive power of the rocks, and the proximity to sources of volcanic heat. The experiments thus far made have been at depths all of which are less than one mile. Since one mile is only about one three thousand nine hundred and fifty-sixth of the average distance from the surface to the center of the earth, the experiments are insufficient to warrant a definite conclusion concerning the internal temperature of the earth."

Northwestern Mining Association.

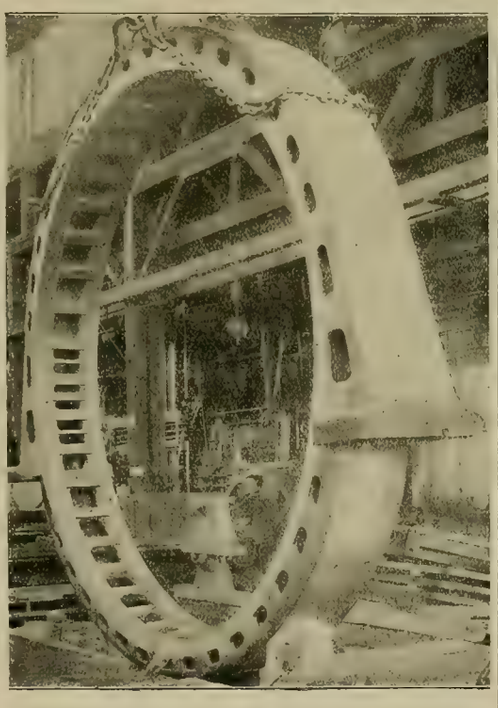
The fourth gathering and second annual convention of the Northwestern Miners' Association met in Spokane, Wash., on the 7th, 8th and 9th inst. Among the subjects discussed were the following:

National department of mines; National and State mining laws; The present stage of mining development; Demand for smelters and reduction plants; Advancement in the science of smelting; What is pay ore? Is it that which pays a profit above cost, or that which may be made to? How to open a mine; The value of a mine—how established; What is the best method of concentration? Tramways—relative and comparative merit; Solvents for gold extraction; Gold camps of the Northwest, where located and what the class and character of ore; Silver-lead camps, where located and what the class and character of ore; Copper camps, where located and what the class and character of the ore; Railroads and lien lands—can the railroad give patents which will give the miner good title to the ground and contents; Suggestions as to means to be employed by State or province which will best assist in opening up a district, and as to funds; Freight rates on ores, as to most equitable method—one rate or relative rate, depending upon the value of the ore; State Geological Surveys—their importance as to classification and consequent protection to mines as versus railroad patents; Reliability and assistance in attracting capital for mining development; General utility in showing the value of all kinds of mineral deposits—metallic and non-metallic; Co-operation with other mining associations; Maintenance of permanent headquarters and probable cost of same; What should be the work for the coming year's business? Common minerals—their uses and value; Alaska and its mineral resources; Rivers and streams within our territory and their protection for mining uses. Quartz mining and methods employed; Placer mining and methods employed; How to timber a mine; Mining ventilation.

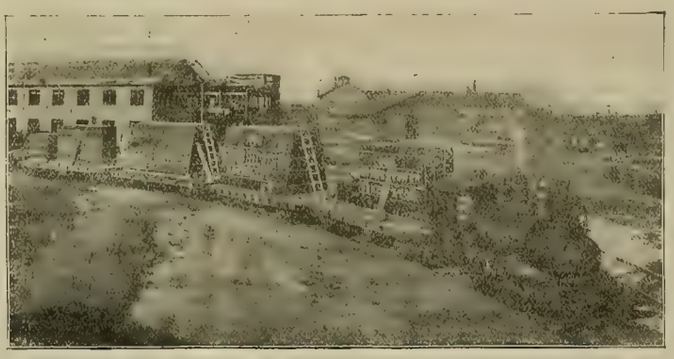
A Huge Generator.

The great three-phase alternating current dynamo intended for the new station of the Edison Electric Illuminating Company of Brooklyn, N. Y., has been shipped from the works of the General Electric Company, Schenectady, N. Y. To transport this exceptional generator to its destination not less than five flat freight cars were needed, and Fig. 3 shows the train with four of them hauled by the G. E. switching engine to the tracks of the New York Central railroad.

REVOLVING FIELD FRAME, BROOKLYN GENERATOR.



ARMATURE FRAME.



FOUR OF FIVE CARS LOADED WITH BROOKLYN GENERATOR ONLY.

The generator is rated as A. P. 40-1500-75; that is, it is an alternating current three-phase machine, of the revolving field type, with forty poles and a normal output of 1500 kilowatts when running at 75 revolutions. In designing this, the instructions, so far as cost and expense of operation, were duly considered in relation to the conditions of service, but the design was left entirely to the General Electric Company. The machine which has resulted would under ordinary conditions be considered one of 2000 kilowatts. In use it will be driven directly by an engine giving its highest economy at a little over 1500 kilowatts, or which can be operated to advantage, and will probably be operated at an output of 2000 kilowatts. The engine selected is a four-cylinder triple expansion engine built by the McIntosh & Seymour Company.

The dynamo is wound for an output of 2000 kilowatts at 6600 volts. The armature windings are mounted upon the stationary part of this machine, shown in Fig. 2. These windings form one of the most interesting features of the construction of this class of machine, the method of coil construction and insulation being especially adapted to high voltage work. The armature frame is built to give perfect ventilation to the windings and the machine is guaranteed to operate continually with a heavy overload with only very moderate heating.

The field structure is built upon a heavy cast iron spider, with a steel ring bolted to the ends of the spokes. To this ring are bolted forty field pole pieces, each built up of carefully annealed sheet iron laminations. Each pole piece carries a coil made up of heavy copper strip wound on edge. All these coils are connected in series, the direct current used for excitation being carried through them. This field structure will be mounted on the steel shaft, 27 inches in diameter, of the triple expansion engine. On the same shaft are the engine cranks and a heavy fly wheel, of such weight that the angular variation of speed within each revolution at full load cannot exceed one-quarter of 1 per cent.

The armature structure will be supported on rails instead of a masonry foundation. This allows the armature to be moved along the rails away from the field, giving easy access to both field coils and armature winding.

The size of this machine and, incidentally, the range of the dynamo and motor work of the General Electric Company may be gauged from the illustration, which shows standing beside the armature frame a General Electric induction motor of ½ H. P. The dimensions of the generator are as follows:

Span of casting or lower half of armature frame	25 ft.
Vertical outside diameter of armature frame	31 ft. 2 in.
Length along shaft	51 in.
Weight of revolving field	59,000 lbs.
Total weight	163,000 lbs.

This machine is destined for the new station of the Edison Electric Illuminating Company, situated at Bay Ridge, at the entrance to the Narrows of New York harbor, on the Long Island side. It will deliver the high potential three-phase current to a system of conductors, over which it will be distributed at different voltages for many purposes. The territory over which the Brooklyn company is preparing to operate covers over 75 miles, and by the use of a great central station at tidewater, with substations at convenients points, the company proposes to distribute current over this vast section. A large portion of the current will be transformed down to 375 volts and then, fed to rotary converters, will be distributed as low votage direct-current three-wire system now receiving current from the stations already in operation. A part of the high potential current will be used to drive synchronous motors directly coupled to arc machines, as well as to drive other motors for various power purposes.

To PREPARE a piece of steel so as to file or turn it into any desired shape it is necessary to soften it before it can be practically worked. To do this, heat to a red heat and bury in a box of sand, which has been previously heated nearly red hot. Allow the steel to remain in the sand until cold enough to handle, and it will be very soft. Never follow the practice of some smiths and bury the hot steel in the fire when going home at night, leaving it to cool off after the fire goes out. Such practice is very bad. The carbon in the steel is changed by remaining in contact with the hot carbon of the fire, and the metal may not be as good steel in the morning as it was at night.

THE number of minor planets known between Mars and Jupiter now considerably exceeds 400, of which M. Charlois of Nice has discovered 86, while Herr Palisa, the Austrian astronomer, has detected 83. The magnitudes of the first 400 of these planets have just been tabulated by Herr G. Huber. All are telescopic, only two being brighter than the eighth magnitude, while of the later discoveries—the second 200—nearly all are of the twelfth magnitude, or smaller.

Scientific Progress.

The Age of the Earth.

In a recent lecture at the Victoria Institute on the "Age of the Globe as an Abode Fitted for Life," Lord Kelvin maintained that if heat had been uniformly conducted out of the earth at its present regular rate, the globe twenty thousand million years ago would have been a molten if not a gaseous mass. A further argument against the huge lengths of time required by the older geologists was sought in the constantly diminishing velocity in the earth's rotation resulting from tidal action. The earth was revolving faster a thousand million years ago than now, and consequently centrifugal action was greater. If the globe had become consolidated while it was traveling at a faster rate, it would have possessed greater oblateness and the length of the equatorial radius would have been six and a half kilometers more than it is. Judging from the properties of rocks and by underground temperatures, the date of the solidification of the earth was probably twenty or thirty million years ago. As to the origin of the atmosphere, at the time of solidification there could have been no free oxygen, so far as could be determined, and no chemical reaction by which it could be liberated. Vegetable life and sunlight must have come into play to prepare our atmosphere in the course of a few hundred or thousand years. A serious geological question was the mode of production of the ocean depths and of the eminences of the continents. Many phenomena were doubtless due to strain on cooling, but that did not afford a sufficient explanation in this case. The author thought the cause was change of density by crystallization. Perhaps the strongest argument against unlimited geological time was afforded by the heat of the sun, which may have illuminated the earth for somewhere about twenty million years. The latest geological estimate of the time required for the formation of all strata since the beginning of the Cambrian rocks was seventeen million years, and the author could hardly be spoken harshly of when he said that this earth could not have been a habitable globe for more than ten million years.

The Wastes of Civilization.

"Improvident Civilization" was the subject of the chairman's address by Prof. R. T. Colburn in the section of Social and Economic Science of the American Association. Touching the currency question, the speaker observed that when we speak of value, equivalency, wealth, risk, trust, distrust, panic, prosperity, we are dealing not with concrete substances like gold pieces, but with states of mind. Yet these ideas lie at the foundation of commercial exchanges and monetary science. "Have any of you ever imagined what would happen if some modern Rosicrucian should succeed in the turning of base metals cheaply into gold? * * * Such a discovery would introduce into the world of commerce, and indeed into all fiscal relations of men, an appalling confusion—first, by a general rise of prices, and second, by a dislocation of fixed payments of interest, salaries and otherwise. Among other curious results we should witness would be a change of sides and tunes between the advocates of the gold and silver standards. * * * The same thing would happen, only more slowly, if a vast deposit of gold were unearthed; and if, after gold was thus discredited by a practically inexhaustible supply, the attempt were made to put silver in its place (the price of which would be enormously enhanced), this state of things would be liable in its turn to be upset by similar discoveries." By precipitating the necessity of inventing some more efficient tool of exchanges, a scientific and more stable enumerator of values, the after benefits to mankind of such an event might compensate for all the disaster it would temporarily cost. The speaker declared our present civilization not abreast of the knowledge of the time and not yielding to mankind nearly the amount of comfort and well-being it might be made to do. As examples of its defects shown in the improvident tendencies of modern life, the speaker cited the waste of warfare and armament, the decadence of races, pernicious competition, spendthrift luxury, the blight of parasitism, the power of superstition, and the diversity of languages.

We are indebted to the sun for light by night as well as by day; for warmth within doors as well as without. Strolling through a town lit up by innumerable lamps, or whirled along at the heels of a locomotive, it is a pleasant thought that the emanations of suns which rose and set millions of years ago—which rose and set in seeming idleness, and to all appearance, in wasted splendor—are now reproduced to enable us to cope with darkness or to conquer space without moving a muscle. There is something captivating in the thought that the great rector mundi was working for us when as yet there was no sign of man—indeed, no promise of his coming—and with quiet patient labor laying up from day to day those treasures of light and heat which are infinitely more valuable to us than all else we possess. No one who has studied geological processes can repress a feeling of surprise, perhaps of impatience, at the slow, deliberate step with which nature ever marches up to her goal. But when we think of the sun toiling in lonely splendor to store our planet with fuel—we had almost said with his own embodied beams—it seems to reconcile us in some degree to the august and awful chronology of the universe.

The barometric measurements of the height of Mount St. Elias by the Prince of Savoy accord closely with those of Professor Russell, who estimated it as 18,100 feet. These figures give the peak the second rank on the continent of North America. Orizaba, an extinct Mexican volcano, is believed to be 1,200 higher. South of British Columbia our highest mountain is Mt. Whitney, on the border line between Tulare and Inyo counties, Cal. Regarding the height of Mt. Whitney, under date of Oct. 8, '97, in response to a query from the editor of this paper, Prof. Geo. Davidson of San Francisco writes: "The authority which I accept for the elevation of Mt. Whitney is Secretary of the Smithsonian Institution. He determined the height above Lone Pine, Inyo Co., by triangulation, and I obtained from Mr. Yelverton the height along the railroad above the sea. The result was 14,522 feet, which he has published." There are several mountains in the Andean chain which are loftier than either Mount St. Elias or Orizaba, Cotopaxi, for instance, is believed to be about 19,000 feet high, Arequipa 20,000, Chimborazo 20,545, and Aconcagua about 23,000.

California sends two expeditions this month to India to witness a total eclipse of the sun. Prof. Burckhalter of the Chabot Observatory heads one: Prof. Campbell of the Lick Observatory represents the State institution. The expedition from the Chabot Observatory leaves October 30; Prof. Campbell's on the 21st. The Chabot expeditions will use the photographic, and the Lick the spectroscopic method. It is believed that these form the most complete expeditions that ever made an attempt to observe an eclipse. Prof. Burckhalter, who leaves on the steamer Belgic on October 30, will reach Hongkong November 28. On December 2 he will take a P. & O. steamer for Bombay, where he should be by December 19; from there by rail 300 miles. The eclipse occurs there on January 22, '98.

Helium, it will be recollected, is a chemical element which was known to exist in the sun and some of the stars long before it had been discovered on the earth. When found on our globe, two years ago, it was discovered in a rare mineral of Norway named cleveite. Since then cleveite has been in demand in chemical laboratories, and its rarity has made it costly. Recently a mine was opened near Ryfylke, Norway, containing cleveite, which has been found rich in helium, and sells for about $5 per pound.

Mechanical Progress.

Low Cost of Steam Power in New England.

In our issue of July 17 we published some data furnished us by Mr. F. P. Sheldon, mill engineer, of Providence, R. I., concerning the cost of power in New England cotton mills with cheaper grades of fuel, a subject he had been investigating, and found from actual accounts that two mills were running at a cost of less than $12 per H. P. per year, the lowest figure being a H. P. for a year for $11.64, the coal costing $1.76 per ton.

Through the courtesy of Mr. John Waterman, treasurer of the Warren Manufacturing Company at Warren, R. I., we have received the figures relating to the cost of operating that plant, which, it seems, is operating at less cost than any plant yet reported.

The plant consists of a vertical cross-compound condensing engine built by the E. P. Allis Company, with high-pressure cylinder 32 inches diameter, and low, 68 inches, both 5-foot stroke and making 75 revolutions per minute. The cylinders have a ratio of volume of 1 to 4.5 and the working pressure is 150 pounds. They are provided with Corliss valve gear, the valves being located in the heads, and separate eccentrics work the steam and exhaust valves. The condenser is operated by an independent air pump driven by a small vertical Corliss engine. The load now carried averages 1950 H. P., and to give this the required mean effective pressure of the high-pressure cylinder is about 55 pounds, and of the low-pressure cylinder about 12 pounds. The steam pressure is 155 pounds. The boilers are of the Heine water tube pattern, having 216 square feet of grate surface and about 7500 square feet of heating surface. An exhaust steam heater in the exhaust pipe of the low-pressure cylinder warms the water to about 120 degrees, and it is then pumped through a Green economizer, which carries the temperature to a point varying from 215 degrees to 250 degrees. Draft is produced by a chimney 175 feet in height.

The coal used is a semi-bituminous of a somewhat inferior grade to Cumberland or Pocahontas, and costs $2.26 per gross ton delivered in the yard close to the boilers.

The following is a tabulated statement of the cost of power:

Fuel per H. P. per year of 3070 hours	$ 4 70
Labor	1 88
Supplies and repairs	42
Total operating expenses	$ 7 00
Interest at 5 per cent	$ 2 05
Depreciation at 5 per cent	2 05
Taxes	41
Insurance	04
Fixed charges	$ 4 55
Total cost of power per year	$11 55

The fuel as above given includes the fuel used in banking fires at night and that required for the supply of five slashers.

Mr. Sheldon, who forwarded the figures to us, writes that the economy at Warren is better than anything he had ever found, and believed it due to the large size of the plant reducing the labor and supply account, and to the low cost of fuel and low rates of insurance and taxes; also on account of the low cost of the plant per H. P. due to its large size. If the steam used for other purposes besides power were deducted, Mr. Sheldon believes it would reduce the fuel by 10 per cent, or 47 cents per H. P. per year, making the total $11.08. The tons of fuel used per H. P. per year is 2.08.

It is said that the engine uses about 12½ pounds of feed water per indicated H. P. per hour. The coal consumption is about 1.55 pounds per indicated H. P. per hour. Although these figures show a remarkable economy, we believe them to be within the bounds of credible data. With good firing, a boiler plant equipped with heaters such as that referred to ought to give a working evaporation by the week of 10 to 1, and the engine should produce a H. P. with a consumption of not more than 13 pounds of feed water per hour for the same length of run. The engine alone should work, therefore, with an economy of 1.3 pounds of coal per H. P. per hour, leaving 25 pounds of coal per H. P. for the miscellaneous work of slashing, etc. The latter is amply sufficient for that work, and for all reasonable contingencies.—Engineering Magazine, Sept. 4th, 1897.

Testing a Boiler to Destruction.

At the recent convention of the American Boiler Manufacturers' Association, held in Philadelphia, John O'Brien described the testing of a boiler to destruction. The boiler was made and the tests were instituted and carried through by the O'Brien Co. The boiler was 60 inches in diameter by 12 feet in length. The shell was ⅝ inch steel of 60,000 pounds tensile strength. The heads were of ¾-inch steel. There were fifty-six 3½-inch tubes. The front head was braced with five ½x4-inch flat stays, doubled. The boiler was made of two rings, designated A and B. The joint of ring A was a butt joint with inside and outside straps. The joint of B was a triple-rivet lap joint, with an inside strap extending 2½ inches each side of the ends of lapped plates. The circular seams were single riveted. The results of the tests in which hydraulic pressure was employed are indicated by the following record:

TEST NO. 1.—MARCH 29, 1897.

Ring B. *Inches.*

At 300 pounds pressure ring expanded 1⅜
At 450 pounds pressure ring expanded 2⅝
At 750 pounds pressure ring expanded 3½

Ring A.

At 300 pounds pressure ring expanded 2⅝
At 450 pounds pressure ring expanded 3½
At 750 pounds pressure ring expanded 5

TEST NO. 2.—APRIL 4, 1897.

Ring B.

At 625 pounds pressure ring expanded 3⅞
Increase in expansion over test No. 1 ..... ⅛

Ring A.

At 625 pounds pressure ring expanded 5⅜
Increase in expansion over test No. 1 ..... ⅜

TEST NO. 3.—APRIL 5, 1897.

Ring B.

At 350 pounds pressure ring expanded 4 1-16
At 400 pounds pressure ring expanded 4 1-16
At 625 pounds pressure ring expanded 4 7-16
Increase in expansion over test No 2 0-16
Total expansion for the three tests 4 7-16

Ring A.

At 350 pounds pressure ring expanded 5⅛
At 400 pounds pressure ring expanded 5⅛
After 400 pounds pressure no perceptible change occurred.
Increase in expansion over test No 2 ..... ⅛
Total expansion for the three tests 5⅛

At 900 pounds pressure the boiler ruptured on the side, horizontally in the second ring about 18 inches above the riveted joint, in the whole plate, the rupture being about a foot long.

Making Compact Steel Castings.

Two new processes related to the manufacture of steel and steel castings have lately attracted the notice of those engaged in these industries. In recent news dispatches it has been announced that the Government had been paying $400 a ton for armor plate, but had reached the conclusion that $300 was enough, and had an offer from an American firm to supply equally good plate for about $110 per ton. It is said that the process which this firm proposes to employ is a modification of the famous Bessemer process. In the old Bessemer converter air jets are forced up from below into the molten metal, which is kept boiling thereby. The impurities are burned out in this manner, but more or less gas is "occluded," or hidden away, in the steel by the operation. In the improved system the air is injected only into the floating scum, or scoria, and not into the metal itself. Great claims are made as to the efficacy and cheapness of this process. The other new method is applicable to the operation of casting, although it has the same general object in view, the prevention of bubbles. Powerful air pumps are connected with the moulds in such a

manner that when the molten metal is poured in all secluded air and other gases are extracted promptly. The pumps act not only on the casting chamber, but also on certain vacuum chambers near it. Pipes with valves connect them. The latter are opened at the right juncture, and the outer chambers suck all gaseous matter from the mould. Hydraulic pressure is applied at the same instant to the mould itself, so as to produce a flawless, homogeneous casting.

A Remarkable Machine.

A new machine has appeared on E. H. R. Green's Texas Midland road, that seems destined to be of considerable value in California for mining and irrigation. A Houston man thus describes it: The ditcher is a steel platform car, 50 feet long, having erected at its center a revolving crane, and is provided with the necessary tools and attachments for loosening the earth at both sides of the track, placing it where required, and shaping up the roadway uniform. The ditcher is hauled by a locomotive, and the entire machine is controlled by the locomotive's ordinary air pump. The different tools are attached to either side of the car and extend outward to desired distance. The mammoth plow is first used to make a furrow at sides of track for the ditch or drain. The plow has the appearance of an ordinary breaking plow, except that instead of handles it has an upright bar about 5 feet long at the rear end of the beam. The plow is attached to forward end of ditcher by a heavy cable, is maintained at proper distance from the side of car by brace, and the hoisting cable of crane is attached to nose of plow to regulate depth of cut by raising and lowering front end, it is kept parallel with track by an air-operated piston which extends outwardly from car at right angle to track, and attached to the upright at rear of beam. The plow moves along apparently unguided, steadily and uniformly, all operations being performed by but one man at the controlling valves; it makes a furrow 30 inches deep, 24 inches wide, and miles in length, in any kind of soil. The plow is followed by the scraper, an immense steel tool that throws the material toward the track, and in that way builds up and strengthens the embankment. Next comes a tool called the shoulder former, which evens off the surface of the roadway to a uniform contour. After this operation the scraper is reversed and takes up all the surplus dirt from the now perfectly formed ditch, and casts it 20 to 30 feet from the track, leaving the drain unobstructed. If, after plowing a cut, more material is turned up than required to form the bank, a scoop or slush-scraper is put into service, which takes up the dirt and carries it to the end of the cut, where no other material is available. The crane is capable of raising and swinging a load of 8,000 pounds, and in emergencies forms a rapid wrecking car, quickly gotten into action, as it requires no generation of steam, it only being necessary to couple on a locomotive, make the air connections, and go to work.

TWO UNUSUALLY large locomotives have been delivered to the Santa Fe Pacific road, the first of a consignment of eight engines built for the Santa Fe, after plans submitted by Superintendent of Machinery Player, and are to be used on California trains 1 and 2 from Topeka to Las Vegas, New Mexico. The engines each weigh over seventy tons. From rim to rim the driving wheels measure 6 feet, and the cylinders are 28x19½ inches. The engines are constructed for a pressure of 180 pounds of steam, or twenty pounds over what was a few years ago considered a remarkable pressure. The engines are built especially for pulling heavy loads at a high rate of speed.

THE *Age of Steel* says: "The revival in mining industries is not likely to diminish, stimulated as it is by fresh discoveries of minerals all over the world. We are probably entering on a mining era that in its scope and duration has had no precedent in the history of man. In Africa, Australia, Corea, Siberia, South America and beyond the northern spurs of the Rockies to the terminal of the Andes the pick of the miner and the hammer of the geologist and explorer are being heard."

MINISTER BUCHANAN, at Buenos Ayres, has supplied the Department of State at Washington with copies of decrees issued by the Argentine government inviting proposals for the construction in Buenos Ayres of a central railroad station, to cost not exceeding $4,000,000. For the first time in the history of such public works the Government has invited bids from citizens of the United States, through the Argentine legation in Washington.

AN improved range finder for field glasses has a flat dial plate, subdivided to correspond with the focus of the glasses, rigidly attached near the rear end of the adjusting screw to the frame of the glasses indicating the adjustment upon a dial. A small wheel upon the adjusting screw turns it so that it will readily focus the glasses for various distances, and enabling the user to also estimate correctly the speed of advancing or withdrawing objects.

Electrical Progress.

Flashlight Call Signals.

Superintendent McHenry, of the Rarus mine, Butte, Montana, is the inventor of a system of flash signals for mines, which the *Inter-Mountain* thinks may prove as beneficial to the miners in the depths of mother earth as the flashlight is to the mariner on the ocean wave. The flash signals have been in use several months in the Rarus mine and have given such satisfaction that their adoption in other mines of the district is only a matter of time. Within a month it is likely that the system will be in use at the mines of the Boston & Montana Company. It is such an inexpensive system that any mine where electric lights are used can be equipped with a trifling cost.

The system consists of a switch cut into the main circuit at each level. The switch box has a projecting lever by which it is operated. When a carman, shift boss or miner wishes to signal the station tender that his presence is required at a certain level, he simply pulls the lever from its contact the number of times corresponding to the signal for that station, breaking the current each time, and then throwing on the light again. It can be done in an instant, in fact, in much less time than the bell rope can be rung, and has the added advantage that the operator does not expose himself to danger in the shaft and is less liable to give a wrong signal. In fact, it is direct communication with the station tender himself, and not, as heretofore, through the engineer.

The signal is flashed immediately through every portion of the mine where electric lights are used. If the station tender is awake in any portion of the mine electrically lighted, the signal reaches him and by counting the flashes can tell in an instant where he is wanted. But the signal can also be used for a variety of purposes. As a danger signal to the men employed under ground it will be found useful and perhaps result in the saving of many lives. In case of a cave or of fire the danger signal—nine bells or flashes—can be first given, followed by the number of the level where the trouble has occurred. In this way the men on stations or in the levels can be instantly apprised of any danger.

Nearly all of the big mines of the camp are now lighted by electricity, not only at the stations but at the turn sheets and in or near some of the workings, so that the introduction of the system would only entail a nominal cost. The mines of the district are getting so deep that the old bell rope system is getting to be an unreliable affair and frequent mistakes are made by reason of the bell not responding to the station tender's touch below. To overcome this difficulty much labor has been expended in devising a system that would be accurate. So far the only practicable method found has been by means of electric bells, but these are also open to objection in wet mines, and mines where the copper water eats into the insulation of the wires.

Electro-Magnets to Move Heavy Metal Beams.

Electro-magnets capable of picking up a load not exceeding five tons are now used by the Illinois Steel Company in its works at Joliet to transfer iron or steel beams or plates from one part of the shop to another. The amount of electricity necessary to give a magnet enough drawing power to make a five-ton load adhere to it is only four amperes at a pressure of 240 volts, or about one-tenth of that required to move an ordinary trolley car on the level. The magnets used are in the form of the old-fashioned horseshoe. The poles of the horseshoe are 7½ inches apart and are connected at the upper end by a soft steel plate one inch in thickness. The poles themselves are each 10 inches long and are elliptical in cross-section, being 24 inches in depth by 3 inches in width. The upper 7½ inches of each pole are covered with coils of insulated copper wire, through which the current flows, to a depth of 1½ inches.

The working of the magnet is simple. When a plate or beam is lying anywhere else than where it is wanted the magnet, attached to the crane tackle, in place of the ordinary sling or hook, is lowered, and its poles placed on the load to be moved as near the center as practicable. Then the current is turned on and the underlying plate or beam is held fast by the magnetic attraction. The crane is then put in motion in the usual manner and the beam is transferred to the spot where it is wanted. When it is fairly placed in its new position, the current switch is turned off and the action of the magnet ceases. The only reason why such magnets have not been long in use is because of the fear that the load would drop if there was any temporary failure of the current. This is always possible, though it is becoming less so every day with the improvement in electrical apparatus.

To guard against accidents the insulated coils are enclosed in water-tight brass casing, and the whole magnet is covered in with half-inch steel. If the five-ton electro-magnets in the Illinois Steel Company's works prove a success when tested by long enough time, larger sizes will be employed. When used in connection with electric cranes, which are now becoming common, only two hand switches will be required to move iron or steel loads. Of course, loads of other materials could be picked up equally well by an electro-magnet, with a heavy keeper and a hook attached to it for the ordinary sling.

Telegraph and Telephone.

It has been thought by proprietors of telegraph lines that the telephone might prove a serious rival, not merely for such messages as might require a very prompt reply, but also for extended dispatches for news purposes. But a recent test of the telephone shows that it has its limitations. It will serve for short news messages, but not for long ones. In a recent local newspaper contest for news from the Klondike to San Francisco, a dispatch 10,000 words in length was handed by a messenger from a steamship to the manager of a telephone office 101 miles from the nearest available telegraph office for transmission to a still more distant point. Previous arrangements had been made for handling so long a report. A sending operator sat down at the telephone and began reading the message, while the receiving operator at the other end of the line wore on her head the apparatus usually employed in central stations. Her hand were thus left free, and she used them to manipulate a typewriting machine. Her copy was then handed to a telegraph operator to be sent to its final destination. It took five hours to send 10,000 words by telephone, thirty-three words a minute. There are machine telegraphic systems now in actual use which transmit at least one hundred words a minute; some of the new plans which have attracted attention within the last few years contemplate a speed of from one thousand to five thousand words a minute. The limit in this method would seem to be, not the number of words one can utter (from one hundred to two hundred a minute), but the dexterity of the typewriter. It is possible for an expert to write fifty or sixty words, but this is not to be compared with machine telegraphy.

Ore Hauling by Electricity.

TO THE EDITOR:—The standard gauge electric car line being constructed in Cripple Creek district probably will be the first application of electric power to the work of ore hauling. The line passes from the town of Cripple Creek up Poverty gulch, over Gold, Globe, Raven, Ironclad and Bull hills and on to Battle mountain and the town of Victor, and branches will extend to other parts of the district. Much of the distance from Cripple Creek to the summit of Gold hill and from Victor to Bull hill—the ascent—will be about a 7½ per cent grade. The rails being laid are the regular 60-pound T-rails, and the track is being well ballasted. There are many semi-circular curves of 100-foot radius. Besides the regular ½-inch copper trolley wire, there are ½-inch feeder wires being put up, which connect with the trolley wire at quarter-mile points. Each car will have two 50 H. P. motors. Special ore cars are being constructed for the line and will be on the hopper bottom plan. The line will be about twenty miles long, including the branches, and is being designed for cheap transportation of ores and passengers through the district. The track is now complete from Cripple Creek to Bull hill. Mr. L. D. Ross, one of the promoters, is managing the construction.

WASCOTT.

Cripple Creek, Colo., Oct. 1, '97.

MESSRS. SIEMENS & HALSKE'S latest process for the electrolytic treatment of zinc consists in the treatment of the blende with chlorine gas to complete chlorination, solution of the chlorides in water, and electrolysis of the solution. Metallic zinc is deposited and chlorine liberated, which is utilized in its turn for treatment of ore. The electrolysis is not carried so far as to effect a complete decomposition of the chlorides, on account of the cost of the electric energy required. But an excess of chlorine is provided in the solution by the addition of common salt, and undecomposed chlorides in the nearly spent solution are not lost since the solution is employed as a lixiviant for fresh lots of ore.—Industries and Iron.

THE Electric Vehicle Company has organized under the laws of New Jersey, with an authorized capital stock of $10,000,000, to manufacture and operate electric carriages to be propelled by storage batteries. The corporation proposes to establish branches throughout the United States.

A WRITER in a current magazine makes the prophecy that in 300 years from now the world will only know three languages—English, Russian and Chinese. The English language will be spoken all over North and South America, in Australia, India, Africa, New Zealand and the islands of Australasia and the Pacific. The Russian tongue will have conquered all Europe except Great Britain, and all in Asia except India, Chinese will hold sway over the rest of the world.

Mining Summary.

CALIFORNIA.

Alpine.

Peter Curtz of Markleeville has a company to spend $20,000 in development work, and it is decided to organize. All openings formerly made are now closed, and a great deal of work will have to be done to put them in working condition. The ore is low grade.

Amador.

The report of the secretary of the Potazuba Mining Co. shows that during the year the company has received $17,000 and disbursed $16,000, has $1000 on hand and is free from debt. The shaft at the mine is 530 feet deep and as soon as 15 feet more of the sump is finished drifts will be run from the 500 on the ledge, which promises to develop well.

Republican: At the Kennedy, at Jackson, they are sinking from the 2100 to the 2300 level. This is perpendicular depth, and is the greatest depth reached in gold mining in this State. While sinking is prosecuted in one shaft, the other is used for hoisting ore for the mill, which will be kept running to its full capacity. It is reported that in the event of the ore body showing the same size and quality at the 2300 level as at the 2100, the milling capacity will be doubled. The quartz is not of such high grade as that crushed in years past from the 900 to the 1500 levels, but is still of paying quality.

The Argonaut mill is nearing completion. In the mine a number of levels have been opened toward the surface, to prove the continuity of the ledge from its contact with the Kennedy vein to the surface. This work has reached a point only 300 feet from the surface, and it is to be continued through shaft and tunnel to the croppings.

The interests of W. N. Bardue in the Amador Queen No. 2 and mill site, also the Dewitt quartz mines, have been sold to a San Francisco company for $85,000. The first payment of $6,200 was made the past week. It is the intention to proceed with the development of these promising properties without delay.

The financial end of the Anita enterprise was improved last week, $10,000 being paid over to Mr. Bright on the bond and four months additional time given on the balance. Development work will now continue without interruption.

At Amador Queen No. 1 a depth of 1000 feet is contemplated at this mine which leaves 275 feet more to sink. The object is to go deep enough to avoid the break in the ledge caused by the deep gulch. At the 500-foot level a crosscut 300 feet in length has been made, and drifting for the ledge is going forward.

The Bellwether is about free of water and sinking will go on.

The Oneida mine has a full force engaged in sinking and the work will continue until the shaft reaches a depth of possibly 2000 feet.

Butte.

A rich pay shoot is reported in the Carlisle mine

Twenty men are employed in the South Thermalito mines, sinking shafts.

Calaveras.

A Mokelumne Hill dispatch says that on the 13th inst. an old resident was arrested charged with having fired the 20-stamp mill and hoisting works of the Moser and Roanoake mines, which were destroyed by fire last Sunday, $25,000 worth of machinery and 15,000 feet of lumber being burned. The Moser and Roanoake mines were discovered in 1891 by S. S. Moser, and were bonded to the Stockton capitalists, West & Sperry of Stockton. The mine was discovered by drifting a tunnel through the rim of a gravel channel in expectation of making a placer mine. The Moser has been worked steadily up to six weeks ago, when the mill was closed down, and only a small force of men were employed sinking in the Roanoake shaft.

At the Keystone mine near Altaville, Chas. Lillie superintendent, the shaft is unwatered and will be 200 feet deep before running crosscuts.

At the Gwin mine the large air compressor is in position and the pipes are nearly all laid for the water and air, and the pumps are on the ground all ready to put in the mine as soon as the compressor is completed. The engines for the south shaft are on the ground and will be put in position in a few days. The 40-stamp mill is kept running steady crushing 150 tons per day. The face on the north and south 1400 is very large, over 18 feet between walls.

San Andreas *Prospect*: A. B. Thompson, superintendent Jupiter Mining Company, E. H. Binns and C. W. Cross have bought the Scribner placer mine and Bund's San Domingo for $18,500. Two hundred and fifty men are at work under Superintendent Thompson constructing a ditch twelve miles in length to take 2500 inches of water from the San Domingo creek at Maccaroni Flat to the Jupiter mine to be used in hydraulicking, and expects to turn water on the bank early in December.

El Dorado.

Nugget: Lieut. Deakyn, of the Debris Commission, has examined the restraining dam put in by J. C. Murphy at the Slate Creek mine. It is the same dam used by Mr. Murphy to restrain the tailings from his Big Chunk mine, which he has been working the past two years, and from which he has taken upwards of five thousand in nuggets, the smallest of which weighed $30 and the largest $1,065, to say nothing of fine gold. In working the Big Chunk, Murphy uncovered a 5-foot quartz ledge which prospects well, and which he proposes working later on. After examination, the Debris Commissioner decided that the one dam was sufficient.

Nugget: The Grizzly Flat gravel mine, A. A. McDonald superintendent, employs thirty men. The Eagle King, owned and worked by John Melton, is running full-handed.

Kern.

Ledges in the Goler placer district are being uncovered; some prospect free gold. Superintendent Coplin of the Visalia Company is sinking a new 14-inch well at the Rand mill. The Rand Company has two mills running day and night on ore from their mines. Considerable assessment and development work is being done on claims east of Garlock. Webb & Harney have started up on the Hard Cash mine. Rose & Co., who bonded the May Queen mine of Kelley & Price, have paid $3000, the balance of the bond, although it was not due until Jan. 1, '98. They have twelve men at work and will put in a hoisting plant. A. D. Glace of Golden Gate has bonded from Clifton & Barman the Galena City, Dell and Modoc claims, near Garlock, for $15,000, on which the first payment has been made.

Postal Inspector Flint says that within three months Randsburg will be a Presidential postoffice. In order to attain this standing it is necessary to show receipts amounting to an annual income of $1900. Although Randsburg has been in existence but a year, it already shows receipts of $1700 and a rapid and steady increase.

Mariposa.

(Special Correspondence).—On the 1st inst. the California Exploration Co. took over the Virginia mine, which has been worked under a bond since the first of the year. This mine, one of the oldest in the Coulterville district, covers about a half a mile of the east branch of the mother lode, and is about a mile southeast of the Merced Co.'s Mary Harrison mine. The Virginia was extensively worked under bond many years ago by a man named Coe, who cleared about $100,000 from his operations, but dropped the property on account of pending litigation. The mine lay idle till three years ago, when it was purchased by O'Toole & Arnhold for rather less than $5000. Last year it was partly reopened under a bond by Clarence King. The present purchase price is not stated, but at the time the bond was given the consideration was announced as near $80,000. The development on the mine includes three tunnels on the vein with a length of 1200 feet and a shaft on incline to a depth of 400 feet, with extensive drifts. There are also several smaller openings on the mine and an old 8-stamp mill in fair condition. The Exploration Co. will at once begin the erection of a 10-stamp mill on the site of the old one, and has already begun work on a timber dam to impound the waters of the gulch for milling purposes. New hoisting machinery will also be placed at the shaft. The new owners have also a bond on the Parker and Austin claims, adjoining on the south and covering 3000 feet more of the ledge.

There are persistent rumors, which cannot be verified, that the Merced Mining Co. is about to install an electric power plant. It was the original intention of the company to operate by transmitted electric power, and to this end the Golden Rock ditch on the south fork of the Tuolumne river was purchased. This ditch formerly supplied the placer mines of Big Oak Flat, Garrote and Horseshoe Bend with water, but has been idle for fifteen years or more. By rebuilding the first ten miles of the ditch a fall of 2000 feet can be had back into the Tuolumne river at a point about fifteen miles from the company's mines. In view of the statement recently put out by the Boston office, that but $20,000 remained in the treasury, it is not thought active construction can begin till further financial arrangements have been made. There are a number of available sites near Coulterville for electrical power plants, and the carrying through of an enterprise of that sort would give a great impetus to local mining matters.

Coulterville, Oct. 13, '97.

Talking of the Mariposa grant Senator Jno. P. Jones is reported to have said in New York this week that "we are just now getting everything in shape to do big work there. A big dam will be built on Merced river to furnish, if needed, power for running the varied machinery. We will go and go in big. There is no use taking hold of a proposition of that kind unless it is done right. We have been getting in shape to do it right. There are a great many mining properties on the Mariposa grant, some of which we think are big. You have heard that the Rothschilds are interested with us up there. They own one-eights interest. Mr. Mackay also owns an eighth, while myself and friends own the rest. We expect to begin almost immediately to build the dam. The development of the property, the handling of the ore and everything connected with the project will be carried on on an extensive scale. We will get to work on our Mariposa property as soon as we complete some little details. That will be very soon." All of which has been said before.

Gazette: About twenty-seven men are employed at the Mount Gaines mine near Hornitos. The ore is being hauled to the Horseshoe mill.

Mono.

Bridgeport *Chronicle-Union*: D. E. Jones has been appointed superintendent of the Jordan mines—the Golelo, Montecito, and Sterling, and has started work to take out 400 tons of ore to put through the new mill. Mr. Jones intends to work the legitimate gold ore of the mines and leave the manganese and copper ores for further tests, and is satisfied that he can make a success of the next working.

Nevada.

(Special Correspondence).—On the Bellefontaine, three miles east of town, the company has reached 320 feet on a drift north, at 320 feet depth. They expect to cut the chute within 25 feet. The ore (a 20-inch ledge) runs from $25 to $50. There is a 2-inch sulphuretic streak on the footwall—smelting ore that runs $252. The property is owned by local and Sacramento people.

In the Maybert district Baron Von Schroeder has pumped the Blue Belle, 600 feet deep, with a view to resuming development work. The property has been closed six years.

Successful work continues in the development of the Governor Morton by Richie & Foster.

The Blue Jay Company (Bonney & Baugh) have resumed work on their property.

Turner & Richards, owners of the Gray Eagle, adjoining the Blue Jay, made a crushing recently that netted them $11.

Grading for a 10-stamp mill has been started on the Last Chance, comprising five claims.

J. A. Lipman, who with ten others leased the Eagle Bird, began work a week ago, sinking from the winze to connect with the 600 level. This property has been closed eighteen months. There is a 30-stamp mill on it. The ore averaged $5.75 per ton. The formation is granodiorite.

Nevada City, Oct. 11th, '97.

(Special Correspondence).—The old Dromedary, situated on the creek adjoining town, is about to be reopened. Preliminary work has already been begun.

Dr. W. C. Jones & Son will reopen an old property three miles north of town. The shaft was abandoned forty years ago. It has a 4-foot vein of ribbon rock highly mineralized.

The Rockland has been pumped to the bottom, 300 feet, and a contract has been let to sink 200 feet.

On the Orleans since placing electric motor and power drills, less than two weeks ago, they have driven 44 feet on the 800 north and 47 feet in the hanging wall crosscut. A saving has been made over the hand-power work, including surface labor, of $10.05. The company will run another 50 feet before stoping. The indications are quite favorable.

The new shaft of the Omaha Consolidated is now making excellent progress, which was considerably handicapped at one time. The old shaft, long years idle, of the Homeward Bound, some 600 feet adjacent, was reopened and two pumps lowered, and the surrounding country for considerable distance is being rapidly drained, which alone made it possible to resume work on the new shaft. The Omaha Consolidated is to-day a plant of large proportions, and the system of the management in every detail is admirable.

Grass Valley, Oct. 12th, '97.

The Last Chance Con. M. Co., incorporated Sept. 15th, capital stock, $500,000, W. F. Barnes secretary, has under bond seven mines with ore showing values of $3 to $15 per ton, in Diamond Creek mining district, nine miles from Emigrant Gap station. The company proposes to build a 10-stamp mill.

The Cadmus and Home mines, on Deer creek, below the Providence, have been idle, the water supply running short. They will start up again when the rains set in.

The *Telegraph* says: The North Bloomfield Mining Company have bought the Quick property at Badger Hill.

Placer.

At Blue Canyon the Alder Creek G. M. Co. will replace its 3-stamp mill, used only for testing and prospecting, by a 10-stamp mill, which will be built at the mouth of the lower tunnel, a crosscut cutting two quartz veins. The first of these was reached 78 feet from the mouth, and the tunnel has been run 75 feet farther toward the second vein, which, it is expected, will be cut within the next 150 feet. The lower tunnel is perfectly straight and well timbered throughout, and is situated 130 feet below the upper tunnel. This will be the main entrance to the mine, and the mill will stand within 100 feet of its mouth and will be run by water power.

The Lost Camp hydraulic mine has had its new impounding dam accepted and has been granted permission to hydraulic.

The Redstone mine is doing developing work, stoping ore and running the mill.

Sentinel: The electrical machinery for the Hidden Treasure mine is in successful operation. The blower which forces the air into the mine has been started. The electric locomotive will soon be in active operation.

The Truro gravel mine has been shut down for the present.

Argus: Hoffman, Bowers and Outhouse, on the Baker divide twelve miles from Forest Hill, intend to sink a shaft 200 feet in the hope of reaching the main gravel channel, and if they succeed big pay is practically assured them. The Hidden Treasure Mining Company expect to have the electric plant at the Dam claim at Centerville in full operation in two weeks. The La Trinadad mine in Sailor canyon, which is worked by members of the Salvation Army, is rapidly becoming a good producer. The Red Point mine, J. A. Ferguson superintendent, is running a big force of men, and it is said that very rich gravel is now being extracted. The Valley View mine, near Lincoln, is about to resume operations. T. G. Durning, formerly of the Gray Eagle, is superintendent. The Baccaratt mine, about two miles from Lincoln, will soon be running in full blast, the company now in charge of it having made all the improvements necessary to push development work.

Plumas.

On the North Fork A. N. Cameron, in the channel in the Cameron drift mine, is taking out between $60 and $80 per day.

National-Bulletin: The Plumas Imperial mine, owned and operated by C. D. Hazzard, is not washing gravel steadily now. The fall rains will soon permit the operation of the mine. A notable change in the character of the gravel deposits is observable. The firmly cemented gravel wash then contended with has given way to that of a soft nature which yields readily to the large stream of water thrown from a 6-inch nozzle. The gravel is estimated to be about 85 per cent of the 100-foot bank. The gravel deposit of the soft nature is widening out, as development work progresses, across the channel, which is estimated to be 1200 feet wide from rim to rim. The portion of this deposit now being worked is rich in gold, indicating that the Plumas Imperial is developing into one of the large and valuable gravel mines of the State.

Riverside.

Gold is reported discovered in Mill Creek canyon, near Redlands, which goes $75 to $150 a ton.

San Bernardino.

Near San Bernardino a plat of ground has been purchased, equally distant from both railroad depots, on which is to be erected the smelter now located at San Fernando.

G. L. Brown, manager of the Logan Gold Mining Company at Victor, reports that twenty men have been working the Calori group of mines in Rattlesnake canyon, near the Rose mine, and have uncovered a large body of ore which will average $20 in gold per ton. The company will put in a power hoist and a revolving roaster of twenty tons capacity.

Sun: The Lytle Creek Quartz Mining Co., capital stock $100,000, all subscribed, is incorporated to mine a ledge of cobalt at Colton, in Lytle Creek canyon, six miles north of the hot sulphur springs, 6,000 feet in length and from 10 to 20 feet in width. It assays 30 pounds of cobalt to the ton, besides low-grade gold and nickel. A smelter of ten tons capacity will be put up at the mine. This is the only known mine of cobalt in the United States.

[Cobalt is not uncommon in the United States, as high as 13,000 pounds having been produced in one year. It usually occurs in connection with nickel ores. The total world's production is about 250 tons annually. Its principal use is in the manufacture of a blue pigment. At present it is worth about $1.50 per pound.—EDITOR.]

San Diego.

J. P. Frizell, who has a lease on the south extension of the Escondido mines, is taking out some rich ore. He is running a tunnel from the west side of the hill to connect with the old diggings on the east side, where he has men stoping in rich ground.

C. W. Witham & Co. have located some new copper claims joining the old Encinitas copper mines, and will build a dam 60 feet high for reservoir purposes, The *Union* says they intend to put in a smelter.

Mining and Metallurgical Journal: Speaking of the mines at Hedges, C. W. Pauly said recently: "The mines are in good shape. We have been running 50 of the 140 stamps until recently, and are now running 70. The gold is taken from the Cross and Crown mine. The rock runs about $8 per ton, and we crush 240 tons per day. Just before I left we made a very satisfactory clean-up. Between 100 and 200 men are at work, partly Americans and partly Mexicans. The Americans do the expert mining, and the Mexicans shovel, cut wood and do purely manual labor. The wood is found on the desert, twelve or fourteen miles from camp, and it sells by the ton, instead of by the cord. We pay $4 per ton at the scales. It is ironwood, very hard and good fuel. There are about 400 people in camp and about 100 more in the vicinity. All are dependent upon the mines for support."

Sierra.

Standart & Horwege are opening a gravel mine two miles above Pike City.

Siskiyou.

Wm. Kline of Sawyer's Bar has sold his mine at the mouth of Jessup's gulch to the Salmon River Hydraulic Mining & Ditch Co., and the company will extend their ditch to the claim.

Journal: At the Klamath River Flume & Mining Company's property work will soon be resumed.

The Chicago Mining Company, four miles from Cottage Grove, is building a ditch, and expect to start up about the first of December. This will be one of the largest mines on the coast when in operation.

The Minetta B. mine, on Thompson creek, is in operation, running with a small head of water.

Satisfactory results have been achieved in the quartz mines in the Humbug district during the past year, and we may look for the erection of quartz mills on some of the ledges next season.

J. F. Boyle has begun work on the Boyle mine, on Humbug, representing O. Howard of San Francisco.

The Klamath River Dredging Company's dredger is still working below Oak Bar and paying well.

Trinity.

The first payment was made this week on the purchase price of three gravel mining properties located near Douglass City, Trinity county—the Vitzhum Gulch, Union Hill and Dutton Creek. The purchase includes a ditch and water rights, the price for which as agreed upon is $100,000. The buyer is Alexander Hill for himself and English capitalists.

Nine miles from Trinity Center is the McLeod mine, where the greatest quartz strike in the county has recently been made. Development work had progressed sufficiently to justify the erection of a stamp mill. A foundation for the mill was commenced when a ledge larger than the one in the tunnel was uncovered. The millsite was moved 50 feet and work commenced again. This time a larger ledge than either of the previous ones was brought into view. These strikes are all on the 73-foot level. Buildings are now being completed so as to admit of work being prosecuted all winter. A tunnel will be run in on the 250-foot level this winter. The ore in the tunnels is principally talc, while that uncovered in the open cuts or foundation work is a hard blue and white quartz, much resembling the serpentine rock (so-called) found in Siskiyou county.

Tuolumne.

(Special Correspondence).—Gov. Machin has resumed work on his claims on Moccasin creek at the foot of Priest's hill. D. R. Oliver & Co. have begun work on the Black Warrior

and adjacent claims on Moccasin creek, near the Tuolumne river.

Soulsbyville, Oct. 14, '97.

The Ribbon Rock G. M. Co., near Carter's, has acquired and is developing six claims, the former property of the Seminole Co.

Democrat: At the Montgomery Supt. J. E. Summers has miners sinking a working shaft directly on the vein.

A new hoist is being put in at the Golden Gate mine.

The old shaft on the Uncle Sam is being retimbered, preparatory to resuming operations. The mine is owned by Robt. Marshall.

The Tarantula is continually being improved with machinery, etc. The new hoisting works will soon be running, and the two ledges of $80 rock made to show their worth.

On Thursday a sack of fine milling ore from the Pennsylvania was shipped to San Francisco that assays $350 per ton. There is said to be plenty more just like it at the mine.

The new hoist at the Arbona is fast nearing completion, and will be running in about two weeks.

At F. Cullers' East Belt mine near Cherokee—the Little Beauty—twelve tons run through the mill yielded $1800 in gold. Work is confined to drifting on the vein.

At the Gold Bug the main shaft is now down 80 feet, with further sinking on every shift. The new steam hoist works admirably. Thos. Whitto is superintendent.

In the Yellow Jacket advantage is being taken of the shortness of the water supply to timber the shaft and do necessary grading for the powerful hoist that will be shortly placed on the property.

Driving in the tunnel to tap the Blue lead on the Traylor mine, above Arrastraville, has progressed to the extent of 473 feet. Supt. J. L. Tonkins states that he hopes to tap the ledge in 60 feet more.

The Rising Sun, owned by a corporation, which has lain idle a long time, will soon be running. J. L. Tonkins is superintendent.

Independent: At the Pennsylvania mine, near Cherokee, a 22-inch vein recently struck has caused a stir in that vicinity and mine owners are more confident than ever of the productive quality of that section. J. Newton is the superintendent.

At the Providence carpenters, miners and surface laborers are busy. A road to the mine is being opened, and a ditch dug. It is the intention to sink a three-compartment shaft. G. Odgen is the superintendent.

At the Consuello prospecting is being vigorously driven ahead and good rock is being taken out.

Superintendent Sharwood of the Grizzly is pleased with the quality of ore taken out. Of the contract to sink 400 feet, 200 feet has been accomplished.

At the Montgomery an 18-inch vein has opened in the bottom of the shaft that tests $35 to the ton. They are in 50 feet. John Summers is the superintendent.

At the Yellow Jacket miners are working on $200 rock taken from a 2-foot vein.

At the Crœsus Superintendent Winwood is having the 50-foot shaft of this mine cleared and the water pumped out. A vein 9 inches wide has been exposed that milled in early days $50 per ton.

Yuba.

The Orient gravel mine has fifteen men running a tunnel to tap the channel near Camptonville. The Grizzly Hill mine is being opened up by a San Francisco company, E. C. Cochran, superintendent. The Tippecanoe, which formerly was worked as a hydraulic mine, is now to be worked as a drift mine. Nine men are at work there, but the force will soon be increased. The Brush Creek mine, above Camptonville, is being opened up.

NEVADA.

About 8000 tons of ore is reported to have passed through the De Lamar mill at De Lamar in the month of September.

The Wilson mines and tailings at Pine Grove have been bonded to Joseph Smith of Salt Lake for $31,000, the final payment to be made in June, '98.

At the annual meeting of the stockholders of the Comstock Tunnel Company in New York on the 11th, Franklin Leonard was practically re-elected president. He is understood to be desirous of engaging in such enterprises as that offered by the American Flat Development Company. It is thought that the proposition submitted to the tunnel company some time ago by the American Flat Development Company will be accepted.

The *Central Nevadan* says: W. E. Dean came up from San Francisco last Wednesday and gave orders Thursday to discharge all the men, numbering some twenty-five or thirty, and closed his property at Dean for a few months. The once prosperous little mining camp of Dean is now almost deserted, most all of the men and their families leaving for other fields.

Upon the reading of recent investigations in western Nevada by Charles D. Walcott, director of the United States Geological Survey, before one of the leading scientific societies of Washington in November last, the query was asked: "Is not Nevada a gold State rather than a silver State?" Recent developments point that way. From Lincoln county in the far south to Elko's line in the north, and Esmeralda in the west, comes news almost daily of the output of some promising gold property or the discovery of a new lode. De Lamar, a camp comparatively unknown in 1894, is now one of the leading producers of gold on the coast. White Pine county is enjoying the investment of capital in its numerous gold deposits, and Elko is having its share. Washoe, the agricultural county, has her leading papers proclaiming recent gold discoveries; Douglas with her rich placers, Lyon with the same, besides rich copper veins, upon which the 40-ton smelter of the Boston-Nevada Compay blew its inaugural whistle last Wednesday; Esmeralda showing every indication of reviving the days of Aurora, together with Storey having already produced $800,000,000 in gold; Nye, Churchill and Humboldt, all producers, makes the above assertion true in every respect.

New York men are examining the Oest gold mine at Silver City, Lyon county, and negotiations for a sale are pending. The price asked for the property is $250,000.

Walker Lake *Bulletin*: John W. Mackay, who is reported to be interested in a project to buy the Blair mines at Silver Peak, returned from the mines last Monday, after a week's examination of the property. The great miner did not seem to be at all enthusiastic over the outlook at the Peak. In answer to a direct inquiry as to what he thought of the mines, he said: "There is a big country and there seems to be lots of quartz. But the quartz is low grade, and it will require the outlay of a large amount of money before anything can be realized. The conditions at Silver Peak are all unfavorable for cheap mining and milling. Wages are high, supplies are high, transportation charges are high. I visited the Peak on the invitation of friends who think of buying the mines. I cannot say whether the sale will be made or not."

Mr. Mackay has come and gone and nobody is much the wiser, and whether the mines are to be sold or not is still a mystery. Mr. Mackay goes to California, where he will remain two months. He will not return to the Peak. L. E. Hanchett accompanies Mr. Mackay to San Francisco, but will return in a few days.

Dayton *Times*: The Peck plant started up this week Monday, and is now running on the Douglass reservoir tailings. About 200 tons a day are being hauled and worked. Twenty-five men find employment in and about the mill.

OREGON.

W. J. Conners, superintendent Golden Star G. M. Co., says the 10-stamp mill on the California mine at Cable Cove, near Baker City, will begin work Dec. 1st.

Campbell Bros. of Port Blakeley, Chilcott of Seattle and Behrman of Port Townsend, Wash., have bought the entire Black Butte bunch of quicksilver claims in southern Oregon—320 acres—and completed arrangements to begin operations.

WASHINGTON.

The Troublesome Creek Mining Company's property has been sold to a German syndicate represented by E. Haber, being three groups of claims on Troublesome creek—the Daisy, Great Scott and the Minnie—for about $100,000; 10 per cent has been paid. Development work has begun. The properties are fifteen miles from the Great Northern road and a railway will have to be constructed. The company will erect its own reduction works there.

BRITISH COLUMBIA.

(Special Correspondence).—Mr. Parke of Vancouver has invented an amalgamating machine for which he claims wonders. In the presence of the MINING AND SCIENTIFIC PRESS correspondent this week, 28 cwt. of ore was crushed to 40 mesh and was put through the machine by a stream from the city hydrant in forty-five minutes. The rock was washed down a feeder into the quicksilver box, where it was forced through the quicksilver—500 pounds—by means of steam, then up to a matted rocker to the tailings tank. The rock, which was from the Fire Mountain mines—free-milling properties of Harrison lake, near Westminster City—assayed ounce by ounce as it was put into the feeder, went $82 in gold. The brick retorted from the "quick" weighed 5 ozs. 12 dwts. 10 grs. Ten per cent of the total value was lost in the tailings. Mr. Parke claims if the rock had been finer he could have saved over 95 per cent.

Mr. Remington of Salt Lake City has his smelter offer now before the council. He offers to erect a $1,000,000 smelter for a bonus of $100,000 on the basis of $1 a ton for the first 100,000 tons smelted. Harry Symonds, Q. C., representing an English syndicate, offers to erect a $1,000,000 smelter for a bonus of $65,000 on a basis of $1 a ton for the first 65,000 tons smelted. He further offers to transfer to the city in exchange for the bonus $65,000 worth of the capital stock of the company, to deposit $5000 as a guarantee of good faith and to pay the expenses of submitting a by-law to the rate-payers. Mr. Remington, who is on his way to British Columbia, will no doubt come down in his demands when he hears of the Symonds offer.

The Golden Cache mill, Cayoosh creek, started up three days ago. Before this appears in print the first clean-up will have been made. The result is watched with great interest, as the Golden Cache free-milling proposition is the most talked of mine on the seaboard.

The Athabasca of Nelson, owned here, shipped 100 tons of free-milling ore to the Hall smelter during September in three lots. The first went over $80 in gold, the second $96 and the third results just to hand show gross returns of $106.30 per ton. Regular shipments will be made hereafter. The mine is now on a dividend-paying basis.

The Channe Company of Vancouver have recently purchased the following claims and are developing them: The Old Hat, Phillips' Arm, seventy miles north of Vancouver, surface assay, copper, $45; the Centerer, East Kootenay, 7-foot vein, surface assay $59, mostly copper; the Maple Leaf, East Kootenay, 3½-foot vein, $34, all values; the Book Rest, East Kootenay, surface gold and silver $194; the Golden Hope, East Kootenay, $75 on the surface.

Vancouver, B. C., Oct. 10th, '97.

(Special Correspondence).—The C. P. Railway is pushing along the location of its line from Robson to Rossland by way of China creek. Construction of this road is soon expected, and the terminus at Rossland is to be in the hollow immediately south of town.

The chief mines now under active development in the Rossland camp are the Le Roi, War Eagle, Centre Star, Iron Mask and Sunset No. 2. These are all in a position to ship ore at present rates. However, much of the work consists of blocking out ore for some time in the future, when transportation rates become reduced. The advent of the C. P. Railway may accomplish this by entering into competition with the Columbia & Western Railway, which now charges $2 per ton for carrying to Trail smelter, a distance of eleven miles.

The Hall mines are about to declare their first dividend. For the last two years they have been heavy producers of copper matte, but the management and the equipment have been very expensive. Their ore body produces somewhat over 100 tons of crude ore per day, the values of which have lately been increasing.

Compared with this time last year, the travel throughout West Kootenay is very light. There is practically none of the "boom" element left, and the camps are settling down to a business which the adjacent mines will support. This will account for the return of some discontented business men to their former homes. Those who stay will build up upon a fairly solid base due to production of ore.

The Canadian representatives of the "New Gold Fields of British Columbia," headed by Sir Charles Tupper and Sir McKenzie Bowell, both late premiers of Canada, are at present making a tour of this district, inspecting some of the company's properties, chief of which are the Exchange group, a silver-gold dry ore mine in the Slocan, and the Velvet, a copper-gold property on Sophie mountain, some ten miles west of Rossland.

In the granite dry ore section of southern Slocan small shipments of exceptionally rich silver-gold ore are being made from the Howard Fraction, Arlington, Two Friends, Meteor, Evening Star and Chapleau. These mines are being run in a small way and will never employ a great number of men, but continue to furnish ore which is rich enough to pay high cost of packing down. There is some probability of a custom mill being established on Lemon creek. The ores appear to be capable of some wet process which will treat the second-class quartz now thrown aside.

The Canadian Geological Survey Department are just publishing a map and report of the Trail-Rossland section. This should be of great use, as their maps—such as the ones of the Lake of the Woods and Yukon country—have proved most correct; besides which the reports enter into the detail of the geological facts of the district, and such facts are of no small economical value to miners and prospectors. Another map and report of Slocan-Ainsworth divisions is to be published about Christmas.

The Kootenay Electric Power Company are busy at the construction of their large system which is to supply electrical power to southern Kootenay from the station at the falls of the Kootenay river, half way between Robson and Nelson.

As usual at this time of year, there is an increased haste and activity in railway construction. Five thousand men are working on the Crow's Nest Railway. Surveys are being run west and south of Robson by the C. & W. Railway and the C. P. Railway; also the Slocan river branch line is near completion. Besides these, it is said the C. P. Railway contemplate establishing a system of tramways to tap some of the principal Slocan mines at present being served by the independent Kaslo & Slocan Railway.

Rossland, B. C., Oct. 16, '97.

The deal which was made some time since by which the R. E. Lee, Homestake, Maid of Erin and Gopher mines of Rossland were combined and sold to an English syndicate, under an agreement to put $125,000 in the treasury of the company, has been hanging fire. D. M. Linnard has gone to London to arrange matters and is confident of success.

Jas. Champion has charge of work at the Cariboo Gold Fields, near Ashcroft, and has 100 men at work building a ditch, capacity 2000 inches of water. It is 9 feet at the top, 4 feet at the bottom and 2½ feet deep, a grade of 9.60 to the mile. The drain tunnel is in 2700 feet. It is expected about 120 feet more will be driven before it will strike the elevator shaft. The elevator shaft will be driven about 68 feet, at the foot of which bedrock is expected to be struck. The shaft is sunk at an angle of 30° for the water pipe to go down to connect with the elevator shaft. At the elevator shaft a double compartment sluice is being constructed at a height of 20 feet above the present surface of the creek, 840 feet in length. The double sluice will be used for the double line of pipe for the use of the two elevators set and in readiness for active work next spring.

Golden *Miner*: The black sand found in the Saskatchewan river near Edmonton, in the district of Alberta, has proved to be rich in gold. It looks like a mixture of black and gray sand mingled together, impregnated with tiny pebbles and minute pieces of rock. It is very heavy, is found in the bed of the river, and the area is some miles in extent. The deposits are renewed by successive floods when the waters of the river become high. Several companies have been formed to treat this sand. Crushing, amalgamation, or extraction by means of quicksilver have been attempted. This process has not been a complete success. Another process has been roasting and smelting. The assays go as high as $400 per ton. There are millions of tons. The searcher after wealth among its particles is so busy with the solution of this problem, that he does not pay much attention to the question—where does this gold come from?

ALASKA.

The delta at the mouth of the Copper river is thirty-five miles wide, and the tide ebbs and flows for twenty-five miles up the river. Then it becomes necessary to make three short portages, together about one mile, after that the river is navigable for small boats for seventy miles, although the water is rapid and rocks abound. At this point on the river is a canyon five miles long; there is a portage around it, which can be covered in two and a half miles. This brings one to the junction of the North and South forks of the Copper river, which is named Tarral. Back on the divide which separates the two branches of the Copper river is an active volcano. This is supposed to be the source of the copper which is found so plentifully in this district.

Juneau *Record*: Large quartz ledges of a grade equal if not superior to the Treadwell have been discovered on the divide between Cassiar and the headwaters of the Yukon emptying into Teslin lake. The development of these mines is now impossible owing to lack of facilities for the transportation of machinery. With the building of the proposed Cassiar Central & Teslin Lake Railroad by the Canadian Government these difficulties will vanish. The Government's surveyors are now at work on the Stickeen river and their report is looked for at an early date.

THE KLONDIKE.

The vexed question of transportation across the Chilcoot Pass is to be solved. An enterprise was organized last week by a strong company at Tacoma, Washington, under the name of the Chilcoot Railroad & Transport Co. The men at the head of this enterprise are largely connected with the Northern Pacific Steamship Company and the Washington & Alaska Steamship Company. They propose building a surface tram road, commencing at tide water at Dyea, extending up an easy grade for a distance of eight miles, at which point a wire rope aerial tramway will begin. This surface road will be equipped with cars, to be drawn by horses. The aerial tramway will extend from the point mentioned up through the Chilcoot Pass and over the summit down to Crater lake, which is the most southerly of the chain of lakes connected with the Yukon river. The aerial tramway will be built in two sections—the first section being four miles in length and the second section (which passes over the Chilcoot Pass) being three and a half miles in length. Mr. N. M. Bell, the San Francisco agent of the Trenton Iron Works, Trenton, N. J., has returned from Tacoma, where he closed a contract for furnishing the material and machinery needed for this tramway, which will be the Bleichert system of double-rope tramway. It is expected that this road will be in operation by January 15th, '98.

The following is a copy of a bill of goods, stating amount and prices, which was purchased in Dawson City from one of the post traders in August, and shows the current prices at that date:

100 lbs. bacon	$ 44 00
200 lbs. flour	24 00
50 lbs. beans	6 25
50 lbs. sugar	15 00
24 cans milk	12 00
10 lbs. peas	12 50
15 lbs. coffee	7 50
12 cups	4 00
12 plates	6 00
20 lbs. rice	5 00
10 lbs. salt	1 00
2 cans pepper	1 00
12 cans butter	18 00
2 frying pans	3 00
1 case L. tongue	12 00
1 case R. beef	9 00
6 blk. codfish	3 00
1 case tomatoes	10 00
55 lbs. ham	24 75
10 lbs. oatmeal	2 50
30 lbs. potatoes	6 00
6 cans B. powder	4 50
4 cans cocoa	3 00
20 lbs. crackers	5 00
1 can opener	50
6 pkgs. matches	75
2¼ lbs. candles	1 00
Total	$241 25

Ex-Gov. Swineford says: "You can say to anybody who thinks of going to Klondike that they will have a pleasant time of it if they live to get there. After they have been there three days they will begin to draw comparisons and wonder what kind of a paradise hell is, anyway, compared with that country. The result will be much the same whether they arrive there in the summer or winter. The fact is that the upper Yukon shows the greatest extremes of heat and cold that are shown anywhere in North America. In winter 30 degrees below is mild, the thermometer reading as low as 80, while during the months of June, July and August it gets ambitious and climbs to the top of the tube, ranging from 110 to 130. One can protect himself from cold, but it is impossible to do so against excessive heat, accompanied by the plague of mosquitoes, deer flies and other winged pests."

The usual contradictory columns of newspaper reports from the Klondike are published. Nothing has transpired during the week that adds to what has already appeared herein. Several letters from Dawson to hand are merely a repetition of what has already been said.

UTAH.

The following description of the Golden Gate mill is from the Mercur *Mercury*: The site, not including the gas plant, covers a ground space 300 feet wide and 400 feet long, and is composed of eight levels, supported by solid walls of masonry, some of which are 40 feet high. The top or crusher level is 75x25 feet in dimensions. The ore, coming up through the incline, which leaves the working shaft at a point about 60 feet below the surface of the ground, passing under a corner of the mill and emerging above the first level, is dumped automatically into the crushers, where it is coarsely crushed and runs into a bin with a capacity of 2000 tons. Above this level—100 feet—is the shaft-house containing the air compressor and hoisting engines, which lift the ore from the bottom of the mine to the top of the mine. Above it also runs the great flue, which comes from the furnace levels below, connects with the dust

chambers, runs up the hill for 200 feet and is crowned by a perpendicular stack 97 feet high. This flue, inside dimensions, is 7x9 feet. The second or drier level, having a foundation wall of solid masonry 40 feet high, has a floor space 75x82 feet. This level will have two driers, 80x16 feet each, which are connected by flues, 4½x6 feet inside, with the main flue. After the moisture is expelled by the driers the ore passes automatically to the third level, where all the rolls, screens and elevators are situated. This level is 90x68 feet, and here the ore is finely crushed and screened and passes into a second ore bin, 25x84 feet, capable of holding 2000 tons. This ore bin rests on three solid walls of masonry. Under this ore bin is the dust chamber, which is 100 feet long and 10x11 feet inside dimensions. This chamber is connected directly with the main flue, and is provided with hoppers 12 feet apart the entire length. The floor is so arranged that the dust collects at the mouth of these hoppers, so that it can be drawn off into cars below without shutting down the plant for an instant. A door also connects with the main flue at this point, at which all dust accumulating therein may be drawn off in the same manner as from the hoppers in the dust chamber. From the third level the pulverized ore goes automatically to the fourth and fifth levels directly to the roasting furnaces. Each of these levels cover a space 298x83¼ feet, and on each rests two furnaces 135 feet long and 16 feet wide. Under the furnace levels are two flues 75 feet long, 6x8 feet inside, connecting with the main dust chamber and running under the ends of the furnaces, with which they are connected. These furnaces have a capacity of 500 tons a day, and here the ore is parted from all arsenical and other minerals which interfere with the treatment by the proposed process. The sixth level, which covers the same space as the fourth and fifth, is left blank. It is made for the purpose of adding two more furnaces, when it becomes desirable to enlarge the plant, and by this arrangement the addition can be made without stopping the mill for a day. After going through the furnaces the ore drops into a hopper excavated from the fifth level, which is connected with the seventh level by a tunnel which runs under the fifth and sixth levels and comes out at a point above the tops of the tanks on the seventh floor. Until the hopper is reached the ore has been handled automatically. Here the ore is drawn off from the hopper into cars and run out over the tanks on the seventh level and dumped into them. The tank room has dimensions 298x60 feet and the tanks are supported by a solid retaining wall and 230 heavy piers of masonry, which go down to the living rock. This floor will contain ten tanks of a capacity of 200 tons each. Above them on the same level will be the solution tanks and running over them will be four lines of track for the distribution of the ore, while running under these the entire distance will be four more lines of track. On the latter will run the cars which will receive the tailings, to be drawn from the bottom of the tanks. The tailings can be dumped at both ends of this level and ample space has been left for more tanks if found necessary when the extra furnaces are added on the sixth level. The eighth and last level is 50x70 feet, and here the solution from the tanks above is precipitated and relieved of its golden burden. Here, also, is located the main solution sump. Unless some accident occurs, the plant will be in operation at the time specified in the contract—December 1st.

The Eureka *Democrat* says that camp is without doubt one of the most prosperous in Utah. "As an evidence of this fact it may be cited that during the past week an agent has been in town offering to give employment to 100 miners at Castle Gate and Scofield, but after considerable hard rustling succeeded in securing only six men."

Tribune, 12th: Negotiations that have for some time been in progress between officers of the Highland Boy Mining company and the owners of the Stewart No. 2 mine at Bingham were yesterday brought to a close and on the payment of $50,000 title to the latter property will pass into the hands of parties represented by Messrs. Thomas Weir and Fred Bettles. The former is general manager for the Highland Boy, the latter superintendent of its big mill, through which the extraction of gold has just commenced. The owners of the Stewart No. 2 were represented in the transaction by Mr. George D. Haven, owner of the controlling interest and well-nigh the entire property.

The final payment on a transaction in which the ownership of the Vulcan mine at Fish Springs, in the Deep Creek, is acquired by George H. Whitmore, Alonzo Hyde and Andreas Jensen, all of Nephi, has just been made in this city, and in a few days work on the property will have been resumed with a full force of men. The final payment in the deal, according to Mr. Whitmore, was $15,000. What the total amount was he would not divulge, although it is said that it was no less than $35,000.

IDAHO.

The New York & Idaho Mining Co. will put in a 70-ton smelter nine miles below the town of Seven Devils, on the Indian creek claim. This company is the owner of the Peacock mine. Manager Andrews of the Peacock mine says he will buy two hoisting plants and his company will spend $100,000 in development.

A Wallace report says the Standard mine commenced caving Saturday night with other caves reported since. The tunnel is now said to be full for a distance between five ore chutes to an unknown depth. Only three cars of ore were brought to the dump to-day and the mill closed to-night. The extent of the injury cannot be determined, but it is certainly the worst cave ever known in the Cœur d'Alenes. The company hopes to be working again soon.

At Burke the Tiger has commenced sinking again. The shaft is now 1325 feet deep, and will continue to 1400 feet.

At Kellogg the sheriff will sell the Stemwinder mine, mill and tramway on the 23rd inst., to satisfy a judgment aggregating $101,338.50, together with costs and interest from March 10th last, the date of the judgment. It is understood to be a sale simply to quiet title, as the Bunker Hill and Sullivan Mining and Concentrating Company now owns the entire possessions of the old Stemwinder Company, has moved the machinery out of the mill and been working the mine for months. The judgment was rendered on a mortgage for $97,338.50, given by the Stemwinder Mining Company, which mortgage, it is alleged, was illegal, having been given after the company was insolvent. The Bunker Hill M. & C. Co. acquired title by purchase from the receiver of the Stemwinder Mining Company.

MONTANA.

At Helena a decree in foreclosure winds up the affairs of the Golden Scepter Mining Company and the reorganization of the Quigley property under the name of the Majestic Mining Company.

F. A. Heinze, general manager Montana Ore Purchasing Company, has sued the Boston & Montana Mining Company for $197,150, alleged damages by reason of defendant taking ore from plaintiff's ground.

Superintendent Evans of the Boston & Montana Mining Company is credited with saying: "At Great Falls the Boston and Montana Company is increasing the capacity of its smelting, refining and concentrating works 33⅓ per cent preparatory to an increased output from that and the Butte and Boston property. The old machinery at the Boston and Montana mine is also being supplanted by the new and more modern appliances. The copper basin of Montana is a mile wide and three miles long and continues to hold good at the greatest depth thus far attained, viz., 200 feet." The Butte & Boston has fourteen claims, of which but two are thoroughly developed. Explorations are being conducted in other parts of its territory, and several of these places are opening up well. This work has been going on since the reorganization, and no attempt will be made at regular production for about a year to come.

The Mayflower mine in Madison county is now the greatest producer of the State. Last year it produced about $350,000, but this year even if the present rich ore body holds out it will not yield more than $200,000. The introduction of the cyanide process in many old districts in Montana this season will have an important bearing on the output of next year. In many portions of the State there are bodies of low-grade ore which, it is thought, can be profitably worked by this process.

COLORADO.

With lead at $4 per 100 pounds, or $80 per ton, and the apparent rise in the price of silver it has created a stimulus in upper Clear Creek for mines that carry a good per cent in lead, of which there are quite a number in and around Georgetown and Silver Plume, several of which are now being developed and producing largely, and many that are only partially developed. The manager of a property at Silver Plume makes the statement that with the recent advance in the price of lead and silver it makes a difference in his receipts of about $600 per month.

For the month ending Sept. 30 there were shipped from the Black Hawk depot of the U. P. D. & Gulf railroad 326 cars of ore, aggregating 5216 tons, to the Denver and Pueblo smelters, being the smelting product and tailings for that month. For the corresponding month of 1896 the ore shipments were 302 cars, or 4832 tons. Last month's shipments show an increase of 24 cars, or 384 tons of ore. Owing to the delayed shipments during the repairing of the Gulf road in August, 1896, the following month's shipments were unusually large, so that it can readily be seen that the past month's shipments have a correspondingly substantial increase, as in fact the ore shipments of each month of this present year will show a total increased tonnage of about 40 per cent, when figured up at the end of this year.

The Rio Grande last week announced that ore rates had been lowered as follows between Leadville and Pueblo to Denver: On $100 ore, $3 per ton, instead of $4.45 per ton as formerly; on iron ore, $2 per ton, instead of $3. The three roads interested in carrying ore from Leadville are the Denver & Rio Grande, the Denver, Leadville & Gunnison, the South Park branch of the Gulf and the Colorado Midland. Later the latter road announced that the cut had been met.

A rich gold strike is reported near the Revenue tunnel, on Mount Sneffels, in Ouray county; "$1000 has been taken out of two cubic feet of rock."

Near Breckenridge a big placer scheme is under way. T. R. Miller, an old California placer miner, has control of 1460 acres of placer ground along the valley of the Blue, below Dillon, and in the Blue river basin. The average depth of the deposit is reported to be at 45 feet, and the value of the gravel throughout the entire tract is estimated very high. A company has been formed, composed mainly of Kansas City people. The money required for the commencement of operations has been deposited in the bank, and the work started under the superintendence of Mr. Miller. Water will be supplied from a ditch five miles long, having a fall in that distance of 480 feet, giving all the hydraulic pressure for the operation of giants when it is found necessary to use them. The gravel beds are to be worked from both ends of the tract. At the lower end, commencing at a point where the Blue makes a sharp bend, a bedrock flume will be started, and a tunnel run through the bar across the bend. The flume will be in two compartments, each 8 feet wide, and will be operated by the water encountered at bedrock.

When necessary to clean up, the water can be shut off from one flume, insuring continuous work. This flume will be driven eventually through the entire tract and will be used to wash the rich dirt taken from bedrock in driving the tunnel. Besides the tunnel, a pit will be sunk to bedrock at the upper end of the tract, and the gravel lifted from bedrock to a surface flume supplied with water from the ditch, the boulders being placed on ground beside the flume for which the company has no other use.

For lifting the gravel to the surface will be required a hydraulic gravel elevator. The total cost of the enterprise, including the ditch and the necessary flumes, is estimated at $75,000.

Aspen *Tribune*: The number of unemployed miners here is smaller than at any time since the slump in 1893. New men are being put to work by both companies and leasers and the output of the camp is increasing. The Cowenhoven tunnel extension will result in a further increase of the working force of the district by reason of the work of driving the tunnel and the opening up of more territory on Smuggler mountain.

Republican: The Crœsus mine, in Magnolia district, Boulder county, has been sold to a company of English capitalists, who have organized a stock company with a capital of $1,000,000, and will operate the mine on a large scale. About six weeks ago L. J. Marks, a mining engineer of wide experience in the gold fields of South Africa and West Australia, came here from London and made a careful examination of the property, and, returning to England immediately, recommended the purchase of the property. On his report the mine was bought and the money paid to the owner. The price given is not stated. Mr. Marks has been appointed manager of the property and returned from England a few days ago to take possession. Mr. Marks says that when examining the property samples taken from 365 feet of drifts averaged 2¾ ounces of gold to the ton. The first shipment made under the new management of a few tons of ore gave returns of 4⅛ ounces of gold and 6 ounces of silver to the ton. A lot of selected ore ran 169 ounces gold and 328 ounces silver to the ton.

Pueblo *Chieftain*: All the stamp mills and cyanide mills that have been set up in Colorado and New Mexico in the last two years are hardly a "patching," and the many gold camps are calling for more of them, and with increased vigor. Almost as soon as a stamp mill gets into good running order some big producer absorbs it and its work is confined to the ore of a single mine. This has happened twice at Granite, and though two stamp mills have been built there Granite is still howling for a custom mill. Tarryall wants one very much and has at least two mines near Puma either of which could supply a mill. The same may be said of Bare Hills and of Freshwater, Duncan and Crestone, La Belle and Red River and many other places.

KANSAS.

A train load of lead ore, consisting of 600,000 pounds and filling fourteen cars, was sold at Galena, Kan., last week by G. E. Geissinger to the Argentine Smelting Works. This was the output of one shaft in the Frisco mine, one mile southwest of Galena, which has been accumulating in the bin for six months waiting for an increase in price. The ore brought $31 per 1000 pounds—the highest price paid for ore in the district for several years.

NEW MEXICO.

The survey for the branch railroad, three miles in length, from San Jose to Santa Rita, has been completed and the contract for grading will soon be let. Preparations are being made for the filling of the large iron contract, 3000 tons per month, which the Santa Rita Copper and Iron Company has made with the Pueblo Smelting Company. The Gilchrist leases on the Guadalupe, Chino and Oxide mines are doing well. The Driscoll Company continues to take out its usual quota of ore from the old dumps.

ARIZONA.

Our Mineral Wealth: The rich strike made last week at a depth of 150 feet on the Schuylkill mine at Chloride still continues. The ore is worth $25 in gold and 1000 ounces in silver per ton, and the ore body is about 5 feet thick. Besides the precious metals in the Schuylkill ore, it carries a high per cent in lead.

The Gold Cliff Gold and Silver Mining Company, Wm. Johnson, superintendent, operates a mile east of the Commonwealth. The company have put down a shaft of 175 feet and some stoping has been done, which shows ore 10 feet wide, similar in character to that of the Commonwealth. A hoist is being operated and a cyanide plant is to be constructed.

Supt. Thompson at Rosemont, on the Chicago mine, at a depth of 250 feet has a 20-foot body of sulphide ore.

In Aravaipa canyon, Graham county, the Grand Reef Mining Co., J. W. Paine superintendent, is working thirty men, preparing for the erection of a large amount of new machinery. About 150 men are now at work building a road from the main road in Aravaipa canyon to the Burgess mine, eight miles. When the road is completed active work will commence on the mine.

MEXICO.

O. P. Poole is enthusiastic over the mining outlook in Mexico. He says Mexico is no place for a poor man, or anyone without capital, but one with means will find good chances. "A man with $10,000 can go there and his money will amount to $24,000 in Mexican currency. Gold can be mined on a silver basis, by which I mean the labor can be had at 60 to 75 cents a day in Mexican silver. An ounce of the retort gold, bringing $16 to $18 here, brings $30 there. The Mexicans cannot handle machinery to any extent, and are poor hands at gold mining. Americans have a good field." He adds that on the train he came on there was $800,000 in silver, which had been bought by Chinese and was being shipped to San Francisco.

The Mulatos mine, twenty miles from Hermosillo, State of Sonora, is again reported sold, this time to "an English syndicate for $1,000,000."

LOWER CALIFORNIA.

Lower Californian: Douglass and Burr, from Cedros island, say the mines are on the north end of the island, which has an area of some eighty square miles, and lies about fifty miles off the coast and is about 230 nautical miles from Ensenada. The island lies north and south and the mineral belt cuts it diagonally across northwest and southeast. In some places it is half a mile in width. There are two principal outcrops, five miles apart. At the northern outcrop is the old camp, where there are three properties lying parallel—the Esperanza, Guadalupe and Chicago—and the mineral has a continuous expanse across these properties for a width of 600 meters, having an area of 290,000 square meters. This ore is quartz, bearing copper, iron and gold. As is natural, the ore is oxidized near the surface, and it is estimated that this character of ore continues to an average depth of 15 meters, thus giving 435,000 cubic meters, and as this is very light material, an allowance of one meter being made per ton gives 4,350,000 tons of this class of ore. At the other outcrop, five miles to the south, though smaller, the area of quartz exposed is still of gigantic proportions, being 100 by 500 meters, or 60,000 square meters, and evidently of a depth corresponding to the first camp, thus giving 750,000 tons of ore in sight. Below the depth of fifteen meters average depth the ore is in its original base condition, with practically the same proportions of the metals as at the surface. The bright colors of the quartz are blood red, yellow, blue, white and black various combinations, and form a striking picture which may be seen for miles. Various estimates as to the value of this vast body of ore place it between $5 and $12 per ton. Located as it is on an island, where machinery, lumber and supplies can be delivered by shipload, this ore should be mined and reduced at a minimum cost; and even figuring at $1 profit per ton, it will be seen at a glance that it is one of the greatest of mining propositions.

Yuma *Sun:* The Steamer Mohave returned the first of the week from the mines of the Mexican Mining Company in Lower California, with a large consignment of sulphur, which Graham Caldicott, the assistant treasurer and representative of the company at this point, is shipping to consumers and refiners all over the United States, in sack lots. These shipments are simply intended as samples, to introduce the product of the mines, which will doubtless in the future supply a large percentage of the sulphur consumed in this country and Mexico. There is perhaps no other place in North America where so enormous a deposit of almost pure sulphur exists as at this one. The supply is apparently unlimited, and the ore almost pure sulphur. In places, however, it is accompanied with alum in quantities which it will pay to save. Alum brings $15 per ton, and as it runs in veins a foot or more in width in these mines, and must be mined in mining the sulphur, it will certainly prove profitable to handle. Gold has also been found associated with the sulphur ore, Mr. J. A. Dubbs, president of the company, during a recent visit to the mines, discovering a considerable nugget of pure gold in a piece of sulphur he picked off the dump. The Mexican Sulphur Company is pushing the development of this great property, and as the gentlemen managing it are experienced, the result can but be satisfactory.

BRITISH GUIANA.

The Barima Gold Mining Company held a meeting September 2nd, in Georgetown, British Guiana. The report showed that for the half-year ending June 30th, 2511 ounces 17 dwts. 6 grains of gold were received, the result of 2636 tons of ore crushed and 75 days work, and remaining on the mine at that date were 332 ounces 18 dwts. 13 grains of gold, the result of 644 tons crushed and 13 days work. The return per ton of ore crushed averaged .867 ounces of gold. The expenditure for the half-year ending June 30th was $68,003.49, and the net value of gold received, and estimated value of what was on hand at date, amounted to $46,016 63, showing a loss of $21,986.86.

The leader of a recent expedition to that country says: "Alluvial mining will never make New Guinea. I never saw a reef all the time I was there, from the mouth of the Vanapa to the foot of Mount Knutsford, but only a few bits of stringers in basalt and slate in the creeks. Ninety per cent of the men who went up with me got the fever and a large percentage died. It was pitiful to see the poor wretches, stricken with this terrible scourge, trying to crawl back to the coast. I wish I may never see such a sight again. The strongest men, too, are the ones who suffer most. The climate—it is impossible to describe it. Then there are thorny creepers which tear your clothes and skin, and drag you back—long, trailing 'lawyer' vines, with hundreds of strong spikes on their creeping branches, strong enough to pull a man back if they once catch him. The natives, too, are thievish and treacherous and cannibalism is rife. The fever is a horrible scourge, and there is another loathsome disease—the scrub itch where masses of little red parasites fasten on the body, and eat through the flesh right to the bone. Numbers of men have been killed by them. The expenses of prospecting in such a land are exceedingly high—£40 or £50 is no use at all; the natives refuse to act as carriers unless paid in money, and many won't do the work for any consideration; and, as added to this, there is practically no gold to go for. I want to strongly warn miners against attempting the journey."

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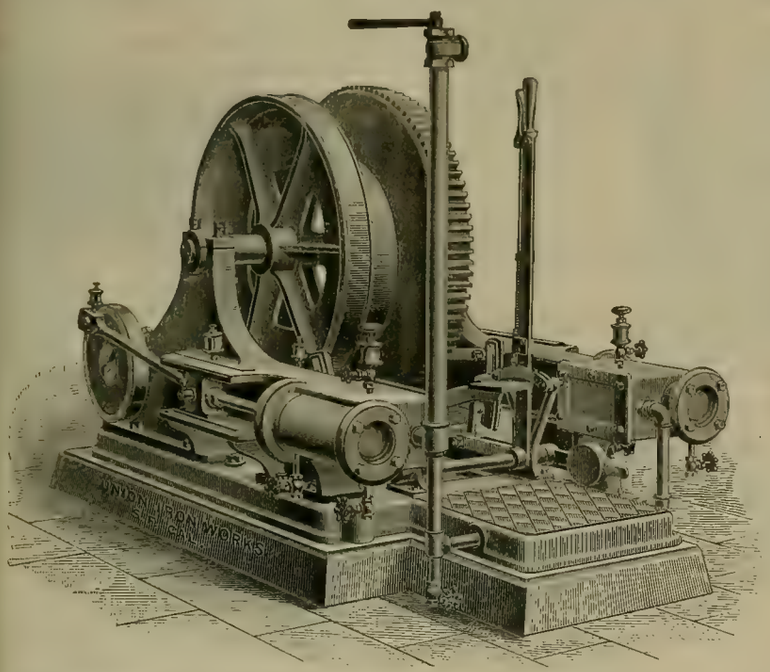
DOUBLE CYLINDER SINGLE DRUM HOIST



HOIST FOR PROSPECTING.

For Prospecting Purposes or Underground Work,

USING COMPRESSED AIR.

The entire hoist is self-contained, being mounted on an iron sole plate or bed which carries all the operating levers and provides a footboard for the operator. The engines are provided with reversible link motion and the drum with a broad strap brake, insuring safe and rapid work.

The general lines upon which this hoist is designed are neat, strong and substantial and all the operating parts are conveniently arranged.

The size herewith illustrated is the 4 in. x 10 in., rated at 15 horse power. The larger sizes, 8 in. x 12 in. and upwards are provided with post brakes.

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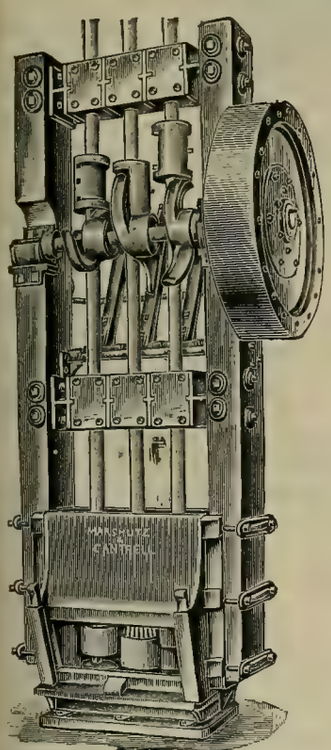

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All work tested and guaranteed.

IMPROVED PORTABLE HOISTING ENGINES.

Improved Self-Contained Three or Five Stamp Mill,

Saves bill for heavy timbers, millwright and mechanics' labor, and a large amount of space. The term self-contained means a great deal for the mine owner, and can be readily recognized and appreciated in making an estimate for an ordinary plant when the comparative cost is considered.

FIRST: There is saved a large bill for heavy timbers, in many instances obtained at great expense and loss of time.

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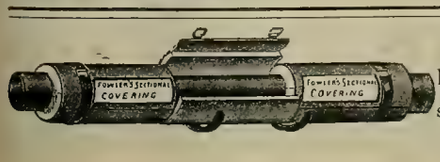

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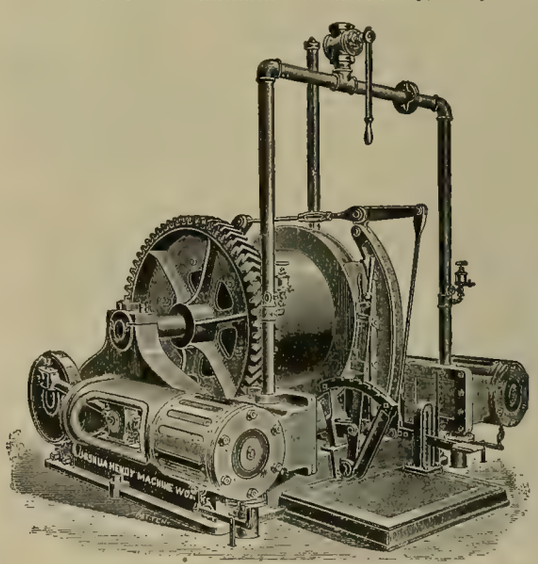

DOUBLE CYLINDER SINGLE DRUM HOIST.

MINING AND MILLING MACHINERY.

THE above form of Hoist has certain features of construction which make it superior to all others It is mounted on a single solid base, with standboard for the operator. The engines are reversible link-motion and the drum is fitted with post brakes and helical teeth, which assure quick and safe operation. The design is compact and superior and the construction strong and substantial. We furnish them either with or without clutch pinions. The above cut illustrates an 8½ inch by 10 inch. Other sizes in stock and built to order.

Coast Industrial Notes.

—The Sierra, Cal., Railway from Oakdale to Jamestown will soon be completed. The track is now laid to Montezuma, five miles from Jamestown.

—One cause of the rapid appreciation of lead is because of the high price of wheat and corn and the abundance of the crops, for every farmer can now paint his house and barn, which means many million pounds of white lead.

—The Tuscarora, Nevada, *Times-Review* says men have begun placing the electric power plant in position. A dam will be built at the head of the canyon and the water conveyed through wood pipe. It is estimated that about 200 H. P. will be developed.

—The Fullerton Walnut Growers' Association has received estimates from all the associations in southern California, the total number of carloads of the present crop being 220. The association estimates that the entire crop of southern California will sell for at least $325,000.

—The Santa Fe Pacific Co. has awarded a contract for furnishing hewn ties to be preserved in the pickling plant lately established at Bellemont, twelve miles east of Flagstaff, Arizona. From 300 to 500 men will be kept at work in the pine forests of Coconino furnishing the ties.

—The Pittsburg company that has a fifty years' lease of the Sulphur Mountain, in Lower California, forty miles from the Colorado river, will build a railroad to Yuma. The sulphur is being quarried. American Vice Consul Godbe, Ensenada, has a concession for the mountain and will receive a royalty.

—The war department has directed advertisements for a proposal for building a large stone pier at Gray's harbor, Washington. The original advertisement, although within the appropriation of $520,000 to $900,000, failed to produce suitable stone. Since that time the department has been informed that good stone has been found near at hand.

—The California vintage of 1897 promises to reach 20,000,000 gallons, or 25 per cent more than last season. About one-half of the grape crop has been converted into wine. The growers are receiving an advance of from $5 to $10 a ton for their grapes, the understanding being that they are to receive one dollar for every cent per gallon the wine brings when sold.

—C. J. Smith, receiver of the Oregon Improvement Company, has filed his report for August, 1897. It shows gross earnings of $491,183, expenses of $327,472, and net earnings of $163,710—a large increase over the net earnings of August, 1896, which were $60,757. The report also shows that the net earnings for the fiscal year ending August 31, 1897, were $538,476, an increase of $345,000 over the preceding year.

—As evidence that people must have Pacific coast lumber, the shipment of a cargo of red cedar lumber by Lewis & Crane, of Seattle, to Buenos Ayres, Argentina, South America, is significant. The order was for tank stock, and was shipped by rail to New York, thence to London by steamer, and again by steamer to destination, a journey of over 14,000 miles, —a roundabout way and an illustration of the need of the Nicaragua canal.

—Attorney-General McKenna has issued an official statement announcing that the Government had decided not to appeal the Union Pacific foreclosure suit, but would allow the road to be sold on November 1, in consideration of the Union Pacific reorganization committee raising its guarantee bid from $47,745,059 to $50,000,000. "The road," he added, "is to be sold to the highest bidder, but with a minimum bid guaranteed as stated."

—With a larger wheat crop selling at good prices, hundreds of farmers in Oregon and Washington will this year have a surplus after paying their debts, and others will largely reduce their indebtedness. Many of these people two years ago were in danger of losing their farms from foreclosure. At that time wheat sold in eastern Washington as low as 16c per bushel, transportation to the seaboard costing 14c, whereas this fall the crop has been selling at from 60c to 80c. California also makes an admirable exhibit along these lines.

—At Sacramento on the 13th Engineer Nurse filed his report with the auditing board to the Commissioner of Public Works upon the investigations and surveys made on the San Joaquin and Sacramento rivers. The report makes an estimate of improving the channel of the San Joaquin at Stockton, recommends and estimates the cost of removing the new town shoals and the closing of the Hershey and other breaks above the city of Sacramento. The auditing board will probably meet next week and order the publication of the estimates and advertise for bids for completing the work as recommended in the report. The total amount of the expenditure which is recommended will be in the neighborhood of $50,000.

—*Locomotive Engineering* is surprised "to find that coal can be mined in China and sold in California at a profit. Several cargoes of coal have been imported into California, and those who are familiar with it report it to be of very good quality. It is expected that within a very few years the Chinese coal mines will supply the whole market of the Pacific coast, except those portions where coal is found. The extremely cheap labor of China enables the coal to be brought to the surface at a very low price. The only obstacle to very active competition in this industry at present is the want of good transportation facilities in China. The extension of Chinese railways, which has begun very actively, is going to exert a very prejudicial effect on the coal mining interests of the United States and Great Britain."

—The Canadian Pacific Railway has placed two corps of surveyors in the field, with a view to opening up the Stikeen River route to the Yukon mines. From the mouth of the river to the point at which the road down the Yukon will begin there are said to be no engineering difficulties, and it is believed the line can be kept open seven months in the year. It is proposed to run a line of fast steamers from Victoria to Fort Wrangel. Steam vessels can run up the Stikeen river for 149 miles, from this point a railroad will be built to Teslin lake, 125 miles further. Light draught steamers will be placed on the Yukon, and it is believed that Dawson City may be reached in thirteen days from San Francisco.

Recent California Mining Incorporations.

Alta California G. M. Co., San Francisco; T. J. Parsons, G. W. Baker, F. W. Vaughan, W. A. Jacobs, S. K. Thornton; capital stock, $100,000; subscribed, $60,000.

Empire Quicksilver Mining Company, Sulphur Springs, Colusa county; J. A. Joyce, R. A. Bogges, J. F. Abel, W. E. Street; capital stock, $500,000; subscribed, $301,100.

Dell Ditch Company, Bishop, Inyo county; E. Shober, A. Dell, W. J. Perry, J. S. McQueen, H. Gerken; capital stock, $30,000; subscribed, $25,200.

Laconia M. Co., San Francisco; J. T. McGhee, J. R. McLean, A. Simpson, J. Mullin, F. E. Philbrick; capital stock, $100,000; subscribed, $100.

Santa Maria M. Co., Woodland, Cal.; T. H. Ryder, P. Saling, R. Fitz, G. Beebe; capital stock, $1,500,000; subscribed, $1,000,000.

Northern Light & Power Company, San Francisco; V. J. A. Rey, E. I. Parsons, J. Sproule, E. A. Denicke, E. Fish; capital stock, $100,000; subscribed, $250.

Pacific Coast M., M. & D. Co., San Francisco; E. A. Mack, F. E. Hannon, G. W. F. Allen, H. R. Waters, O. A. Lane; capital stock, $1,000,000; subscribed, $100,000.

Mountain View M. Co., San Diego; N. O. Hanson, G. W. Marsh, G. D. Tantan, J. Russell; capital stock, $10,000; subscribed, $4480.

Dreisam G. M. & M. Co., San Francisco; A. W. Livingston, A. Trittenbach, G. Trittenbach, T. J. Walsh, B. Healey, C. P. Grimwood, W. Ladd; capital stock, $1,500,000; subscribed, $900,000.

Eureka Quartz M. Co., Usal, Mendocino county; F. C. Marbon, W. J. Turner, E. S. Parker, D. A. Frost, W. G. Robinson, M. A. Cathie; capital stock, $1,000,000; subscribed, $5000.

Personal.

F. A. R. PENROSE is reporting on the Hailey, Idaho, Gold Belt. The local paper says that his interest in the Pearce mine, Arizona, nets him $1,000 per day.

R. L. DUNN, of San Francisco, sailed last Thursday for Siberia to examine and report upon some quartz properties at the instance of a French syndicate.

PHILLIP DEIDESHEIMER, the first superintendent of the Hale & Norcross mine, Virginia City, Nevada, is examining property at Lundy, Mono Co., Cal.

Commercial Paragraphs.

THE contract for the cast iron work for Wells, Fargo's new San Francisco building, to cost $16,000, has been awarded the Joshua Hendy Machine Works.

THE Fulton Engineering & Shipbuilding Works are building four schooners—three of them for the lumbering trade and one for fishing purposes. The latter will be equipped with compound condensing engines. They are also building a new steamer for the California Navigation Co. to ply between San Francisco and Stockton. The contract requires a speed of 20 knots per hour.

THE James Leffel Water Wheel Company has closed a contract with St. Paul capitalists for six turbine water wheels of 1000 H. P., each for a $2,000,000 power plant to be established near Butte, Mont., on the Big Horn river. While the plant will furnish electricity to Butte and power for general purposes, the plant is being built chiefly to supply power to the copper mines near Butte. The wheels are intended to be the largest ever built.

THE Union Gas Engine Co. of San Francisco has furnished eleven engines to the Tokio Navigation Co. for use in their vessels in Japanese waters, and this week received an order for six more with very complimentary reference to the efficiency of these machines. The Union Gas Engine Co. is now building a 50 H. P. engine for a launch for G. W. McNear of the Port Costa Flour Co. and another similar engine for the San Francisco Launch Co. at North Beach, and a 60 H. P. engine for W. A. Ryan & Co.

IN a distant city, says *American Investments*, there has recently been organized a little company which has for its object the looking after of freight contracts and overcharges for shippers generally. Railroad freighting has become so complicated these days that, unless one devotes his whole attention to it, the subject cannot be grasped to much advantage and profit. The various classifications, rulings and decisions of the powers that be are quite beyond the average shipper's comprehension, so he will welcome with open arms any plan or system that will bring him an immunity from the perplexities and cares of attending it himself. The company proposes to do all that is desired by the shipper in the direction of securing rates, advantageous packing, collection of overcharges and everything that will enable the shipper to put his goods into the hands of his customer at the lowest possible cost. It will be a great saving of worry and time. Similar companies have been formed to look after taxes and assessments for firms and individuals, which so far as we know are working admirably, resulting in the saving of many dollars. We have car-tracing bureaus, concerns that tell merchants how buyers of goods at retail pay their bills, clean towel companies and what not. Everything comes to him who patiently waits for it long enough.

Recently Declared Mining Dividends.

Mercur, Utah, $25,000, Oct. 20—a total of $800,000.

E. H. SCHAEFFLE, of Murphys, Cal., is now traveling through Amador, Calaveras, Tuolumne and Mariposa counties as agent and correspondent for the MINING AND SCIENTIFIC PRESS.

New Publications.

Catalogue No. 15 of the Risdon Iron Works, Howard and Beale Sts., San Francisco, is devoted to "Gold Dredging Machinery." They have the Postlethwaite patent and the right of building those dredges; also, the new form of gold tables and riffles. The catalogue contains in its entirety a recent article on "River Dredging for Gold," written by Mr. Postlethwaite for this paper, which gives the result of his New Zealand experience in that line, and a technical description of the new $25,000 dredger he has just finished on the Yuba river, handsomely illustrated. This method of mining is financially successful in New Zealand, and experiments in the same direction in California rivers have proved fairly successful. Those desirous of learning more about this system of securing gold would do well to send to the Risdon Iron Works for the pamphlet, as, next to seeing the dredge itself, its pages furnish the best exposition of its construction.

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The Most Powerful Made!
Send for Illustrated Catalogue.
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Bankers, Importers, Exporters and Commission Merchants.
Representatives and Agents of the principal Mining Companies in the State of Sinaloa and the dependencies of the Pacific coast in the States of Durango, Chihuahua, Sonora, Lower California and Jalisco.
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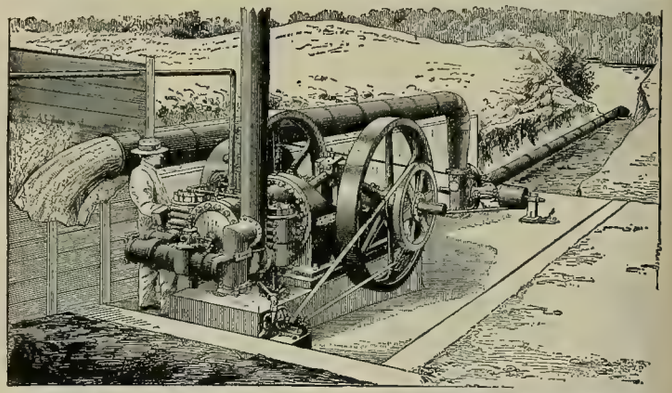

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The illustration shows the gigantic pumping plant recently built by the Hercules Gas Engine Works on the Packer Ranch, Colusa Co. 80 h. p. Hercules Engine, pumping 7200 gallons a minute, 27 feet high. Burns Gasoline or Distillate oil. Cheapest power known. Gas, Gasoline and Oil Engines, 2 to 200 h. p. Send for Catalogue. HERCULES GAS ENGINE WORKS, 217 Bay St., San Francisco.

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For Heavy Mining Pump Buckets. Will outwear any other material and give best satisfaction. Samples furnished on application. A. C. NICHOLS & CO., Leather Manufacturers and Dealers, 404 Battery St., S. F.

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IN THE PAPER READ BY THE MEN WHO BUY WHAT YOU HAVE TO SELL.

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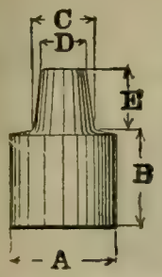

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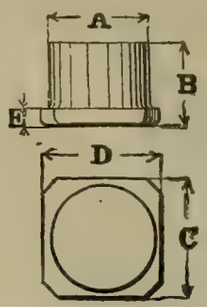
These Shoes will outlast any other make and will not chip or cup.

We have attached a sketch showing sizes; fill in the size of your Shoes and Dies, and order a trial set.

Our prices are as low as any, and the article we offer should commend it to all mine owners and mill men.



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Assaying.—Part I—Gold and Silver Ores.

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Roasting of Gold and Silver Ores and the Extraction of their Respective Metals Without Quicksilver.

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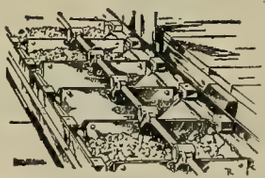

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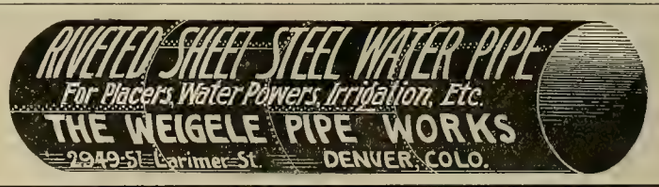
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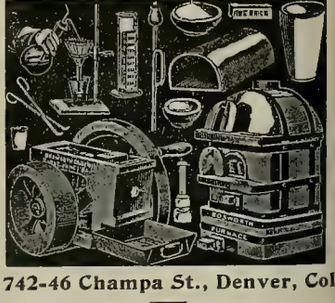

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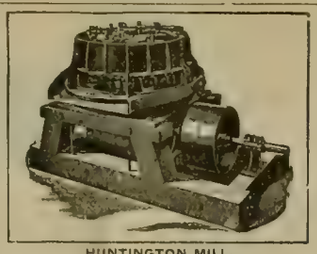

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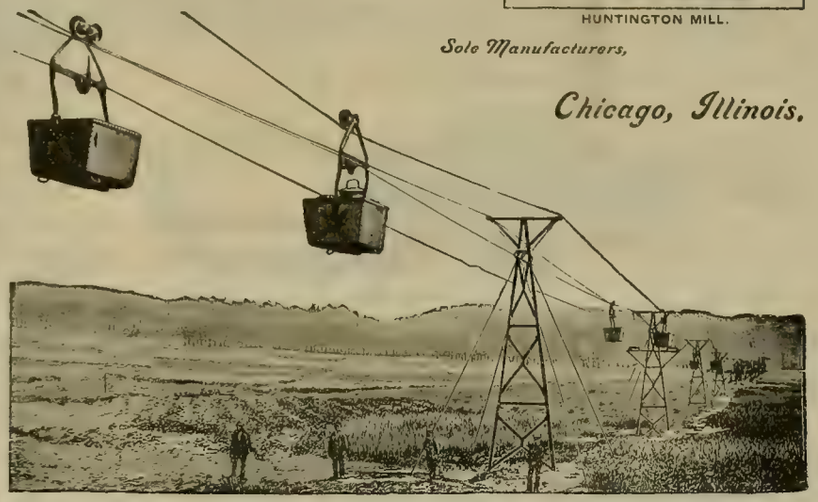

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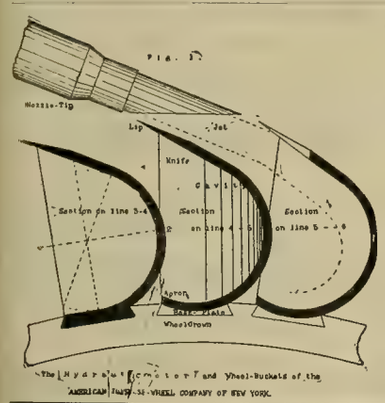

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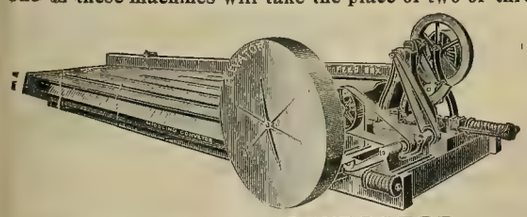

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FOR WEEK ENDING OCTOBER 5, 1897.

591,264.—STEEL TRAP—Abbey & McLeod, Lookout, Wash.
591,070.—VALVE—G. S. Binckley, S. F.
591,207.—LATHING—M. Carrick, S. F.
591,208.—SCAFFOLD—M. Carrick, S. F.
591,158.—BABY CARRIAGE—C. D. Chandler, Damascus, Or.
591,109.—NEST EGG—N. S. Clark, Los Angeles, Cal.
591,211.—KITE—M. A. Daberer, West Berkeley, Cal.
591,113.—FRUIT GATHERER—I. C. Drake, South Prairie, Wash.
590,971.—CLOTHES-LINE—H. C. Eakin, Dallas, Or.
591,114.—CARVING MACHINE—A. G. & H. Edmund, Seattle Wash.
591,248.—FOLDING CRATE—M. Ek, Silverton, Or.
590,974.—LUBRICATOR—R. M. Gelinas, Seattle, Wash.
591,038.—TRACE HOOK—B. A. Goodwin, Ripon, Cal.
591,216.—POISON DISTRIBUTOR—M. L. Griffin, Priest Valley, Cal.
591,099.—INVALID'S SUPPORT—W. Harbaugh, Alameda, Cal.
590,987.—MOWING MACHINE—J. S. Howk, Reno, Nev.
591,101.—WINDMILL—H. A. Hyne, S. F.
591,356.—HINGED WINDOW SASH—W. McCall, S. F.
591,119.—AMALGAMATOR—J. P. Schmitz, S. F.
591,200.—SAFE LOCK—A. Stevenson, Ellensburg, Wash.

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Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

LATHING AND FINISHING FOR BUILDINGS.—Martin Carrick, San Francisco, Cal. No. 591,207. Dated Oct. 5, 1897. This invention relates to improvements in lathing and finishing buildings. The object is to provide for the construction of complete walls, ceilings and partitions in which a space is provided for deadening, means for protecting the plaster from water and making the construction vermin-proof. The lathing is made in sections or sheets preferably of sheet steel, or other suitable metal stamped by dies with slots or channels and intermediate parallel bars so as to form a key or lock to hold the plaster in place. The sheets are so arranged as to overlap and break joints and also be supported out of contact with the surface upon which they are nailed and the construction is such that they may be bent to fit the angles or curves of cornices and to fit about posts or pillars where the plaster is to be applied, and in any position where it is desirable to use them.

ADJUSTABLE SCAFFOLD.—Martin Carrick, San Francisco, Cal. No. 591,208. Dated Oct. 5, 1897. This invention relates to a scaffolding which is especially designed for the use of plasterers, wall artists and decorators where it is necessary to have the scaffolding in rooms, halls or other structures. The scaffolding consists of vertical hollow posts with other posts telescoping therein, holes made in each of them to coincide and bolts by which they are united together, transverse bridge bars extensible horizontally and united to the vertical posts by brace rods and in conjunction with these are other brace rods which rest upon the floor and serve to retain the posts in an upright position. This apparatus can be fitted to any height or width of room, moved from point to point without being taken down while within the room and finally reduced to a very small compass for the purpose of transferring from one room to another, or one floor to another.

SLIDING-HINGED WINDOW SASH.—Wm. McCall, San Francisco, Cal. No. 591,356. Dated Oct. 5, 1897. This invention relates to an improvement in windows and their sashes. It consists essentially in the combination with the sashes of independent vertical slides movable in guides in the casing having window weights connected with them, a novel means for locking the sashes to the sliding portions or to disengage them from the sashes and simultaneously lock the slides to the casing, and hinges upon the opposite edges by which the sashes may be opened inwardly for the purpose. When thus opened the sliding portions are locked by suitable mechanism so as to prevent their being thrown up by the action of the weight which is attached to them.

POISON DISTRIBUTER FOR FIELD USE.—M. L. Griffin, Priest Valley, Cal. No. 591,216. Dated Oct. 5, 1897. This invention relates to a device which is especially useful for distributing and placing poison for the extermination of gophers, moles, ground squirrels and other vermin which burrow in the ground. It consists essentially of a containing case having a contracted roller end, a discharge spout connecting with and extending downwardly from one side, an intermediate channel having openings out of line with each other communicating respectively with the discharge spout and with the containing case, a slide movable in the intermediate channel having an independent slidible block forming a chamber between itself and the lower end of the main slide, a screw-threaded rod extending through the top of the main slide having a swiveled head in the lower end turning loosely in the sliding block so that the latter may be moved to increase or diminish the size of the chamber by means of a spring-pressed foot-piece, the slide would be moved upwardly when pressure is brought upon the foot-piece by resting it upon the ground, and this brings the movable slide into line to admit the poisoned grain from the containing receptacle, and when the pressure is relieved the slide is returned by the spring and the grain which was delivered into the chamber is transferred to the discharge passage. The device is adapted to be carried about by means of a handle so that a person riding on horseback can travel over the ground and introduce the poisoned grain into the holes of the vermin without dismounting.

KITE.—Max A. Daberer, West Berkeley, Cal. No. 591,211. Dated Oct. 5, 1897. This invention relates to improvements in the construction of hollow or box kites. It consists in the novel arrangement of triangularly disposed rods or frames having a covering material, these coverings extending in sections at the top and bottom, and in conjunction with this device may be used propellers. Wings are fixed upon the sides of the kite which may be turned so as to steady the kite in its flight

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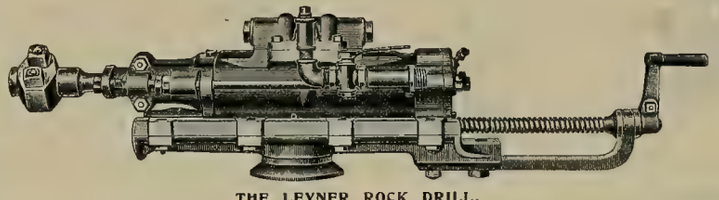

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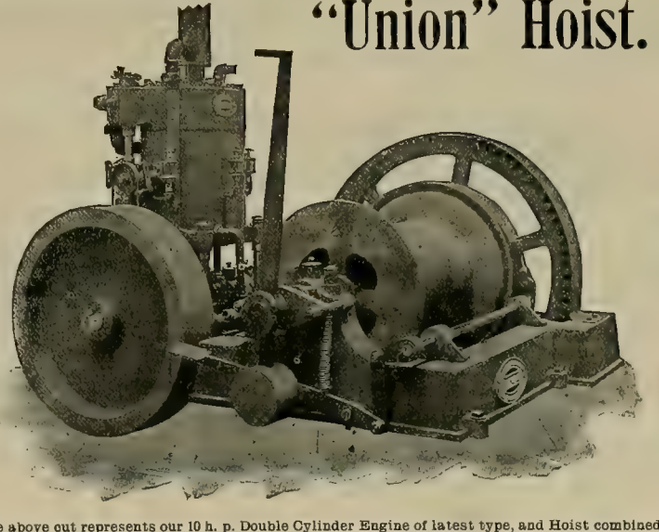

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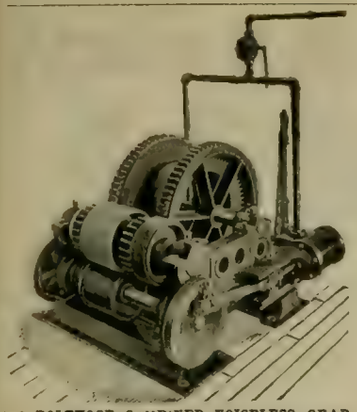

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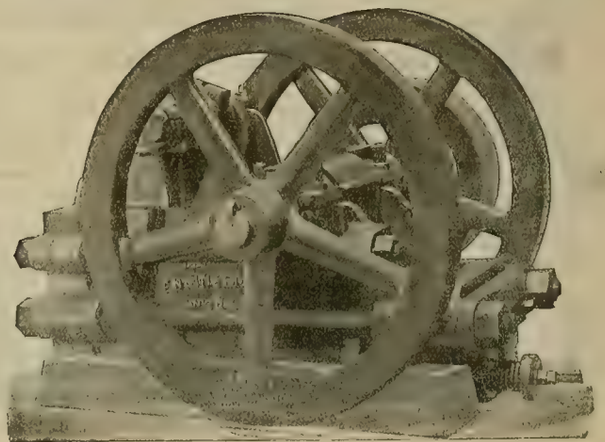

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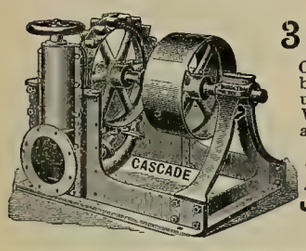

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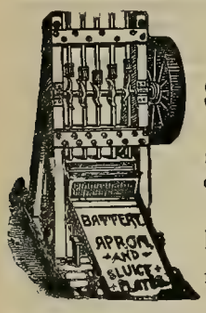

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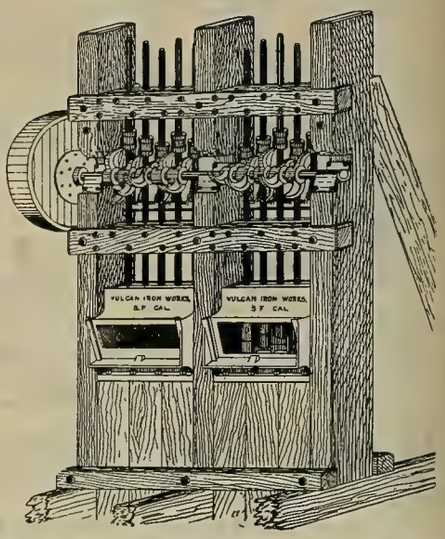

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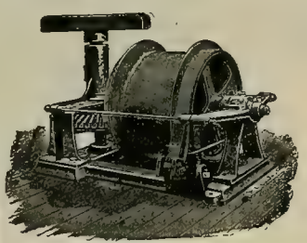

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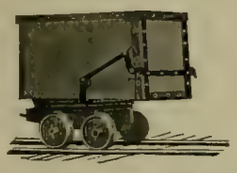

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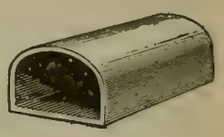

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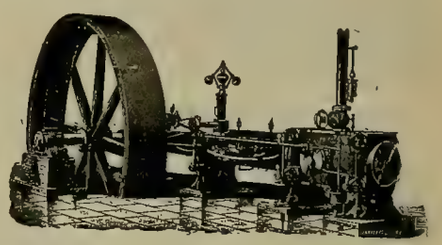

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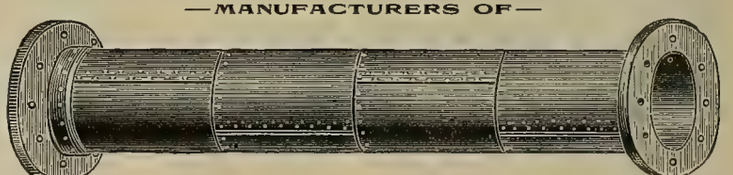

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Market Reports.

The Markets.

SAN FRANCISCO, Oct. 14, 1897.

Business has been quieter, yet the volume of goods going out is in excess of the corresponding time last year. Then the feeling was largely pessimistic but now it is optimistic with croakers few and far between. The steadiness of wheat at the higher prices and better average prices obtained for all kinds of farm, dairy and orchard products and also for live stock are calculated to promote a feeling that 1898 will be the most prosperous year seen for over a half decade. To this must be added also the almost certainty that gold mining will forge ahead and work into a good-sized boom. The Klondike craze this fall with confirmed reports of the richness of many mining streams have had their effect in centering investors at home and abroad on the vast mineral wealth of this coast. They are keenly alive to investments calculated to pay a good percentage on the money invested and for such mines they stand ready to pay well for. It is stated that several experts are looking up such properties in California and neighboring States.

The money market continues to rule in favor of borrowers. Deposits are quite heavy, which, in the absence of speculation outside of wheat, goes far to show that business is based on a legitimate basis and has good substantial foundation. The banks have large accumulated funds, which is witnessed in the reports made at the annual meetings of the Nevada Bank and Bank of California, each of which had over $3,000,000 in cash on hand. It is stated that considerable sums have been sent to the East where good employment was offered, but the shipments of over six million dollars in gold to this country has caused an easier tone there. If these shipments should be followed by others, then the ease would be more pronounced. What effect the higher charges for gold by the Bank of England and higher rates of discount on the continent will have is as yet uncertain, but it is reasonable to affirm that it will check, temporarily at least, large gold shipments to this country, for it may be instrumental in causing European holders of American securities to sell a large proportion, which would for a time equalize trade balance.

New York Silver Prices.

NEW YORK, Oct. 14.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	26⅛	56⅛
Saturday	26⅜	57
Monday	26⅜	56⅞
Tuesday	26⅜	57
Wednesday	26⅜	57
Thursday	26¾	57¾

	Copper.	Lead.	Iron.	Tin.
Fri.	11 10 @11 30	4 17½	10 00@12 25	13 65
Sat.	11 10 @11 25	4 20	10 00@12 25	13 65
Mon.	11 15 @11 25	4 17½	10 00@12 25	13 70
Tue.	11 10 @11 25	4 12½	10 00@12 25	13 70
Wed.	11 10 @11 25	4 10	10 00@12 25	13 75
Thur.	11 10 @11 25	4 10	10 00@12 25	13 75

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	15c Prem
New York Telegraphic Transfer	17½c Prem
London Bankers' 60 days	$4.83
London Merchants	$4.81
London Sight Bankers	$4.85
Refined Silver, per oz. 1000 fine	57¾
Mexican Dollars nominal	46

The British steamer Doric, hence October 12th, took out the following: For China, Mexican dollars, $216,593; silver bullion, $158,500; for Penang, Mexican dollars, $50,000.

SILVER.—The market strengthened the past week, making a sharp jump to-day. Bankers here say that it is unnatural, and therefore it is without stability. While this may be the case, yet it goes far to prove that the market is very sensitive, and an increase in the demand is responded to by higher prices. This ought to suggest the possibility that the world's available spot supply is largely reduced. There can be no question that within the past two years larger quantities have gone into arts and for general purposes than ever before within the like period of time. Aside from that, many countries have been purchasing quietly so as to replace worn coin with new and also increase the circulation, which was too small under increased business.

MEXICAN DOLLARS.—The market is stronger to-day with 46 cents obtainable for round lots, but there is no telling what the price will be to-morrow, it being governed entirely by that of silver and exchange.

COPPER.—The market has held fairly steady with us, but it is slightly easier at the East. The weaker tone there is due to a falling off in the European demand and no increase in the demand in this country, with the output from the mines showing no falling off in production.

Our market is quoted as follows:

Ingot casting, jobbing	13 @—
Ingot " wholesale	12½@—
Sheet copper	— @16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½

QUICKSILVER.—The market is steady. Shipments by water the past week were 100 flasks to Mexico and 4 flasks to Victoria, B. C.

Our market is quoted at $38 for domestic consumption.

LEAD.—The market is weak and while quotations remain unchanged lower prices can be had. The market at the East has eased off some.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	5 00	@	5 25
Sheet	6 25	@	6 50
Pipe	5 50	@	6 00

TIN.—Our market is unchanged. We are informed that there are inquiries from canners on the market for next season's supplies of plate. The East reports pig stronger in sympathy with improved prices abroad.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

SHOT.—The market is easy.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 40
Drop, B and larger sizes, " "	1 65
Buck, Balls and Chilled, do, " "	1 65

POWDER.—For mining the demand is very large. Quotations are unchanged.

COAL.—The market is lightly supplied with Seattle. The exodus of miners to Alaska has lessened the output on this coast owing to mines running light-handed.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$8 00@— —
Greta	6 00@ 6 50
Nanaimo	6 50@— —
Gilman	5 50@— —
Seattle	5 50@— —
Coos Bay	—@ 4 75
Cannel	9 50@— —
Egg, hard	12 00@— —
Wallsend	6 75@— —

TO ARRIVE—CARGO LOTS.

Australian	5 75
Liverpool Steam	6 75
Scotch Splint	7 50
Cardiff	7 50
Lehigh Lump	12 00
Cumberland, bulk	10 50
Egg, hard	9 50
West Hartley	6 75

COKE.—The market is quoted as follows:

Gas Companies'	— — — —
English, to load	— — @ — —
" spot, in bulk	10 00 @ — —
" in sacks	11 00 @ 12 00
Cumberland	— — @ — —

IRON.—The market is firm for both foreign and American.

AMERICAN.

	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

NAILS.—The market is strong with a good demand ruling.

upwards.

Wire, carloads, basis per keg	—
" jobbing, " "	$2 45
Cut, carloads, " "	—
" jobbing, " "	2 35

ANTIMONY.—The market is firm.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 8c for Cookson's, 7½c for Hallett's and 7c for Japanese.

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4½

PLATINUM.—The market is steady.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is firm.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

Chemicals.

The demand is almost entirely of jobbing, there being a light movement from first hands. A thorough canvass of the market does not show any change in quotations. We are informed that there does not seem to be any disposition to advance prices.

SULPHURIC ACID.—The demand is fair.

We quote in a jobbing way at 1½c per lb for 66%.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported easy from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is steady.

We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is steady.

Our market is quoted in a jobbing way at $1.40 a pound.

BONEASH.—The demand is good for export.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is firm.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firm at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is steady at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—The market is quiet at 2½c a pound from stores.

NITRATE OF SODA.—The market is steady.

Our market is quoted from store at 4c for 95%.

Mining Share Market.

SAN FRANCISCO, Oct. 14, 1897.

The market has been spasmodically active, with the center of attraction for traders still in Crown Point and Belcher, with Yellow Jacket a fair second. The moves in Belcher are rather mysterious, and to an outsider are an unsolved riddle. After selling up to $2.15 it sold down to as low a figure as 58 cents. The advance was not warranted by any showing in the mine and can only be accounted for on the supposition that those shorts who frightened on street points when the shares were $1.50 that the Jones crowd were buying after the largest shorts filled. The Jones crowd neglected to sustain the prices, but let them off with a rush, which prevented a line of shorts being put out and the street bulls from getting out. The Belcher shares have for several days been fluctuating between 60 and 75 cents, Crown Point between 70 and 85 cents, and Yellow Jacket between 70 and 80 cents. These moves make them attractive to boardroom traders, who put them out on the small ups and fill on the small downs. The rest of the market is not affected much by the erratic moves of the above three. Chollar, Potosi and Sierra Nevada show an undertone of considerable strength. It looks as if the shares are being absorbed, but whether they will go off after the present buyers get enough remains to be seen. As a rule lower prices generally follow a steady absorption before an upmove is made. In Crown Point they ought to be ready to run for the ore, while in Belcher they will be ready to start work for it some time next week. This, no doubt, causes the shares of these two mines to be quite sensitive. The belief prevails with well informed miners that they will not report finding enough ore to warrant any advance in the shares on a legitimate business showing, but what will be done on a gamble they are not expressing an opinion. Reports are current about work in Yellow Jacket, but we fail to have them verified, as yet. In about every mine on the Comstock lode and also on the Brunswick lode active and important work is being done, which is calculated to make the shares a gamble so long as it continues.

The news from the Comstock mines continues to report active work, but with no increase in the force of men at work. At several points work is nearing completion which will admit of active exploiting and to a much better advantage. This work is causing the older and more experienced miners to watch the progress with greater interest than usual, but, so far as we are able to learn, there is not one that expects anything big to be developed this year; but there may be enough to cause outsiders to hold shares, by which mine managers can collect assessments, so as to lay the foundation for more active work after the winter months. In Utah they are still running in a northwesterly direction. The formation is favorable. They have started a tunnel in Sierra Nevada to tap the ore on the Layton tunnel at a lower depth. This work will be watched with interest. No change is reported in the work on the 900-foot level. From Union nothing new comes to hand. They are still running an east crossdrift on the 1000-foot level in Mexican. West crossdrift No. 3 in Ophir on the 1000-foot level was at last advices in better formation. It is in over 500 feet. No change is reported in the work on the Central tunnel level. They have shipped to the Mexican mill for crushing 252 tons of ore, assaying over $22 to the ton. They are still drifting north in Andes on the 175-foot level. In Con. Virginia work is confined to the 1550-foot, 1650-foot and 1750-foot levels. Nothing new from Best & Belcher. They will commence extracting 1000 tons low grade ore in Gould & Curry next Wednesday. This ore is for testing to see if it will justify extracting. The work in Savage is practically the same as has been reported for several weeks past. No work in Hale & Norcross. They will soon be through with the repairs in Chollar. In Potosi they are in position for the better extraction of ore on the upper levels. Last week forty tons were extracted, giving nearly $14 in gold and over 13 ounces in silver. In Alpha they have started a northeast drift from the top of an upraise from the 500 foot level. No change is reported in the work in Con. Imperial, Confidence, Overman, Seg. Belcher, Kentuck, Alta or Justice. The work in Crown Point and Belcher is noted in the introductory above.

From the Brunswick lode our advices state they have commenced on the 300-foot level of Gould & Curry an east crossdrift on the Best & Belcher boundary line. They are working on the 600-foot level. They are extracting less ore from Chollar. Active work is being done on the 500-foot and 600-foot levels. On the former they are running south, while on the 600-foot level several crossdrifts are being run. In Occidental they are running two new crossdrifts on the 650-foot level. The work in this mine seems to be prosecuted with energy on the 550-foot, 650-foot and 750-foot levels.

The market opened barely steady this morning with the north end and middle shares under support. After call a raid was made on Crown Point, Belcher and Yellow Jacket so as to drive holders to sell shares mostly, desired owing to an improvement in the 600-foot level in the joint Con. Virginia, Best & Belcher and Gould & Curry workings on the Brunswick. This is considered quite important for experienced miners have always claimed good results at that end. The formation is improving in the Confidence, Challenge and Con. Imperial west crossdrift. It looks as if they are near ore. Advices from reliable sources are very encouraging to-day from several mines. The market was steadier this afternoon. Strong parties have been buying several days.

The following illustrates the changes of the week:

Mines.	Oct. 7.	Oct. 14.
Alpha	$ 21	
Alta Consolidated	23	$ 17
Andes	30	33
Belcher	1 00	70
Best & Belcher	75	63
Bodie		
Bullion	14	11
Challenge	54	53
Chollar	71	73
Confidence		1 40
Consolidated California and Virginia	1 55	1 50
Consolidated New York	06	
Crown Point	94	81
Exchequer	06	
Gould & Curry	63	51
Hale & Norcross		1 15
Justice	34	38
Mexican	58	54
Ophir	1 16	1 05
Overman	23	19
Potosi	39	61
Savage	58	52
Sierra Nevada	1 20	1 15
Union	56	52
Utah	25	25
Yellow Jacket	77	73

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Alta S M Co, Nev	57	10c	Sept 3.	Oct 6. Oct 27.	J E Jacobus, 309 Montgomery
Andes S M Co, Nev	44	10c	Sept 1.	Oct 4. Oct 25.	J W Twiggs, 309 Montgomery
Belcher S M Co, Nev	56	20c	Sept 18.	Oct 21. Nov 11.	C L Perkins, Mills Building
Caledonia S M Co, Nev	47	10c	Oct 6.	Nov 10. Dec 2.	A S Groth, 414 California
Chollar M Co, Nev	44	25c	Sept 1.	Oct 7. Oct 28.	C E Elliott, 309 Montgomery
Confidence S M Co, Nev	29	30c	Sept 10.	Oct 15. Nov 5	A S Groth, 414 California
Con Imp M Co, Nev	39	1c	Sept 27.	Nov 2. Nov 23.	C L McCoy, Mills Building
Eureka Con D M Co, Cal	10	3c	Sept 14.	Oct 16. Nov 6.	D M Kent, 330 Pine
Gold Ridge Con M & M Co, Cal	5	4c	Aug 3.	Sept 18. Oct 28.	H Sylvester, 43 Sixth
Hale & Norcross S M Co, Nev	112	10c	Aug 18.	Sept 22. Oct 28.	R U Collins, 331 Pine
Potosi M Co, Nev	48	25c	Sept 8.	Oct 12. Nov 4.	C E Elliott, 309 Montgomery
Red Cap M Co, Cal	1	$9	Aug 25.	Oct 1. Oct 23.	E deK Townsend, 125 Beale
Savage M Co, Nev	93	20c	Sept 2.	Oct 5. Oct 25.	E B Holmes, 309 Montgomery
Silver Hill M Co, Nev	35	5c	Sept 7.	Oct 12. Nov 5.	D C Bates, 309 Montgomery
Thorpe M Co, Cal	8	2½c	Sept 28.	Nov 6. Nov 29.	A F Frey, Phelan Building

San Francisco Stock Board Sales.

SAN FRANCISCO, Oct. 14, 1897.

9:30 A. M. SESSION.

300 Alta	17	300 Mexican	54
300 Andes	32	400 Ophir	1 05
800 Belcher	70	100 Overman	19
600 Best & Belcher	63	100 Potosi	61
300 Bullion	11	500 Savage	52
100 Challenge	53	200 Seg Belcher	15
100 Chollar	73	300 Sierra Nevada	1 15
360 Con Cal & Va	1 50	100 St. Louis	18
100 Con Imperial	03	50 Union	52
400 Crown Point	81	300 Utah	25
200 Gould & Curry	51	400 Yellow Jacket	73
500 Justice	32		

SECOND SESSION—2:30 P. M.

550 Ophir	1 05	400 Yellow Jacket	69
500 Mexican	54	400 Belcher	65
500 Gould & Curry	51	200 Confidence	1 40
400 Best & Belcher	63	500 Sierra Nevada	1 15
750 Con Cal & Va	1 45	800 Justice	38
100 Savage	50	500 Union	52
200 Chollar	70	250 Challenge	48
1200 Potosi	58	200 Andes	33
100 H. & N	1 15	300 Overman	18
800 Crown Point	78		

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Rainfall and Temperature.

The following data for the week ending 5 A. M., October 13, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

CALIFORNIA STATIONS.	Total Rainfall for the Week	Total Seasonal Rainfall to Date.	Total Seasonal Rainfall Last Year to Same Date.	Average Seasonal Rainfall to Date.	Minimum Temperature for the Week.	Maximum Temperature for the Week.
Eureka	12	1 39	2 62	2 47	48	64
Red Bluff	00	.23	1 17	1 25	52	90
Sacramento	00	.17	.32	.60	49	86
San Francisco	.01	.11	.66	.80	51	65
Fresno	00	.54	.28	.55	50	86
San Luis Obispo	00	.06	.24	...	48	74
Los Angeles	00	.26	.03	.46	52	76
San Diego	T	.05	.13	.32	58	68
Yuma	00	.81	1 06	.78	56	100

NOTICE OF SPECIAL MEETING
OF THE
STOCKHOLDERS OF THE SUNOL LAND AND IMPROVEMENT COMPANY.

Notice is Hereby Given that a Special Meeting of the Stockholders of the Sunol Land and Improvement Company, a Corporation, is hereby called and will be held at the office of the Company, at 240 Second St., in the City and County of San Francisco, California, at the hour of 4 o'clock P. M. of the 26th day of October, 1897. The object of such meeting is the election of a Board of Directors of said Corporation, to serve and act as such until the next annual meeting of the Stockholders of said Company, or until their successors are duly elected and qualified. The said meeting has been called by the order of Stockholders holding more than one-half of the votes of the Corporation, to-wit: W. J. Wiley, Thos. Alton, C. B. Stone.

Dated San Francisco, California, October 8th, A. D. 1897. C. B. STONE, Secretary.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from San Altyre, in the Emerton mine, near Gibsonville, Sierra Co., to deposit tailings in Slate creek; and in the Doherty mine, near Table Rock, Sierra Co., to deposit tailings in Slate creek; from Victor Montre, in the Grizzly Canyon mine, near Pike City, Sierra Co., to deposit tailings in Grizzly canyon; from B. F. Atkinson, in the Homestake mine, No. 2, near Sierra City, Sierra Co., to deposit tailings in the impounding basin of the Homestake mine, and from C. R. Scott, et als., in the Gold Nugget mine, near Gibsonville, Sierra Co., to deposit tailings in Canon creek, gives notice that a meeting will be held at room 59, Flood building, San Francisco, Cal., on October 25, 1897, at 1:30 P. M.

PATENTS

Our U. S. and Foreign Patent Agency presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American reports, with full copies of U. S. Patents since 1872. All worthy inventions patented through DEWEY, STRONG & CO.'s Patent Agency will have the benefit of a description in the *Mining and Scientific Press*. We transact every branch of patent business, and obtain patents in all countries which grant protection to inventors. The large majority of U. S. and foreign patents issued to inventors on the Pacific Coast have been obtained through our agency. We can give the best and *most reliable* advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and circulars free.

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The work, like Mr. Aaron's former publications ("Testing and Working Silver Ores," "Leaching Gold and Silver Ores,") that have been "successfully popular," is written in a condensed form, which renders his information more readily available than that of more wordy writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents.—Perface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of cupellation; Weighing of Bead; Parting; Calculating the Assay; Assay of Ores Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests of Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

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DELINQUENT SALE NOTICE.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 5) levied on the 3rd day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
John A. Heninger	16	250	10 00
Nils Johnson	120	100	4 00
Nils Johnson	121	100	4 00
Hattie E. Gray	124	100	4 00
Wm. Westhoff	144	250	10 00
A. O. Lindstrom	148	250	10 00
Wm. Westhoff	177	500	20 00
Richard Phelan	188	5	20
Wm. Westhoff	200	100	4 00
Wm. H. Lillie	202	10,500	420 00
Mark Strouse	208	5	20
P. E. Robertson	215	250	10 00
Sarah Spalding	216	100	4 00
Abe MacCreadie	220	500	20 00
Alfred H. Hogg	221	300	12 00
Abe MacCreadie	222	250	10 00
J. W. Brown	231	4,099	163 96
C. D. MacNeill	236	200	8 00
Paul Muller	239	50	2 00
Paul Muller	240	100	4 00
Paul Muller	242	1,000	40 00
Chr. W. Heyer	243	755	30 20
Chr. W. Heyer	246	606	24 24
Abe MacCreadie	247	200	8 00
Wm. Westhoff	250	200	8 00
Mary Ann Robertson	251	250	10 00
Mary Ann Robertson	252	250	10 00
R. H. Daley	268	1,000	40 00
C. M. Howe	272	1,000	40 00
C. M. Howe	274	500	20 00
R. H. Daley	275	1,500	60 00
Francis Brady	277	700	28 00
R. H. Daley	278	100	4 00
Dr. H. Sylvester	280	51,278	1,971 12
(2,000 shares of this cert. have been paid by H. Sylvester, being part of his stock.)			
L. V. Merle	286	10	40
J. T. M. Kelly	289	500	20 00
R. H. Daley	290	100	4 00
R. H. Daley	294	750	30 00
R. H. Daley	295	185	7 40
E. Swenson	296	1,750	70 00
Mark Strouse	297	5,000	200 00
Mark Weil	299	750	30 00
C. W. Heyer	300	400	16 00
Mark Strouse	301	100	4 00
Geo. Day	302	1,000	40 00
Dr. H. Sylvester, Trustee	305	1,105	44 20
Dr. H. Sylvester, Trustee	306	5 000	200 00
R. H. Daley	307	250	10 00
R. H. Daley	308	240	9 60
F. Heard	309	125	5 00
Mark Weil	310	125	5 00

And in accordance with law, and an order from the Board of Directors, made on the 3rd day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Rooms 12 and 13, No. 43 Sixth St., San Francisco, California, on SATURDAY, the 9th day of October, 1897, at the hour of 12 o'clock M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

The day of sale of the above delinquent stock has been postponed by order of the Board of Directors to THURSDAY, October 28th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

DELINQUENT SALE NOTICE.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 25th day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
Harvey M. Binckley	2	1	9 00
Alice E. Binckley	20	4	36 00
Alice E. Binckley	23	20	180 00
Alice E. Binckley	24	20	180 00
Alice E. Binckley	25	20	180 00
Alice E. Binckley	26	20	180 00
F. de Kay Townsend	14	1	9 00
F. de Kay Townsend	29	2	18 00
Caroline S. Townsend	18	20	180 00

And in accordance with law, and an order from the Board of Directors, made on the 25th day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, 125 Beale Street, San Francisco, California, on SATURDAY, the 23rd day of October, 1897, at the hour of 3 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

H. H. MARTIN, Secretary.

Office—125 Beale Street, San Francisco, California.

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Assessment Notices.

FAIRFAX VILLA COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fairfax, Marin County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 10th day of September, 1897, an assessment (No. 7) of Fifty Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 56, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of October, 1897, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on MONDAY, the 8th day of November, 1897, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

J. STADTFELD, JR., Secretary.

Office—Room 56, No. 309 Montgomery street, San Francisco, California.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 28th day of September, 1897, an assessment (No. 8) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, Room 44 Phelan Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of November, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 29th day of November, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

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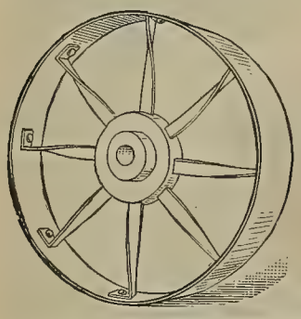

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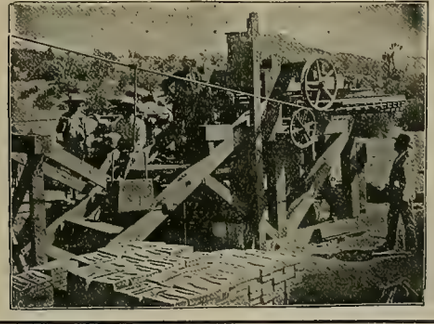

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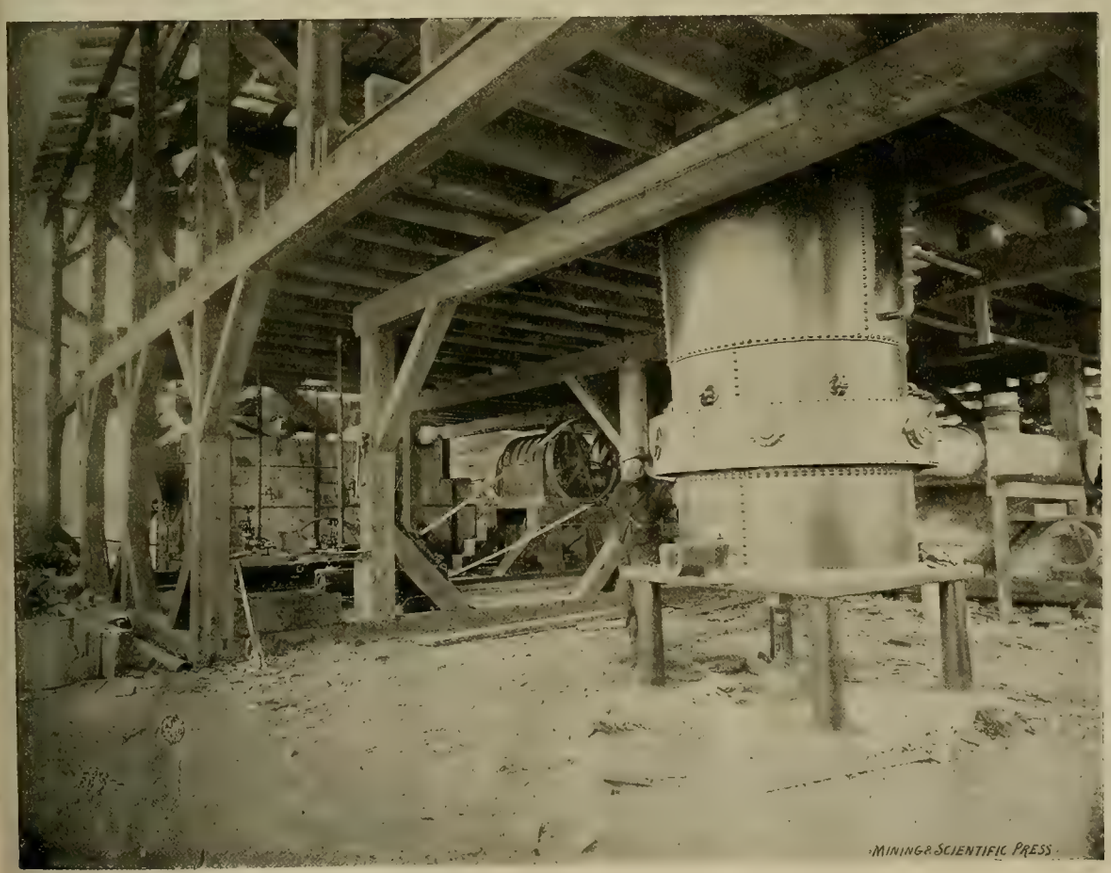
No. 1946.—VOLUME LXXV. Number 17. SAN FRANCISCO, SATURDAY, OCTOBER 23, 1897. THREE DOLLARS PER ANNUM Single Copies, Ten Cents.

A Mountain Forest and Sawmill.

The forests of Fresno county, Cal., comprising nearly four thousand square miles, covered with redwood, sugar pine, yellow pine, fir, cedar and oak, are of great commercial value. Two sawmills are in the timber belt of the Sierra Nevada mountains, one on Kings river and the other on Pine Ridge, near the San Joaquin. Flumes sixty miles in length carry the manufactured lumber, posts, wood, etc., from the sawmills in the mountains out upon the plains. One of these flumes ends at Sanger and the other at Clovis. At both of these points doors, sash, blinds, boxes and finished mill work of every description are turned out. One of the sawmills on Kings river daily cuts a quarter million feet of lumber per day; the combined output of the two companies is over forty million feet of lumber annually, besides sash, doors, shingles, lath, posts, etc. The lumber companies at these two places employ nearly one thousand persons. There are also several small mills where from five million to ten million feet of lumber are manufactured annually. The owners of the mills now in operation say they have timber enough to run from twenty to forty years, and they own but a very small part of the milling timber of Fresno county, which illustrates the great lumber supply of this one California county. The engraving on this page is furnished through the courtesy of the *Interior*, Fresno, Cal.

SUGAR PINE FOREST AND SAWMILL IN THE SIERRA NEVADA, FRESNO COUNTY.



BOSTON-NEVADA COPPER M. CO.'S SMELTER, YERINGTON, NEV.

A Smelter at Yerington, Nev.

The accompanying engraving from special photograph for this paper depicts a little smelter just completed at Yerington, Nevada, for the Boston-Nevada Copper M. Co. to treat the copper ore of Mason Valley. The furnace is a 42-inch water jacket, built by the Union Iron Works of San Francisco. Supt. O. B. Hardy writes: "The cost of construction, including cost of all machinery, boarding house, bunk house, assay office and blacksmith house, is about $20,000. I am turning out per twenty-four hours about six tons of black copper, containing 70% copper and $30 gold. I have blocked out in mine, ready to run through smelter, about 30,000 tons of ore."

At the University of California, Berkeley, Cal., last week, Prof. O'Neil of the Department of Chemistry, in the course of a lecture on "The Transmutation of Metals," declared that the idea of making gold from silver and other metals is not an unreasonable one. The professor believes that the old alchemists who searched for a means of manufacturing gold did not waste their time, as the science of chemistry is based upon results they produced. He says "there is ground for thinking that gold can be made out of silver or other metals," and that it is not "scientifically improbable."

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TO THE PUBLIC.

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San Francisco, October 23, 1897.

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California Miners' Association Convention.

The Sixth Annual Convention of the California State Miners' Association was a very important one to the mining interests of the State and coast. Contrary to prior belief in some quarters as to results, it was the largest, most interesting, most enthusiastic, most representative of any of the annual conventions, and transacted at least as much business as any one of the preceding five annual meetings. The wisdom of its deliberations was manifested throughout.

The Association wisely retains its old president, and refuses to commit itself to any wide departures from the policy and purpose that caused its creation. It recognizes the importance of county organization, the necessity for financial aid and personal individual interest on the part of these county organizations; and it is to be hoped that in every mining county in California the co-operative work of the Association will receive hearty and cordial support. The red life blood of actual individual interest is needed, personal contact is required, and the feeling must be made universal throughout the State that the interest, well being and individual prosperity of every miner, mine owner and mine worker in California is wrapped up in the California State Miners' Association.

As usual the Association was honored by the presence of many distinguished citizens of the State, including United States officials, who spoke encouragingly on many topics of immediate interest to the Association. The subject of revision of Federal mining laws—which promised to assume considerable importance—was prominently brought to the front at the start, but was deemed too large a field to exploit while other subjects, on which the Association showed more unanimity and which were deemed to be of more local importance, required discussion. The building of restraining dams, the expenditure of the $800,000 already appropriated for that purpose and river improvement, and in general the specific department of hydraulic mining, occupied the greater part of the time of the convention; and in this regard it may be said that there was less talk and more work than is customary in a convention of this nature.

The matter of local mining legislation, the mineral exhibit at the coming Paris Exposition, the mineral land bill and the creation of a Department of Mines and Mining in the National Cabinet are among the subjects that will receive attention at the hands of the special committee appointed during the year.

It is to be remembered that these annual gatherings of the California State Miners' Association are largely to hear what has been done during the year and to formulate plans for the coming twelve months. The work of the Association is not done in the convention; the actual work of the California State Miners' Association goes on day by day continuously. It is in the hands of an executive committee, composed of representative mining men from all over the State, and is also delegated to special committees which are in continuous session. These committees make their annual reports and carry on the work of the Association without a break.

The complaint on the part of some of the counties that they are not represented, is entirely their own fault. All that the miners in any county in California need do to have full representation is to organize a County Miners' Association in accordance with the rules of the California State Miners' Association, and they will receive full recognition in the executive committee and all other committees of the Association. They cannot help others without helping themselves, and in no way can more be done for the mining industries of the State of California than in being in active accord with the California State Miners' Association. It knows no county limits, it has no interests to serve, no man in it works for pay. Everyone that works with the Association is actuated by but one motive, and that is, to aid the industry without hope of personal reward, but with the ambition to do what he can, honestly and sincerely, to forward the just claims of the miners of the State and to enable them to work their property without injury to the interests or property of anyone else.

The Sixth Annual Convention of the California State Miners' Association met in Odd Fellows Hall, in San Francisco, at 10 A. M., Monday, October 18th, Hon. Jacob H. Neff of Placer county presiding. The Committee on Credentials reported the following delegates entitled to seats:

Alameda County.—E. H. Benjamin, T. W. Jeffress, L. Bridges, A. W. Bishop, A. H. Rickett, J. B. Eldridge, J. L. Lyon, N. T. Farrar, John Daggett, Thomas Mein, K. A. Hughson, J. S. White, J. R. Scupham, M. Webber, J. T. Bradly, S. B. Christy, W. R. Thomas, C. B. Rutherford, R. W. Snow, F. A. Leach, C. E. Gillett.

Amador County.—R. C. Rush, J. F. Parks, Hiram Deacon, C. R. Downs, J. E. Dye, A. McWayne, T. B. Dillon, R. Robertson, W. I. McGee, J. A. McIntire. J. B. Francis, M. J. McDonald, W. R. Thomas, C. Bradshaw, F. Frates, J. Graham, E. S. Barney, Senator E. C. Voorheis, J. B. Treadwell, Thomas D. Calkins, John R. Tregloan, A. Caminetti, Dr. Thomas Boyson, A. J. Crain, W. F. Detert, W. S. Weymouth, J. Trustcott, J. F. Davis, J. E. Barnes, D. Gutman, V. W. Gaskill, A. B. McLaughlin.

Butte County.—W. E. Duncan.

Calaveras County.—P. Eley, Richard A. Parker, W. L. Honnold, J. E. M. Lorley, H. A. Messenger, Mark B. Kerr, O. Dolling, J. H. Smith, P. L. Schuman, W. T. Robinson, W. N. Clary, Jr., J. Burt, Judge C. V. Gottschold, W. C. Howard.

El Dorado County.—D. H. Jackson, N. E. Picket, C. A. Swisler, J. C. Diamond, G. H. Burnham, G. M. Clark, J. F. Armstrong, S. J. Alden, D. B. Mason, A. Mierson, J. Smith, A. H. Ten Broeck, John Brown, W. Leadon, G. W. Raymond, J. H. Barnard, John Thiesen, Thomas Clark, J. J. Crawford, R. S. Raw, J. Richards, H. S. Morey, John Morrow, W. W. Mountain, R. V. Robertson, C. N. Weatherwax, R. Rowland, F. F. Barss, J. H. Moss, F. Adams, E. A. Stent, Louis Barrington, C. H. Dunton, Taylor Gearhurt, A. A. Woods.

Los Angeles County.—F. M. Edelstein.

Nevada County.—D. McPhetres, W. L. Mobley, C. F. Hendricks, H. Schroder, O. K. Cluidman, F. W. Banks, C. L. Miller George Fletcher, James Hoskins, W. A. H wley, S. Granger, W. F. Prisk, J. P. Shoemaker, F. Dulmaine, J. M. Lakenan, C. W. Kitts, E. H. Brown, J. Weissbein, M. J. Farrell, T. Simmons, L. L. Myers, C. F. Hegarty, C. D. Eastin, P. S. Cramm, M. Maguire, James Chisholm, P. Campbell, J. F. Kidder, E. Briggs, J. P. Melville, H. B. Diggles, W. Shelby, C. D. McLean, J. F Lang, H. Daniels, W. C Connell, I. W. Hayes, C. Brockington, T. W. Carson, R. Stenson, Thomas Dunkley, George Fletcher, R. Thomas, A. D. Bigelow, C. O. Jepsen, J. C. Goodwin, E. T. Worthley, J. S. McBride, A. D. Foote, George Mainhart, H. L. Bush, James Tyrrell, E. W. Donnelly, E. C. Morgan, J. P. Zipi, M. Sp oul, C. H. Mitchell, W. Bray, John Greaney, John Eddy, James Bennallack, J. M. Thomas, W. J. Mitchell, Henry Fuchs, Fred Zeitler, G. C. Gaylord, F. E. Wadsworth, W. W. Waggoner, W. W. Mather, William Floyd, J. J. Jackson, F. Page, William Mather, Dahl Nivens, W. A. Dennis, Gus Kartschope, Peter Tautphaus, George E. Turner, A. Cornell, Joel Andrews, William Campbell, Louis Dorsey, W. F. Englebright, F. Searles, G. A. Nihell, R. C. Walrath, E. J. de Sabla, J. T. Morgan, Henry Lane, Charles Stepp, J. M. Buffington, W. H. Tuttle, W. H. Martin, H. F. Shockley, Joseph Fetz, N. P. Brown, J. V. Hunter, C. J. Naffzeiger, Richard White, August Guillaume, D. B. Marwick, William McKinley, F. Eilerman, J. M. Walling, E. J. Rector, S. W. Marsh, George Hethersol, A. Isoard, D. McFall, J. S. Gregory.

Placer County.—L. Balliet, J. L. Gould, W. Rablin, J. Nicholls, L. Tetzlaff, H. H. Hudepohl, E. A. Moody, C. H. Carr, J. Stewart, J. H. Neff, H. Lobner, H. Disque, Ivan H. Parker, Amos Stevens, William Rule, George McAulay, F. H. Green.

Plumas County.—J. Thomes, B. C. Lorich, A. D. White, C. R. Thompson, W. J. Edwards, W. W. Kellogg, J. C. Coburn, S. R. Hall, S. W. Cheyney, William Metcalf, Dixon Bradshaw, William Schuld, Dr. F. N. Folsom, Arthur Price, C. D Hazard, James Jones, Thomas Price, John Nevills, P. Lawrenzi, John Roberts, C. E. McLaughlin, J. H. Frisseli.

Sierra County.—J. M. Harper, Charles P. Gale, Paul Meroux, H. W. Orear, H. H. Squire, John Scott, S. F. Purdy, J. W. Orear, Frank R. Wehe, Tirey L. Ford, Ed F. Wehe, Lewis F. Byington, William H. Byington, Louis Rosenfeld, Mason W. Mather, J. O. Jones, E. A. Meily, William L. Cole, W. F. Page, James McGregor, John Myers, A. B. Moulder, Julian Sonntag, Claud T. Hamilton, Andrew Carrigan, G. M. Sayles, I. Copeland, Frank L. Cole, Stanley A. Smith, J. A. Vaughn, D. T. Cole, J. F. Cowdery, M. H. Mead, Henry Kingdon, J. Westall, H. Spaulding Sr., W. H. Esbacher, J. K. Wiggins, John Costa, P. Carbury, William H. Spaulding, William Cox, Thomas H. Crossman, S. G. Whitney, I. T. Mooney, George D. Gray, Timothy Donohue, F. A. Gourley, W. S. George, A. S. Nichols, R. P. Mott, Giles H. Gray, George W. Fox, Thomas Kirkpatrick, C. C. McIver, James S. Wiggins.

Shasta County.—E. M. Dixon, J. C. Hopper, J. M. Graves.

Santa Clara County.—Charles C. Derby, W. E. Carson, Richard Harry, R. J. Peace, Thomas Wasley, Ellard W. Carsen, R. B. Bulmore, R. Harry, R. R. Bulmore, John Trevorrew, A. C. Innis.

Siskiyou County.—John Daggett, Major Andrew G. Myers, Martin C. Beems, Robert J. Nixon, George H. Vogan.

San Francisco County.—A. J. Ralston, T. J. Parsons, Julian Sonntag, W. C. Ralston, S. W. Backus, Edward A. Belcher, S. K. Thornton, Andrew Carrigan, Hugh Craig, John Coleman, C. W. Cross, H. T. Lally, J. O'B. Gunn, Col. George Stone, J. M. Wright, B. T. Lacey, Charles Watt, D. B. Pike, I. S. Foreman, C. Barbour, P. George Gow, R. R. Grayson, S. J. Hendy, Robert McMurray, J. F. Halloran, C. H. Lindley, A. Scott, W. W. Montague, Henry Pichoir, S. Mooney, J. L. Rathbone, George Schmidt, Charles Allenburg, R. C. Sargent, Samuel C. Irving, Judge Niles Searles, D. E. Hayes, Tirey L. Ford.

Trinity County —John McMurray.

Tuolumne County.—A. M. McDonald, John N. Neals, F. M. Wilmans.

Yuba County.—J. C. Campbell, W. J. Mellon, F. K. Lord, W. R. Meek, C. C. Mayo, Frederick Joubert, J. E. Poingdestre, Daniel Cettins, J. H. Drake, Joseph Hibbert, C. S. Holbrook, Otto Woehler, T. J. Sherwood, F. W. Johnson, James O'Brien, Louis Comath, W. C. Halstead, A. C. Wheaton, C. L. Armstrong, John McQuaid, W. W. Chamberlain, John Peardon, George A. Morris, R. H. Postlethwaite, Thomas Conlin, Joseph Durfee.

The veteran Judge Niles Searls in an eloquent address on behalf of the Association, presented the President with a massive silver loving cup, gold lined, and suitably engraved, as a token of the esteem of the miners and their appreciation of his years of leadership as President of the Association from its first day, to which President Neff made suitable response.

Secretary Sonntag read his report, showing the receipts for the year up to October 15th, 1897, to be $3,374 and the expenditures $2,497. Since then El Dorado county has sent in $100, Nevada county $150, Placer county $150, Calaveras county $20 and others making the total net amount on hand $1,397. He also reported that during the year the Executive Committee held six meetings.

Treasurer Montague's report tallied exactly with the Secretary's. Both reports were received and adopted. The usual letters were read. President Neff delivered his annual address. The Committee on Legislation made its report; as did likewise the special Committee on Revision of the Federal Mining Laws; (see pages 383 and 384.

President Neff appointed a Committee on Resolutions to which all resolutions offered during the meeting were to be referred without debate.

The Committee on Revision of Mining Laws made report as follows:

To the President and Members of the California Miners' Association:

GENTLEMEN.—Your Committee on Revision of Mining Laws appointed by J. H. Neff, president of the Association, respectfully submit the following report of their action since their appointment:

The duties of the committee as originally appointed were limited to suggestions concerning amendments to Federal laws, but at the request of the Committee on Legislation the Committee on Revision of Laws investigated the large amount of proposed legislation and it delivered its report to the Executive Committee.

The committee did not feel authorized to make any recommendations to the Le islature; but from time to time during the session of that body presented for the consideration of the Executive Committee their individual views.

At a meeting of the Executive Committee a resolution was adopted as follows:

Resolved, That it is the sense of this committee that the proposed legislation supplemental to the provisions of the Revised Statutes, relating to the acquisition and enjoyment of mining rights upon the public domain, be confined to the following purposes:

1. The enactment of a law providing for the recording of notices of location and making such notice when recorded prima facie evidence of the facts therein recited.

2. The enactment of a law allowing the discoverer of a lode claim sixty days from the day of his discovery to perfect his location and mark his boundaries.

3. The enactment of a law providing for the deposit with the County Recorder of the several counties of all district records heretofore existing, making such County Recorder legal custodian of such records and authorizing copies certified by such Recorder to be admitted as evidence with like effect as if certified to by the original custodian of such record.

4. Making provision for the amendment of location notices where the originals are defective.

5. Providing for the proof of annual labor by affidavit filed with the County Recorder on the lines of the existing laws.

Acting upon these suggestions, the committee did not consider any proposed legislation beyond the scope defined in said resolution.

The existing law, passed by the Legislature in March, 1897, reflects to some extent the views of the Executive Committee.

With re erence to the proposed amendments to the Federal laws, it became manifest to the committee that no Federal legislation could be secured unless the co-operation of all the mining States and Territories was assured.

At the Gold Miners' Convention, which was held at Denver on July 7th of this year, W. S. Keyes was a delegate, having been appointed to that position by the Governor of this State. He was also a delegate to the Transmississippi Congress, held at Salt Lake City on July 14th of this year. He was also appointed by Governor Prince, president of the Miners' Convention, as a member of the committee, representing California, to formulate proposed amendments to the Federal mining statutes. The committee of the Denver Convention, consisting of delegates from all the States, met at Denver on September 22nd and 23rd, and there discussed and outlined certain proposed amendments to the Federal law.

As Mr. Keyes, who was a member of the Committee on Revision of Laws of this Association, was present at the meeting of the general committee at Denver, participated in its deliberations, and is familiar with the results obtained, we have requested him to present for the consideration of this convention a report as to the action of the Denver committee and the suggestions made by it. Such report may then be referred to the new Committee on the Revision of Laws, to be appointed by this convention or its president Respectfully submitted,

C. W. Cross, R. E. Browne, W. S. Keyes, T. L. Ford, J. F. Halloran, H. Pichoir, Fred Searls, A. H. Ricketts, Committee; CURTIS H. LINDLEY, Chairman.

In connection with the above, Col. W. S. Keyes made a report in which he offered the following for adoption by the convent on, they being the expression of what had been agreed on at the Denver congress:

Resolved, That the existing statutes of the United States touching mineral lands require radical amendment.

Resolved, That the law of the apex and its corollary, the so-called extra lateral right, should be abolished and a return made to the common law right of surface boundaries, and that the claim of unit of location be of sufficient width *i. e.*, of sufficient width on the side of the dip to permit of excavations on the ledge to a depth of 1800 or 2000 feet when the angle of the dip is not less than 45°.

Resolved, That the local rules and regulations ought to be abolished.

Resolved, That the Congress of the United States be petitioned or requested to formulate a complete mining code, touching all matters from the inception of the claim (location) to the final acquisition (patent) thereof.

Resolved, That the process of applying for and obtaining patent should be simplified and made less costly to the miner.

Resolved, That section 2323 of the Revised Statutes relating to the so-called tunnel locations be restric ed in its application to the deep placers or dead rivers whose course and direction are not shown upon the surface by reason of accumulations of drift, soil, lava or other rock. A tunnel for the discovery of such deposit or deposits must be prosecuted with due diligence, and proof of such diligence shall be held to mean work upon the tunnel for not less than four months in each year, with at least two shifts of workmen. The channel, deep placer or dead river, when encountered, to be locatable to the extent of not more than 1500 feet up and down stream from the point of intersection by the tunnel.

Resolved, That all the precious or useful metals, earths, rocks, stones, fossils, mineral oils, bitumens, natural gas, hydrocarbons, natural fertilizers—in a word, any substance found within or beneath the surface of the earth and having a commercial value—should be subject to location under the section or sections of the law applicable to placers.

Resolved, That any party or parties who may desire to avail him or themselves of the provisions of the present laws must apply for patent before January 1, 1900. A failure to so apply shall constitute a forfeiture of all such claim or claims and thereafter they shall be open to location as other public mineral lands. Provision should be made so that mineral land so abandoned may be located preferentially by a neighboring claim, whether possessing a square location or not, if such land be claimed located within a reasonable time—say within six months—and no other location shall be allowed during said period unless such neighboring claim owner shall, in writing, have declined to take up such abandoned ground.

Resolved, That a committee consisting of members of this convention be appointed by the President to formulate in detail the provisions of a bill in accord with these resolutions, to be placed in the hands of our Senators and Representatives in Congress, with a request to urge its passage in the next Congress.

The resolutions were referred to the Committee on Resolutions.

Pending the report of that committee the convention adjourned until 10 A. M. October 19th.

During the evening of the 18th there was delivered an address by Professor Christy of the mining department of the State University at Berkeley on the treatment of low-grade ores by the cyanide process and an address by W. F. C. Hasson of San Francisco on the transmission of electric power, both lectures being illustrated.

Professor Christy said that it cost about 8 cents to work a ton of tailings or low-grade ores in general by the cyanide process.

Lieutenant Hasson said that the application of electric power in the working of mines was rapidly on the increase. Electric motors for milling and pumping were pronounced successes. The mountains of California contained plenty of water at high altitudes that can be used to generate electric power cheaply, and in the past three years the generation of electricity by water power and its transmission for long distances had made rapid strides.

Upon convening the following morning at 10 A. M. the Committee on Resolutions made its report as follows:

To the Officers and Members of the California State Miners' Association: Your Committee on Resolutions begs to submit the following report:

First—On the several resolutions proposed in the report of General W. S. Keyes, herewith returned to the convention, the committee report as follows: Without expressing any opinion upon the merits of the question presented in the resolutions recommended in said report, your committee recommends non-action upon the same, upon the ground that the Association should bend its energies to the completion of unfinished business already engaging the attention of Congress at its request, and upon which there is unanimity among its members, before proceeding to the consideration of new matters covering so vast a field of discussion and probable contention. We believe it of more importance to concentrate our efforts upon the accomplishment of legislation admitted to be imperatively demanded than to weaken our advocacy of any measure by attempting to promote legislation upon too many subjects.

Second—Mr. Sherwood's resolution concerning a conference with the Executive Committee of the State Anti-Debris Association the committee has fully considered, and report the following substitute therefor and recommend its adoption:

Resolved, That it is the sense of this convention that the Executive Committee to be appointed at the close of this convention immediately appoint a sub-committee of three of its members, whose duty it shall be to confer with the Executive Committee of the State Anti-Debris Association, and request its co-operation in urging upon the attention of the United States Debris Commission the importance of procuring immediate protection against a further flow of heavy material into the navigable rivers by the construction of restraining barriers in accordance with such plans as may be indorsed by the said United States Debris Commission, and that said sub-committee is directed to report to the Executive Committee of this Association at their next meeting the result of such conference.

Third—The resolution of Mr. Myers concerning the mineral exhibit at the Paris Exposition has been considered and a substitute as follows recommended for adoption by the convention:

Resolved, That it is the sense of this convention that the miners of California should make a mineral exhibit at the Paris Exposition in the year 1900 which will fully display the varied and valuable resources of this State. And the President is hereby authorized and requested to appoint a committee of five to take into consideration the best method of accomplishing this purpose. Said committee is hereby empowered to confer with State and other organizations contemplating making exhibits at said exposition, and to co-operate with the same in effecting arrangements for such exhibition. Said committee is directed to report its conclusion and action to the Executive Committee of this Association.

Fourth—The resolution offered by Secretary Sonntag in relation to annual visits of certain officers of this Association to mining centers is herewith returned with the recommendation that it be adopted.

Fifth—The resolution concerning the invitation to the President of the California Good Roads League is herewith returned without recommendation.

Sixth—The committee report the following resolutions and respectfully recommend their adoption:

Resolved, That the Committee upon the Revision of Federal Laws be and is hereby instructed to draft a bill for the consideration of Congress which shall define hydraulic mining as the same is defined by the provisions of the Civil Code of the State of California.

Resolved, That the Executive Committee be requested to formu-

late for the use of the Secretary of the Association a circular letter stating the work accomplished by the California Miners' Association, and setting forth the plan of operations for the ensuing year. The Secretary is hereby instructed to circulate the same among miners and business men throughout the State.

Resolved, That the thanks of this Association are due and are hereby extended to the officers of the California Miners' Association for the earnest, intelligent and effective services rendered by them during their term of office.

All of which is respectfully submitted:

T. J. Parsons, J. F. Halloran, A. M. Ten Broeck, H. T. Power, A. Caminetti, F. R. Wehe, J. F. Davis, John McMurray, James O'Brien, J. K. Scupham, J. M. WALLING, chairman.

The second section of the report was argued at great length during the morning session. Postponement of the debate was made to listen to a speech from Congressman De Vries of the First Congressional District, who said the Public Lands Committee, of which he is a member, has the House bill under consideration and will doubtless report favorably upon it. It will, in all probability, be passed by Congress. The Congressman said he believed that if any delay is occasioned in the building of restraining dams with the $50,000 appropriated by the State Legislature and Congress it will be due to the engineers who are deliberating over plans. He has urged them to proceed as speedily as they can. He is heartily in sympathy with the miners, and suggested that the convention express by resolution its wishes in relation to the Mineral Lands bill and the construction of impounding dams.

The debate on the resolutions was then renewed. During a lull in the animated discussion, United States Senator George C. Perkins was called upon and delivered an address, stating all that had been done for the miners in Congress; and pledging himself and the entire congressional delegation of the State to do all that could be done at Washington to further their just interests.

Senator Perkins paid a glowing tribute to Major Heuer and then to the miners in general, declaring that there would have been no California if there had been no mines. The farmer could no more live without the miner than the miner could live without the farmer. Therefore, the subject of mining and the restraining of debris should be discussed from a mutual standpoint. He was glad to see representatives of the agricultural interests in the convention. He assured the convention that the California delegation in Washington would willingly serve the Association in the halls of Congress if only the members would agree upon what they want. The Mineral Land Act was before Congress and would become a law within sixty days after the next convening of Congress. He explained the difficulties in the way of getting legislation through Congress. There was so much of it that it was often impossible to get bills through promptly. The miners should not get weary if there should be delay. Senator Perkins said the miners would not be able to get a Cabinet officer at the head of a department of mining. That, he said, was not practicable; but the miners could get a Commissioner of Mining. That would accomplish all that the miners desired.

Major Heuer of the United States Debris Commission who has just returned from a two years station at Cincinnati, was also asked to address the convention and did so, stating in effect that upon the United States Engineering Corps devolved the additional duties of the Debris Commission and that they were proceeding as rapidly as circumstances would permit. But he desired to remind the miners that he had not sought the appointment, which had been thrust upon him and his colleagues.

"I did not come here to make a speech," said Major Heuer: "I just heard something about military men being on the Debris Commission, but the work was forced on the military men, and they have done the best they could for the miners.

"The North Bloomfield mine has been referred to here as having been stopped after it had built a dam. That is true; but we did not officially know that there was a dam. It would have been easy for them to have secured a permit. The Debris Commission was appointed because the Caminetti law required it to be appointed.

"The river and harbor laws prohibit anybody putting anything into the navigable streams to impede navigation, and if the Debris Commission does not take notice of other things it is because no complaints have been brought to it. If so they would have taken the complaints to the District Attorney."

John P. Irish, representing the San Francisco Chamber of Commerce and Board of Trade, addressed the convention in relation to the proposed department of mines and mining, and, in a long and eloquent address, pointed out the need of such department. He disagreed with Senator Perkins as to being content with a "Commissioner of Mines," and favored the appointment of a Cabinet officer to control mining matters. If a commissioner were to be appointed, it should be with the distinct understanding that a Secretary of Mines and Mining would follow. Concerted action with Eastern miners, he said, was necessary to insure the success of the plan.

Governor Jas. H. Budd was the next speaker, who, amid much applause, said:

"As long as I am Governor of the State of California I will be pleased to come before you and ask: How can I serve you? I am largely under obligations to the miners of this State for my election to the chair of Governor, and hope to be able to repay you in some way. I have never refused my signature to a just bill placed before me which the miners had prepared for passage. I have kept my pledge to the State and to the miners, and will continue to do so. To have a Department of Mines is your main object of convening here. Now is a good time to press the question, and I assure you I will give all the help that is in my power. It is time we should know what regulations are to govern the gold and silver mines of this State. I will not be your Governor for a great length of time, for I would not take a second term under any consideration. I intend to retire as a private citizen, and will then, as now, say if I can be of any assistance to you, simply say the word, and I will respond with a will."

Congressman J. A. Barham of the Second Congressional District was the next speaker. He also declared his belief in the timeliness of the request that a new Cabinet position be created. The products of all kinds of the mines of the United States amounted annually to $700,000,000, and were worthy of special governmental protection and direction as in other countries.

"At all times," said Mr. Barham, "I have to the extent of my ability presented the claims of the miners in the halls of Congress and shall continue to do so. Whatever I can do to help procure a Secretary of Mines and Mining, I will do. This department will not be for gold and silver mines alone, but for mines of every character. The mining industry is as much entitled to consideration as any in the country. The Mineral Lands bill was once passed by the House, and will become a law at the next session of Congress, I have no doubt. The Idaho-Montana Mineral Lands bill is the one we want, and Speaker Reed informed me that he is in favor of it. The Senator from Oregon assured me that at the next session he would not tack on the Oregon amendment, which has held the bill back heretofore."

After these speakers, the convention again took up the discussion of the resolutions, the result being their partial adoption. The section was changed to read as follows:

Resolved, That it is the sense of this convention that the Executive Committee to be appointed at the close of this convention immediately appoint a sub-committee of three of its members, whose duty it shall be to confer with the Executive Committee of the State Anti-Debris Association, and request its co-operation in urging upon the attention of the United States Debris Commission the importance of procuring immediate protection of the navigable rivers of this State by the construction of restricting barriers as provided for by that certain Act of Congress known as the Caminetti Act, and for the purposes mentioned in said Act, and in accordance with such plans as may be indorsed by the said United States Debris Commission, and that said sub-committee report to the Executive Committee of this Association at their next meeting the result of such conference.

Ex-Congressman Caminetti introduced the following resolutions, which were adopted:

WHEREAS, The National Government has appropriated $250,000 for the building of impounding dams for the protection of the navigable rivers of the State, under the provisions of Section 25 of an Act to create the California Debris Commission and to regulate hydraulic mining in the State of California, approved March 1, 1893; and

Whereas, The State of California has likewise made an appropriation of a like amount for such purpose;

Whereas, The State of California has also made an additional appropriation of $300,000 to be used in the improvement of the navigability of said rivers;

Whereas, The money so appropriated by Congress and by the State remains unexpended, while the injuries resulting from a lack of restraining works are being constantly aggravated;

Whereas, No more important work can engage the attention of the department having the expenditure of the appropriation made by the United States than the immediate construction of said impounding dams; therefore, be it

Resolved, By the California Miners' Association, that the Secretary of War and the Chief Engineers, U. S. A., be and they are hereby respectfully requested, as far as is consistent with their duty, to cause the preparation of plans and the construction of said impounding dams as early a date as possible; be it further

Resolved, That the members of the California delegation in Congress be and they are hereby requested to present in behalf of this Association these resolutions to the Secretary of War and the Chief of Engineers; be it further

Resolved, That copies hereof be transmitted to said Secretary of War, Chief of Engineers and the California delegation.

The important discussion on the recommendation of the Committee on Resolutions that the Committee on Revision of Federal Laws draft a bill for Congressional definition of what "hydraulic mining" is, was closed by the adoption of a motion that the matter be referred to a special committee with instructions to present no bill to Congress unless it had the express sanction of the Executive Committee of the Association.

The Committee on Dredgers then presented the following report, which was read by John M. Wright:

SAN FRANCISCO, October 18, 1897.

To the President and Members of the California Miners' Association:

Your Committee on Dredgers appointed at the time of the last meeting of your Executive Committee has not had time to make such an exhaustive examination into the subject of river dredging and into its cognate subject of river jetties, as it will be necessary to make before the miners of California can derive practical benefit from the operation of a combined system of jetties and dredging in the Sacramento river.

In the opinion of your committee, while it is desirable to construct a system of restraining dams to hold back the *debris* already accumulated from former hydraulic mining, pending the investigation of the subjects of jetties and dredgers, yet such restraining dams will not avail to any large extent in bringing about the results this Association was primarily organized to promote, namely, the restoration to the hydraulic miner of his right to use and enjoy his own property to the full extent of its value—a privilege not denied to the owner of any other class of property.

Notwithstanding the short time in which your committee has been able to work, still your committee has collected a large amount of valuable data regarding the subjects entrusted to its care, which, with other material yet to be collected, will be systematically treated in the future reports of your committee; and your committee is able to assure the miners of California that it is quite among the probabilities of the near future, not only that the owners of a few small hydraulic mines may mine here and there in secluded gulches of the Sierras under the fostering care of the California Debris Commission, but that by the establishment of a proper system of jetties in the Sacramento river, supplemented by the use of powerful dredging machines such as have been recently constructed at Government expense, hydraulic miners everywhere may mine without fear of the *baton* of the marshal and without objection from their friends and neighbors, the farmers.

It is true that large amounts of money must be appropriated and employed, but such amounts are infinitesimal when compared with the vast benefits to result, and, considering the now universal interest in the subject of mining and the generous aid already extended by both the State and National Governments in the way of mere experiments, it can scarcely be doubted that at no distant day the authorities of the National Government will provide liberally for the improvements indicated.

To illustrate the efficiency of the dredgers recently constructed for the Government, your committee refers to Appendix WW of the Annual Report for 1896 of the U. S. Chief of Engineers, from which report your committee quote the following, showing the performances of the dredge "Alpha."

"Early in September, owing to the steady decline of the river, the services of the Alpha were needed at four localities between Cairo and Memphis, viz., Cherokee Crossing, Sam Phillips Bar, Point Pleasant Bar, and Medleys. She was immediately started from Memphis and reached Cherokee Crossing, the first obstruction to navigation above Memphis, on the morning of September 12, and worked there sixteen days. During this time she made six cuts, aggregating 2350 feet in length, and increasing the navigable depth 3.62 feet. Not less than 6 feet was found in the channel during the rest of the season, notwithstanding a fall of 2.45 feet in the river subsequent to the dredging. The material encountered at Cherokee was usually coarse and hard to move.

"From there the dredger was towed to Sam Phillips Bar, where work was commenced on September 30. In ten days four cuts, aggregating 3845 feet long, had been made, and the navigable depth increased 1.68 feet. Not less than 8½ feet was found in the channel during the rest of the low-water season, although the river fell 2.07 feet subsequent to the dredging.

"At Point Pleasant Bar work was commenced on October 9 and continued fourteen days, during which time eight cuts, with an aggregate length of 3520 feet, were made, and the navigable depth increased 3.50 feet. Not less than 9 feet was found in the channel during the rest of the season, notwithstanding a fall in the river of 1.39 feet subsequent to dredging.

"At Medleys work was commenced on October 25 and continued twenty-three days. The material here was also very difficult to handle, from its extreme fineness rather than its coarseness, as was the case at Cherokee. Here it fed in toward the dredge from long distances ahead and on both sides, assuming an extremely flat slope. Three cuts were made, with an aggregate length of 3020 feet, by which the navigable depth was increased 2.13 feet. Not less than 10.65 feet was found in the channel during the rest of the low-water season."

Your committee also quote from the same report part of the history of the building and of the performances of the dredge Beta as follows:

"But while the practicability of improving the low-water navigation of the Mississippi river by dredging may be considered as established, there is much yet to be learned concerning the best arrangement of parts and details in a dredge for this purpose, as well as the system of operating it, including the motive power, the method of attack on the bar, the relative dimensions of the cut and the disposal of the excavated material. These questions can only be settled by experience acquired with the use of specially designed and strongly constructed dredges of great capacity.

"These considerations had weight with the Commission in specifying the requirements for the dredge Beta. A capacity of 1600 cubic yards of sand per hour delivered 1200 feet from the point of excavation was demanded. This was far beyond the performance of any dredge ever built. A bonus proportioned to the increase of output beyond the fixed rate, up to 2400 cubic yards of material per hour, was offered to the dredging class of boilers and machinery was specified. A width not exceeding 40 feet and a draft not exceeding 4½ feet was allowed, leaving the length of the hull to be adjusted to the weights. It was constructed 172 feet long.

"The contract time for completion, ready for testing, was August 1, 1895. The other general requirements for this dredge, as adopted by the Commission, may be found in the annual report of the Mississippi River Commission for 1895.

"On the recommendation of the dredging committee of December, 1894, as authorized by resolutions of the Commission of November 13, a contract was made with Mr. Lindon W. Bates, of Chicago, for the construction of a dredge in accordance with these general requirements, provided with six 5x5-foot cutters, revolving on vertical shafts, actuated by spur gear and divided into two batteries. She was to have two double-entry centrifugal pumps, with 7-foot runners, and two 32-inch suction and discharge pipes, all so arranged as to form two separate units from the heads of the suctions to the ends of the floating discharge pipes, 1000 feet away from the dredge. The amount of the contract was $172,775, provided that a rate of delivery of 1600 cubic yards of sand per hour was attained. The bonus was $86,387.50, if the rate of delivery of 2400 yards per hour was reached, and proportionate amounts for intermediate rates of delivery. A penalty of $250 was imposed for each and every day's delay. This contract was not finally approved by the War Department until February 23, 1895."

SCHEDULE OF TESTS OF THE "BETA."

Number.	Duration of tests, seconds.	Sand and water, in cubic feet.	Sand, in cubic feet.	Per cent of sand.	Velocity in pipe, in feet per second.	Rate of sand delivered per hour, in cubic yards.
1	35	8,641	228	2.64	20.77	868
2	68½	9,698	1,465	15.10	11.89	2,847
3	38½	5,147	1,780	34.58	11.60	6,354
4	64⅞	10,606	2,427	22.80	19.76	4,988
5	26½	4,183	1,528	36.40	13.47	7,798
6	55¾	9,251	2,028	21.92	13.97	4,850
7	53⅞	8,975	1,378	17.43	14.03	3,872
8	50½	8,113	2,356	29.00	13.52	6,217
9	51⅝	8,451	2,438	28.85	13.85	6,327
10	49⅞	8,494	1,826	21.50	14.92	5,083
Average				23.02		4,921

"The dredge was thus proved to be of immense capacity, delivering as the average of tests quite three times the volume of sand demanded by the contract, and twice that required to earn the entire bonus."

As to the general result of its experiments with dredgers, the Commission states the following:

"It appears therefore, from the experience of the Commission with the dredge Beta, that the capacity which can be given to such machines for the purpose of bar removal on the Lower Mississippi is very great. This goes far to establish the feasibility of an improvement of navigation by dredging, since it can not be doubted that the resources of constructive science are sufficient to adjust the parts of a dredge so perfectly and to build them up so strongly that she will be substantially free from delays from accident, and to proportion a hull so that it will float its machinery on a draft which will allow it to navigate the river at its lowest stages."

Your committee recommend that the work of your committee be entrusted to a committee under the name of Committee on Dredgers and Jetties, with instructions to vigorously prosecute its investigations and to report the results thereof to the Executive Committee without delay.

W. C. Ralston, J. F. Halloran, JNO. M. WRIGHT, Chairman.

The report was adopted.

The following report from the Committee on Mineral Lands was read and adopted:

SAN FRANCISCO, Oct., 18, 1897.

To the President and Members of the California Miners' Association:

Your Committee on the Protection of Mineral Lands has the honor to report that the past year has been one of inactivity with it, as the well known conditions existing at the commencement of its year have remained practically unchanged, except in the marked diminution in the area of advertised selections by the railroad companies of lands lying within the limits of their grants. Against such advertised selections no protests, under the rules of July 9th, 1894, have been filed on behalf of this Association, as the acreage was comparatively inconsequential. In any event, this committee has no way of meeting the requirements of the Department of the Interior in the protest cases of Benjamin vs. Southern and Central Pacific Railroad Companies, reported in Volume 21 of the Decisions of the Department of the Interior, page 387, in which it was said that where no specific allegation was made of the presence of mineral in any particular subdivision covered by a railroad company's selection, there was no necessity for ordering a hearing or further suspending the issue of patent therein.

The advertised lists of railroad selections during the past committee year, as given it by the professional clipper, are filed herewith. All of which is respectively submitted.

E. C. Loftus, J. F. Halloran, H. T. Power, E. H. Benjamin, A. H. RICKETTS, Chairman.

Mr. Cooper of the California State Mining Bureau said that it was the intention to issue a register of the mines and miscellaneous economic minerals of the State, and to classify the mines in their general nature, as quartz, hydraulic, drift, placer and beach, and give the location and particulars of a public nature of each mine. The register will give the location and character of title of each mine; the strike, dip and thickness of the veins, the nature of the ore, the character of the walls, the number of men employed, and other facts of general interest. It will show the amount of development done, depth of shafts and length of tunnels. The register will also contain a list of quartz mills and reduction works, and will be accompanied by a map of each county, compiled from most reliable and recent available data. In order to complete the register up to date as nearly as possible, a deputy will be appointed in each county. As soon as the conditions will permit, bulletins will be issued on the following subjects: "Chlorination," "Dry Washing," "Beach-Washing," "Dredging," "Building Stones," "Petroleum," "Limestone" and "Cement."

In the evening Professor Geo. Davidson delivered an illustrated lecture on Alaska, discussing its leading physical features and resources.

The following resolutions were also reported on favorably by the Committee on Resolutions and adopted by the Convention:

Resolved, That it is the sense of this Convention that the lien law of this State be amended so as to secure to the laborer who labors upon, and to the material man who furnishes material for any mining claim in this State, located on lands held under an agricultural patent, a lien upon the said property as security for any wages due, or the price of material furnished, in the same manner as such laborer or material man now has upon a mining claim to which the claimant has acquired the right of possession by a compliance with the laws of the United States, and of this State, and the local rules and customs of miners, and the Legislative Committee of this Association is hereby instructed to urge the said measure upon the Legislature at its first session.

Resolved, That a special committee of five be appointed by the President to act in conjunction with like committees from other bodies and conventions in behalf of an executive department of mines and mining, the secretary whereof shall be a member of the President's cabinet.

Resolved, further, That all papers, documents, resolutions and other matters pertaining to the foregoing subject be referred to said committee, which said committee is hereby requested to act in conjunction with other like committees, and to use all honorable means to obtain such national legislation as will secure the desired result.

A resolution favoring the preparation of a State mining exhibit at the Paris Exposition, and another calling for the creation of a national department of mines and mining and the appointment of a Cabinet officer, and a resolution requesting Congress to pass the Mineral Lands bill were adopted.

Resolutions were also adopted thanking Professor S. B. Christy, Lieut. W. F. C. Hasson and Professor George Davidson for the instructive and interesting lectures delivered by them before the Association.

The morning of Wednesday, the third day of the convention, was devoted to the election of officers. Hon. J. H. Neff, for the sixth time, was unanimously elected president of the Association. For the position of vice-president the names of T. J. Parsons and Col. Geo. Stone of San Francisco were presented. Balloting ensued, but before the result of the vote was announced, Col. Stone moved that the vote for Mr. Parsons for vice-president be unanimous. Mr. Parsons was accordingly elected by unanimous vote. For treasurer, Samuel J. Hendy of San Francisco was unanimously elected, and for secretary Julian Sonntag was unanimously re-elected.

Tirey L. Ford made a closing argument in favor of the creation of the Department of Mines and Mining, reminding the delegates that active work and co-operation on the part of the miners of this and other States was necessary for success. President Neff then announced the following standing committees:

At Large—W. W. Montague, Edward Coleman, A. Caminetti, W. C. Ralston, W. S. Keyes, George Stone, R. McMurray, John McMurray, James O'Brien, S. B. Christy, L. T. Byington, D. T. Cole, J. J. Crawford, J. F. Halloran, John M. Wright, S. K. Thornton, C. W. Cross.

El Dorado—H. E. Pickett, G. H. Ten Broeck.

Tuolumne—F. M. Willman, A. M. McDonald.

Santa Clara—Charles C. Derby, R. R. Bylmore.

Siskiyou—Andrew G. Myers, John Daggett.

Placer—Charles H. Carr, Harold T. Power.

Yuba—Joseph Durfee, Louis Conrad.

Sierra—F. R. Wehe, Gail Jones.

Trinity—P. M. Paulsen.

Amador—J. F. Parker, E. C. Voorheis.

Nevada—E. J. Rector, J. S. McBride.

Plumas—A. Hall, John Roberts.

Shasta—J. M. Gleaves.

Calaveras—Richard A. Parker, Mark D. Kerr.

San Francisco—Andrew Carrigan.

President Neff also announced the following special standing committees:

Committee on Legislation—Fred Searles, John McMurray, W. S. Soward, Louis Glass, E. C. Voorheis, F. R. Wehe, E. H. Chapman, Charles A. Swisler, W. F. Prisk.

Committee of Revision of Mining Laws—Curtis H. Lindley, W. S. Keyes, J. F. Halloran, John F. Davis, C. V. Gottschalk, T. L. Ford A. H. Ricketts, Stanley A. Smith, R. C. Rust.

Committee on Mineral Exhibit at the Paris Exposition—J. J. Crawford, John Taggert, R. C. Walrath, A. G. Myers, S. B. Christy.

Committee on Secretary of Mines and Mining—Tirey L. Ford, Louis Glass, Charles G. Yale, W. C. Ralston, J. J. Crawford.

Committee on Mineral Lands—A. H. Ricketts, H. T. Power, George C. Sargent, A. H. Ten Broeck, Robert J. Nixon.

Committee on Jetties and Dredging—John M. Wright, J. F. Halloran, W. F. Englebright, John A. McIntire, R. V. Robertson.

Committee on Conference with Anti-Debris Association—John Spaulding, James O'Brien, Thomas Clark.

Committee on Finance—Andrew Carrigan, A. A. Watkins, Louis Sloss, Jr.

Following is President Neff's address:

Fellow Miners:—Another year has passed and another annual gathering brings its pleasures and

duties to those to whom has been entrusted the more active work of our Association. Again we pause in our industrial march to take another annual account of stock and ascertain the progress made by the mining industry of California and the needed measures for its future advancement. Again we meet in general conference for mutual consultation and suggestion, that we may the better aid the great industry upon which our State was founded and upon which its prosperity in great measure yet depends.

We are happily assembled at a time when the mining industry in California has taken on new life and when its future outlook is more than ordinarily bright. The steady increase in the annual gold yield of our State is supplemented by renewed activity and increasing yield in other branches of mining to the extent that the eyes of the world are now turned upon California and legitimate investors are making careful and earnest examination of the advantages here offered.

This happy condition is in no small degree the result of the united efforts of the miners of California through the Association whose representatives are here assembled. The value of organization and unity of action is thus signally emphasized, and the duty of the California miner made clear and plain. I sometimes question whether the miners of this State have always appreciated, or even realized, the substantial benefits that have resulted from their united efforts. Six years ago the mining industry of this State was in a lamentable condition. The annual gold yield was at a low ebb, and one branch of gold mining was practically destroyed. The yield of other minerals was limited, and the belief generally prevailed in the industrial world that mining in California was rapidly becoming a thing of the past. So general was this belief that capital, in its search for mining investments, scarcely gave California a thought, but passed on to more alluring, if more disappointing, fields.

Then came the California Miners' Association with its enthusiastic energy and co-operative determination. Our State Legislature promptly responded to our appeals and Congress lent us a willing ear. Public sentiment suddenly turned in our direction and the people of the valley gave respectful attention to our appeal to reason and justice. Above all, the world once more learned of our marvelous mineral resources and capital hastened to make investment in California mines. To-day the mining industry of California is better known, better understood and is attracting more favorable attention than for a quarter of a century past.

It is not my purpose at this time to review the history of this Association or of the mining industry of California, nor shall I detain you with any detailed statement of the work of the Association for the year just passed. The former I had the honor to present in my annual address a year ago, and the latter will be fully covered by the reports of the various committees.

I am glad to report that cordiality and good feeling exist between those in charge of the State Miners' Association and the executive officers of the Anti-Debris Association of the Sacramento valley, and that there is no difference of opinion regarding these matters, leaving hope for future harmonious action. Several conferences have taken place during the past year between a committee representing this Association and a committee representing the Anti-Debris Association, looking to a joint appeal to Congress for financial aid in the furtherance of such work as the two associations might be able to mutually approve. Although these conferences have so far produced no definite results, yet I am glad to report that cordiality and good feeling existed, and that there is no difference of opinion regarding the necessity of such action, each working in co-operation for the common good and mutual prosperity of our State, in which we are all so deeply interested. To this end we await the action of the Government engineers in adopting and reporting a plan for the protection and improvement of the Sacramento and San Joaquin rivers as contemplated in the act of Congress known as the Caminetti act.

You are doubtless, gentlemen, familiar with the fact that since we last met considerable progress has been made in the important matter of State and Federal appropriation for purposes agreed upon by mountain and valley residents of this State. You are also doubtless fully conversant with the protracted efforts in our State and National Legislatures, and I will but direct your attention to the results.

By an act of March 24th, 1893, the Legislature of this State appropriated $250,000 to be applied to this work, namely, the building of restraining dams. This appropriation, contingent upon a like appropriation by Congress, was made good by a similar appropriation on the part of the Federal Government; and, to obviate any possible legal technicalities, the California Legislature, at its last session, reappropriated the amount. At the same time the State Legislature appropriated $300,000 for dredging the Sacramento river, which makes now available for the purpose on which we all are united $800,000, all of which, except the $300,000 appropriated by the State and under State jurisdiction, is to be expended under the direction of the United States Government engineers for building dams and restraining debris.

There has been considerable delay and some impatience manifested, more especially by valley residents, regarding the beginning of the actual work, and some considerable discussion has been published concerning the proper character of such work. It may be said in passing that when the bill for the $300,000 was signed by Governor Budd it was the direct understanding that the money was not to be immediately available. Without expressing any opinion, one way or the other, upon the State appropriation, it is believed that in a broad view of the matter the State authorities are doing wisely in making haste slowly, and it is to be sincerely hoped that at the coming session of Congress the Federal Government may be induced to aid by further appropriation in this same work, as it is believed that such improvement naturally and rightfully belongs to the Federal Government.

It is understood that the present conference between the State authorities in charge of the dredger scheme and the United States engineers will result satisfactorily. It is likewise understood that the delay in beginning the expenditure of the $500,000 joint State and national appropriation in the construction of debris restraining dams has been occasioned by difficulty in determining the exact point at which the work should begin. In this connection, it is to be noted that there has been considerable of a change in the United States Debris Commission, and it is believed that upon the return of Major Heuer from Cincinnati (which I am informed will be about the first of next month) that progress in this matter will be stimulated.

The $500,000 appropriated for the building of a debris restraining dam is not understood, nor was it so understood at the time, to be for the impounding of fresh debris or for miners to use as a dam for their tailings, but to stop the movement of material mined by miners and stirred up by agricultural development when you and I were boys. It is also clearly understood that under the Caminetti Act, regardless of State or national appropriation, hydraulic miners must continue to build their own dams and take care of their own debris.

I would have been pleased to have given you a more favorable report of the progress made in the expenditure of the $800,000 appropriated, but in the above have briefly outlined the facts as they exist. I would suggest that, in my judgment, it would be well for the Association at this meeting to set forth the present status of the matter and petition Congress for further appropriation to continue the work which the $300,000 was intended to inaugurate.

I also hope that the Mineral Land bill, so long pending in Congress, may be passed at the ensuing session of that body.

I also desire to refer briefly to the International Gold Miners' Convention held at Denver in July last and to the Transmississippi Commercial Congress held at Salt Lake City during the same month. This Association was represented at both conventions, and action was taken by each convention looking to the creation of a Department of Mines and Mining, and also to the revision of our Federal mining laws. At the Denver convention, Col. W. S. Keyes of this Association was made a member of the Committee for Revision of the Federal Mining Laws, and at the Salt Lake convention Hon. Tirey L. Ford was made chairman of the Committee upon Department of Mines and Mining. These gentlemen will doubtless report what action, if any, has been taken by their respective committees.

I cannot conclude without adding a word in commendation of those who have thus far so successfully carried on the work of the Association, and of encouragement to those in whose hands its future usefulness must now be entrusted. The position with which you have so continuously and so generously honored me has afforded me unusual facilities for observing the unselfish labors of those who have so industriously devoted their time and energies to the cause. Whenever legal services have been required, they have been promptly rendered by eminent counsel without pecuniary reward. Whenever anything was to be done requiring executive or business ability, men of affairs have not been wanting to perform the needed service. When money was needed to defray the necessary expenses of important undertakings, that, too, was promptly furnished by the friends of the mining industry. In short, gratuitous service and generous financial aid have marked the course of the Association continuously since its birth. It must be confessed, however, that the mining counties, themselves, have not always responded as they should and that the financial burdens of the Association have fallen quite largely upon the merchants and manufacturers of San Francisco.

To all who have so generously aided the cause I desire to tender the thanks of the Association, coupled with my own personal gratitude, for the kind assistance of those upon whom have fallen the principal burdens of our noble work.

For those who shall succeed to the duties of the present officers of the Association I bespeak the same kind and generous treatment that you have ever accorded to those whom you have so highly honored in the past. Above all, I appeal once more to the miners in the mountains to respond more liberally with financial aid. You are the direct beneficiaries of the great work that has been and is still being carried forward by the Association, and upon you must the future of the Association depend. Without your cordial support the Association must needs confine its work to a more narrow compass, while with your hearty co-operation and financial aid the past achievements will but mark the beginning of a glorious dawn for the industry that means so much to our State and nation and upon which you must rely for your own prosperity and material advancement.

Report of the Legislative Committee.

Following is the report of the Legislative Committee:

To the President, Officers and Members of the California Miners' Association—GENTLEMEN: Your Committee on Legislation beg leave to submit the following report for the year just closed:

1. *National Legislation.*—Nothing has been done by Congress in the matter of mining legislation since the last annual meeting of your honorable body. The Mineral Land bill, so called, which was then pending in the House of Representatives failed to receive the recognition of the Speaker and thus failed to become a law. The same bill was then introduced into the present Congress by Hon. George C. Perkins in the Senate and by Hon. Marion De Vries in the House of Representatives. Your committee regrets, in common with all those who have the interest of the mining industry of this State at heart, that the above bill should have failed of passage by the Fifty-fourth Congress. It is unnecessary to review here the causes of such failure, though it may not be amiss to say that the California Miners' Association did all that lay in their power to secure its passage and approval. Our representatives in Congress give us much hope to believe that the bill will pass and become a law during the approaching session of the Fifty-fifth Congress.

According to an estimate made for your committee by the Commissioner of the General Land Office on June 19th last, there remained unpatented at that date within the railroad land grants in California 11,596,073.86 acres, distributed as follows, to-wit:

	Acres.
Western Pacific (San Jose to Sacramento)	1,128,317.35
Central Pacific (Sacramento to Nevada State Line)	1,199,384.71
California and Oregon (Roseville to Oregon State Line)	922,301 04
S. P. Main Line (San Jose to the Needles)	4,418,296.80
S. P. Branch Line	3,927,873 96
Total	11,596,073.86

Your committee has no means of knowing how much of this vast acreage is mineral in character, though it is believed that a large percentage of it would be found upon examination to be mineral land within the meaning of the proposed Mineral Lands bill.

2. *State Legislation.*—Our State Legislature, during its recent session at Sacramento, so amended the original act appropriating $250,000 for the construction of restraining barriers as to make it conform to the Congressional act and thus remove as near as possible any impediment to the appropriation and expenditure of the above sum. This, together with the $250,000 appropriated by Congress, makes a fund of $500,000 now available for the construction of restraining barriers. It is understood that plans are now being perfected by the Federal engineers for the expenditure of this money and that actual work will be begun during the summer of 1898.

The Legislature also passed an act governing the manner of locating and recording mining claims. This act was intended to supplement the Federal laws upon those subjects and to remedy such defects as experience had pointed out. The bill, as it left the hands of your special committee having it in charge and as originally introduced by Hon. F. D. Soward of Sierra, was amended by the Committee on Mines and Mining in the Assembly in several particulars, which amendments were finally incorporated in the bill by both Senate and Assembly. The principal one of these changes relates to the necessity of doing $50 worth of work upon a mining claim as a part of the location thereof. This change has been the subject of considerable comment, concerning which your committee expresses no opinion. Many other laws were enacted by the Legislature relating to the mining industry which are believed to be of considerable value, but which we have not space to recite in detail in this report. They relate to provisions concerning miners' liens, the safety of miners employed in the mines, the conduct of the business of mining corporations, and many other matters of equal importance to the mining industry. In fact, the Legislature, at its last session, accomplished much in the way of mining legislation and deserves the sincere thanks of the miners of California.

3. *Revision of Federal Mining Laws.*—Pursuant to the recommendation of your committee a special committee for the revision of the Federal mining laws was appointed at the last session of your honor-

able body. Your committee, therefore, has nothing to report in respect to that matter.

4. *Department of Mines and Mining.*—There was also appointed at the last session of your honorable body a special committee to take such steps as they might deem proper to aid in the creation and establishment of a Department of Mines and Mining. This subject, therefore, has not been considered by your committee.

Your committee desire to say, however, that the International Gold Miners' Convention which met at Denver, and the Transmississippi Commercial Congress which met at Salt Lake City, both in July last, took up both of the last above-mentioned subjects and appointed committees to work in their behalf. These committees, so your committee is informed, are taking steps toward securing the co-operation among the miners of the country looking to the establishment of a Department of Mines and Mining, and a scientific revision of our Federal mining laws. As to what steps have been taken in this regard your committee has not been fully advised.

5. *Recommendations.*—Your committee beg leave to recommend: First—That prompt and urgent measures be taken to secure the passage of the so-called Mineral Lands bill at the approaching session of Congress. Second—That Congress be urged to make further appropriations for the construction of restraining barriers and other works, with a view to the improvement and protection of the Sacramento and San Joaquin river systems, to the end that all branches of mining may be successfully and profitably conducted without material injury to other interests. Third—That further steps be taken to secure a revision of the Federal mining laws and the creation of a Department of Mines and Mining.

All of which is respectfully submitted. Harold T. Power, S. B. Christy, Louis Glass, W. F. Prisk, W. E. F. Deal, E. H. Chapman, F. R. Wehe, C. H. Burnham, Committee. TIREY L. FORD, Chairman.

Amendment of Federal Mining Law.

TO THE EDITOR:—In your issue of Oct. 2d I have read with much interest the letter of Mr. F. T. Freeland of Aspen regarding proposed amendments to the national mining code. While fully recognizing the necessity for some changes in the existing laws, and the value of Mr. Freeland's experience to suggest such amendments, I am yet inclined to doubt if he has reached a satisfactory, or the true, solution.

Mr. Freeland summarizes his proposed changes as follows:

1. Location without discovery.

2. Official survey required, and claims limited in size to ten acres in any shape.

3. Substitution of an annual tax of $50 per claim in lieu of assessment work.

4. Vertical boundaries in place of the law of the apex.

To consider these points in the order he has chosen:

(*a*) To allow the location of alleged mineral ground without any discovery therein, or showing of such mineral character, would be a radical change, subversive of the idea which hitherto has been the foundation of our national mineral policy. This has always been to virtually give away the mineral lands as an inducement to their exploration and development, relying on the material advancement of the mineral country to justify such liberality. To permit their acquisition without any work whatever negatives the idea of exploration, and the absence of any showing of mineral character as a pre-requisite to such acquisition can only result in an endless amount of litigation over such character, with all the accompanying "adverses, hearings and experts" which Mr. Freeland deprecates. Coupled with the abolition of annual work, this law would offer an inviting field to the land grabber and speculator, who for a nominal cost could hold vast mineral tracts undeveloped and indefinitely.

(*b*) The extension of the official survey is no doubt a step in the right direction. Already encouraged by the laws of most of the mining States (which permit the filing of such surveys and make them prima facie evidence in the courts, and from the first an ultimate requirement before issuance of patent), they are only objected to on account of the expense incident to getting a surveyor to remote locations, an expense which must be incurred before there has been time to determine if the character of the claim justifies it.

The other half of this clause, limiting claims to ten acres in any shape and without extra-lateral rights, seems very objectionable. It is not proposed to thresh over here the old straw of "square claims vs. law of the apex." Like General Hancock's famous tariff views, this is largely a "local issue." Eminently suited to the sensibly level copper deposits of Michigan, and not objectionable when applied to some of the carbonate deposits of Idaho and Colorado, to parts of Montana and California the square claim is entirely inapplicable. In large systems of parallel fissures, like the Butte deposits, a single square claim of the standard Canadian size would have consolidated numbers of what are now independent and profitable mines. That is to say, a location which would cover sufficient extent of a flat deposit to justify the great expenditure requisite for development would cover too much in a region characterized by close parallel veins with steep dip. A dozen such claims would eat up the heart of the Butte district. On the other hand, Mr. Freeland's proposed claim of "ten acres in any shape" is too small to fit the flatter ore bodies of the California mother lode. To illustrate: This lode may be roughly said to dip easterly at an angle of 45° for the first 200 feet of vertical depth, then steepening to 55° the rest of the way. Similarly, the ore bodies may be said to pitch northerly or southerly along the strike at an angle of about 45°. Assuming the ore chute to pitch southerly, and applying these conditions to the ten-acre claim which has a chute 100 feet long, located at the most favorable point within the surface boundaries, *i. e.*, the northwest corner, in the case cited (and it is doubtful if the locator without discovery would have been fortunate enough to get just this arrangement of surface lines), then the most favorable size for a ten-acre claim becomes 750 feet long by 580 feet wide. At a vertical depth of 650 feet the ore chute would begin to pass out from the surface boundaries through the south end line, and at 750 feet the last vestige of it would go out at the southeast corner. We are just learning that our mother lode shows its best values only with depth, and a law that sets 750 feet as the practical limit of working would prove disastrous. Apply the rule, for instance, to the Kennedy, Gwin or Providence mines.

True, the owner might catch another chute dipping into his ground from outside, or he might be the owner of the next claims on the dip and strike, or he might sell his shaft, when done with it, to the owners of the next claims—and then he might not.

(*c*) The proposed substitution of the annual tax of $50 for the present annual expenditure of $100 is objectionable from many points of view. While it is true that assessment work is often of small advantage to the property, yet in the majority of cases it tends to ultimately develop enough values to insure a sale or development on a proper scale. Most of the larger working mines of 1897 were first brought out by the results of the assessment work. It is certainly a fact that the perfunctory style of assessment work is more generally done by the speculators, and the poor man who has to make every dollar and every day's work count usually does this work faithfully, to demonstrate the value he thinks is in the claim. It is also a fact that it is this same prospector and poor man who discovers and brings out the mines. Mining companies and syndicates rarely prospect for new claims, preferring to wait and buy when the prospector has developed a showing. Every one who has noted the steady call for "developed and producing properties," and the impossibility of getting money for prospecting work, will appreciate this fact, and hence it seems that any change in the manner of acquiring and holding claims should be in the interest of the man who has the brunt of this work to do. Nothing could be further from this or better calculated to crowd him to the wall, and to promote wholesale acquisition of the mineral lands by large corporations, than Mr. Freeland's proposition. With no obligation to discover mineral or to work the claim, the sole qualification would be the ability to pay the annual tax of $50 per claim, which at once places the prospector at a disadvantage as compared with the capitalist. On the basis of ten-acre claims an annual expenditure of $3200 would hold a mile square, even in the heart of any mining district. How many syndicates are there who would not be glad to hold large areas indefinitely on such terms, unexplored and unworked, awaiting developments? For $10,000 or $20,000 Randsburg, Cripple Creek or Mercur could have been smothered with such a law in force. Mr. Freeland says "the tax would prevent the holding of large blocks of claims by one person." Just how a payment of $50 per annum would accomplish in this regard what the requirement of an expenditure of $100 has notably failed to do he neglects to explain.

It, of course, is not strange that such a law should approve itself to the manager of ten companies at once, for it is directly in the interest of corporations; but to the little prospector it would mean annihilation. Many a man who for years has in good faith held and worked his claim never had or expects to have $50 at once; only in the sweat of his brow can he fulfill his obligations to the Government, and the imposition of the $50 tax would mean simply confiscation of his claim. At least, he should have the option of payment or work. Under this provision for annual tax, no discovery and no extra-lateral right, any blackmailer who had squatted a few years ago on the hanging side of one of the big Montana copper producers, and had paid a few $50 taxes, would long ere this have owned property valued at millions, through no merit of his own, only through the enterprise of the Haggins, Hearsts, Dalys and Bigelows. They could pay his price or he could take his property. True, the law would not be retroactive in this case, but history repeats, and there will be more Anacondas and Mountain Views.

Mr. Freeland continues: "Patenting could proceed, on payment of $500 per claim additional," on which he predicates the statement that "hearings, adverses and protests would be much abbreviated and delays lessened."

Patent proceedings are already entirely ex parte, and there are no hearings, adverses or protests at all, save in cases of conflicting surface boundaries. Such conflicts must and will arise at times, and there must be some tribunal and means for settling them. Even in the interest of the most stupendous land grab, it would hardly be maintained that the contestant's rights should be "abbreviated."

The claim that 90 per cent of litigation will be avoided is merely assertion, and probably far from the fact. While so-called "apex" and "continuity of the vein" cases may disappear with the abolition of extra-lateral rights, in their place will spring up a new lot of "mineral character" and "extra-lateral trespass" cases, with attendant applications for entrance to and survey of workings. The claim that mining litigation will be so far diminished as to restore prosperity to the farmers is also a trifle strained. The poor farmer is being overworked these days. We have just been through a long political campaign, where he was alternately held up as an awful example of the opposition policy or promised pie three times a day if he would assist in putting the other fellows in power. He had about come to the conclusion he was ill-used when the prosperity wheat crop shook him up again, and if we now convince him that the real sources of his misfortunes are adverse suits and lateral rights, he may get prejudiced against the whole mining industry—not a desirable result so long as our beneficent system contrives to invariably supply juries fresh from the alfalfa fields to try our mining cases. Let us let the farmer alone; he is doing pretty well, anyway, just now, and in any case he is best off when the laws best foster the true interests of the mining communities.

Mr. Freeland's charge that our mining law is "tainted with geology" is unanswerable, for it is probably true. The same baneful taint has an appreciable influence on all our mining operations. Whether the commission now revising the laws can put forth a code free from geology is yet to be seen.

If they finally evolve a law on the lines proposed by Mr. Freeland, it is to be hoped they will have the candor to entitle it "An act to facilitate the transfer of the mineral lands of the public domain to certain syndicates." R.

River Improvement.

Engineers Nurse and Randle of the Board of Public Works have submitted their report of the work necessary to be done for the improvement of the Sacramento and San Joaquin rivers, Cal.

The report states that, from the Elkhorn up, the river for a distance of about five miles, to the lower end of acceptable levees, numerous crevasses have occurred. These are known locally as the Butcher, Hershey and Jacobs breaks.

In this connection the report says: "The estimated number of cubic yards of earthwork required to repair the breaks and to build the four and one-fourth miles of necessary levee to a height of 3 feet above maximum flood plane with eight-degree crown and three degrees to one degree slopes will be 12,500. This, at 10 cents per cubic yard, will cost $12,550.

"In view of the magnitude of local agricultural interests long devastated by floods, it is to be hoped that the incidental restoration of better conditions resulting from the execution of the proposed plan of river improvement may serve as an incentive to concerted action of land owners and lead to the construction of a greater portion of the necessary levees this fall and winter, in order that no delay may attend the building of an easement as early next spring as the weather and river stage of the water will permit."

The report goes on to say that the site for an easement has not been definitely settled.

The proposed channel rectification of the San Joaquin river consists largely of cut-offs, and the excations necessary will cost about $35,000.

The present intention seems to be to remove the Newton shoals by a system of wing dams.

It Is.

Is it not true that many of San Francisco's manufacturing firms, who never saw a San Francisco daily, are well known to Colorado people through the medium of the MINING AND SCIENTIFIC PRESS?—The Mining and Industrial Reporter, Denver, Colorado, Oct., '97.

THE Pennsylvania Railway Co. broke its record between Louisville and Indianapolis Oct. 5th. The train left Louisville at 2 P. M. and reached Indianapolis at 4:08 P. M., a distance of 106 miles in 101 minutes. Five full stops and two slow-downs were made. The train was a special carrying Louisville commercial bodies.

California Mining Inventions.

To the Editor:—California has long led in improved mining machinery and as one scans the advertising columns of foreign journals, it is not unusual to find familiar cuts of machinery, set forth as "patented" articles of these countries, and all under different names, which the general reader of these foreign publications, unfamiliar with the advance, conceives to be the work of home talent, when of all these "patented" improvements, as applied to mining, it is probably within the limits of truth to say that three-fourths are simply an appropriation of California inventions. Years ago it was well known to our manufacturers, and the complaint may still be made, that no sooner was an improvement put forth in mining machinery, especially in stamp batteries and amalgamating devices, the work of Irving M. Scott, Zeneth Wheeler, Almarin B. Paul, Thos. Varney and many others, than their devices were "drafted" and put forward by others under different "patented" titles. It is time California asserted her due. One of the most glaring appropriations of California inventions is that of the Paul pulverizing barrel, now so generally in use in Europe and Australia. To illustrate this we have taken the trouble to prepare cuts of the original, and also of the foreign "patented" machines, and here give the names of those claiming to be the inventors of same. Almarin B. Paul of California was the inventor of "a pulverizing barrel for reducing ores *to have the material fed continously, and to automatically screen and discharge the same,*" the feature as given in italics, being the vital point of all of these ball pulverizers. The conception was first patented by Mr. Paul, May 10, 1870, and was first put to use by the Ransome Artificial Stone Co. of San Francisco in that year. This machine is illustrated by Fig. 1. This idea

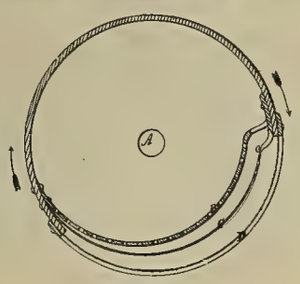

FIG. 1.

was enlarged upon by Paul, who in 1877 obtained a re-issue of his former patent when the barrel as represented by Fig. 2 was brought out. This bar-

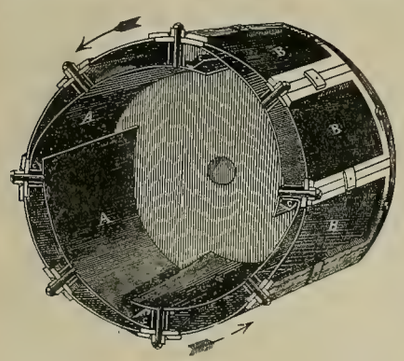

FIG. 2.

rel, though very complete, being ahead of its time, met with but a limited sale, but like every article possessing merit, in after years its value became to

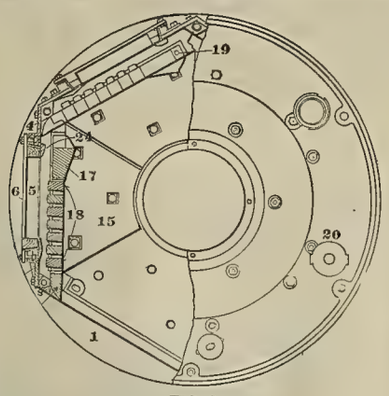

FIG. 3.

be appreciated, and appropriated at the same time. The first one to take the Paul idea of self screening inside and returning the unscreened ore for pulverizing was Miles M. Dodge of this city, who brought out the Dodge pulverizer, which is illustrated by Fig. 3.

This appropriation was amicably adjusted, but soon Paul's patents ran out, he receiving but a limited reward for this valuable invention, as to-day there are over 1000 of these barrels in use.

Now comes the point of this article. This barrel, which was unmistakably a California invention, is now heralded all over the mining world as a valuable one and is "patented" in the several foreign countries in which it is extensively used, notably Germany, England and Australia; the German "patentees" even having the audacity to bring it to the United States, offering it for sale to our miners. To further illustrate our position, a cut of the Grusonwerk ball mill, Fig. 4, patented in Germany

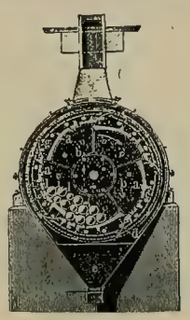

FIG. 4.

FIG. 5.

and now in use in Australia, is given. The mill is also known as the Fried Krupp mill. There are a large number in the Krupp works, and elsewhere in Germany, also in Australia, all going as a German invention.

Now comes the Jenisch "patent" ball mill of Herm Lohmert, Bromberg, Germany, which is heralded as a great and valuable "invention." An investigation of the cut, Fig. 5, shows how much of an invention it is as belonging to Germany.

The next of these machines which we find "patented" is the Otis ore crusher, patented by Hughs, Rigby & Perris of South Melbourne, Australia, Fig. 6. By the foregoing it is seen how our

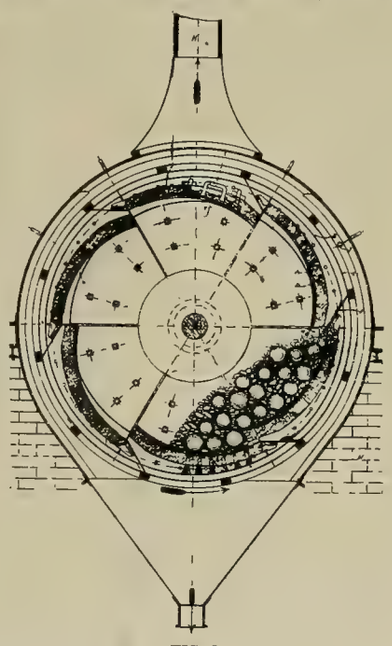

FIG. 6.

California inventions are appropriated by foreigners.

This appropriating of another's inventions, and palming them off as the work of their own brains, is worse than any literary plagiarism and should meet the condemnation of their own countrymen as well as every fair minded man.

So much for Paul's first invention. Seeing the principle, which was conceived some twenty-seven years ago now so generally recognized in Europe and Australia, as he first considered it, he improved upon his original idea, and has succeeded in bringing out a new ball mill on which the Government has allowed him a patent, as the most important step yet made in the line of ball pulverizers.

The main point of this new ball mill is, that it performs the work of automatically returning the unseived material into the center of the barrel for repulverization, and at the same time the crushing is all done with the wearing bars on a complete circle, thus allowing more square feet capacity for pulverizing, and more work to be done at less expense. Besides the mill costs less.

The feed is a central one, which allows the ore to more speedily distribute itself in the barrel during its reduction.

A device as a central circle is so arranged that overloading is at once perceptible, Fig. 7. The screening is all done during the revolution of the

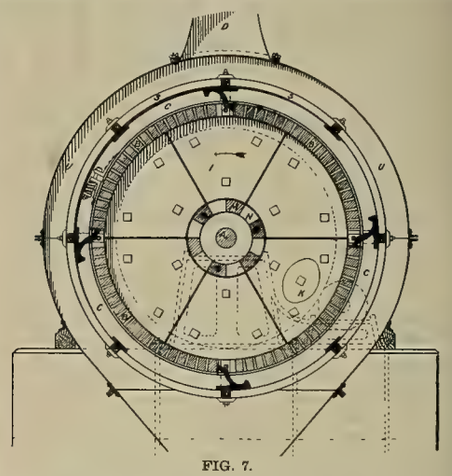

FIG. 7.

barrel, and of any size desired down to an impalpable powder. The barrel will work ores wet or dry equally well.

The merits of this barrel over all others yet put forth stand out so prominent that the Parke & Lacy Company of this city have secured from Mr. Paul the entire control of it, and they will soon commence the manufacture of the same in this city. They have the mill patented in other countries of the mining world.

Mr. Paul, who is one of California's oldest millmen, is strongly of the opinion that the principle on which this barrel is made is in time going to do away entirely with the stamp battery for the reduction of ores. He gives as another reason that as solution systems for securing the highest per cent of gold for the least cost are now coming fast to the front, and as this barrel system of reduction makes comparatively few slimes, which the stamp battery does to a great extent, that it at once becomes the most desirable way of reducing ore, to say nothing of it being done at less cost. Mr. Paul says he knows that it takes time for people to get old ideas out of their heads, but that it will come in time nevertheless.

San Francisco, Oct. 10th, '97.

Agricultural Possibilities of the Yukon Valley.

No doubt many on this coast will be interested in a sketch of the agricultural possibilities of the great Alaskan valley, which is now so prominent in the minds of gold seekers. It is from a Minnesota man, and the California reader will of course remember that his standards of comparison are very different from those a Californian would employ. The following is from a correspondent residing in Fairbault, Minnesota:

The Alaskan Winter.—The winters in the Yukon valley are not much different from those of northern Minnesota in their influence upon the white man. The cold is more prolonged and severe, but the extreme dryness of the air, in a large measure, offsets this difficulty, and a man who has labored outdoors through a northern Minnesota winter will not notice much difference in the cold of the two localities in its effect upon his constitution. On the Yukon there are frequent periods during the winter when a man must desist from all out-door work, and the thermometer drops down to 70° below zero, but I have on several occasions seen the mercury go as low as 60° below zero in Minnesota. From this, it appears that the cold is not to be regarded as so great an obstacle of that region as it has usually been.

Area and Soils.—The Yukon valley is so vast in extent that it is difficult to realize its size, and a very large portion of it is identical with the Red River valley of Minnesota in formation and in soil. The upper terraces of that portion of the Yukon valley which lies below the point where the river makes its exit from the mountains are immense level tracts of deep, rich soil which are only slightly broken at long intervals. So level, indeed, are these flats that the eye can seldom detect any change in the surface on them, and a furrow twenty-five miles long might be turned in many places without a break. The Pacific ocean exerts a profound influence on the climate of the valley, and the changes of the seasons are wonderfully abrupt and decisive. When the spring comes the sudden disappearance of the ice and snow, and the bursting forth of green verdure, are all but

magical. The quick growth of plant life, and the perfection it attains, are truly remarkable. But it seems to be fully accounted for when the conditions of soil and climate that exist in the valley are understood. During the summer the ground never entirely thaws out. The surface is quickly released from the frost to the depth of 4 to 10 feet, according to location and character of the soil, and this frozen state of the subsoil is the principal factor in the growth of plant life. The summer is one long day of three months' duration. The sun swings 'round in a circle and is above the horizon from twenty-one to twenty-four hours each day, so that, for this lengthy period, it never becomes dark, and the ground has no chance to chill; no frost falls, and the thermometer ranges from 90° upwards in the sun during these three months.

Moisture and Crops.—Again, the dryness of the air renders this prolonged, excessive heat as easy for man to withstand as a 75 to 95-degree temperature in Minnesota. It is seldom that rain falls during this short but potent summer, and storms of wind and hail are unknown. But the more prolonged the drought and heat may be the quicker and more perfect is the growth of all plant life present, and the wide valley is clothed in deepest green during these summer months. The secret of this is that an abundant supply of moisture is furnished by the frozen subsoil, that slowly thaws and steadily releases the water stored in it, which is brought to the surface through the channels of capillary evaporation. This moisture is but slightly above the freezing point when it is absorbed by the roots of the growing plants, and it must exert a highly beneficial influence by counteracting the fierce heat that steadily assails the surface of the ground. Under these peculiar conditions of the natural forces of nature it is easily realized that a number of our staple crops will succeed and reach perfection in the Yukon valley. Scotch Fife wheat produces enormous yields of the very highest grade of that grain, which has been proved, by test, to make the best class of patent fancy flour. Barley and oats, potatoes and roots of all sorts, and many of the garden vegetables, also reach surprising perfection. In the case of barley grown in the Yukon valley, the malt makers would likely find the very highest grade of grain for their use, which might soon take precedence throughout the world. The growing barley would not be subject to the vicissitudes it is in the States, and especially it would escape the injury from rains during harvest, and when standing in the shock, which lowers the quality of this grain more than any other.

Present State of Farming.—There are already a number of small farms in the valley which have been opened by disappointed gold seekers, and it is from the results secured on these that I have drawn my most trustworthy information. These farmers are reaping a rich harvest of dollars. The miners stand ready to pay high prices for vegetables, and even for grains, which they grind into coarse meal for bread. This is the golden side of the picture of prospective farm life in that semi-polar region.

The Drawbacks.—But there is a darker side to life in that far northern country, which will likely appear to those used to the comforts of farm homes in the States as insurmountable. The long, cold winter, with its constant night of nearly three months, when the landscape is wrapped in deep gloom, and when only a faint flicker of twilight and the changing play of the aurora borealis shining on the white snow reflect a faint, uncertain light, is likely to give a dubious aspect to the Yukon country. This dismal and dangerous period of the year, coupled with the incredible swarms of mosquitoes and flies in the summer, which make it impossible for horses or cattle to exist, seems to outweigh the favorable features of the valley. Mules and the reindeer will be the beasts of burden in that country if it be ever brought under cultivation. Sheep and hogs will, no doubt, be easily acclimated, and goats may take the place of the cow. The reindeer is a very valuable animal. It makes an excellent beast of burden, furnishes good meat, is easily reared, and is in its native home in that climate, and will take the place of the horse and the ox.

Anticipations.—If, however, a railroad should be built to connect the great Yukon valley with the commercial world, and wheat growing prove to be a profitable business there, the work would likely be done mostly by steam. There is plenty of coal in all districts of the valley, which will furnish cheap fuel for every purpose. On those great flats a traction engine can run a gang plow, turning furrows miles in length, and fields of 50,000 or more acres of wheat would likely be a common sight. The people could live in villages for mutual protection, and in the spring, summer and fall carry forward their farm work on the largest scale. Here the bonanza farm would find its true sphere, with room for all who wished to enter that class of business, and the great Yukon valley could be made to supply the marts of the world with the very highest grade of wheat that would, no doubt, command a better price than that of any other country. Neither are we to presume that this is a painting of the fancy. It will likely become a reality at no distant date.

Gold: The Coming Golden Age.

Extracts from an address by ALMARIN B. PAUL before the California Pioneer Association, Oct. 4, 1897.

* * * * *

How far back in the world's history when gold was first discovered and received the adoration of man is mere conjecture. The most reliable authority points to India, as the oldest of Hindoo records speak of it. That it possesses a remarkable charm for the human family, history of all the ages clearly testify. Not only does it possess a charm, but an influence and a force which at times moves actively the people of the earth, and even nations bow to its silent power.

Its influence for good is widespread and more potent than its influence for evil. We can say that civilization dawned when mining for gold became a pursuit, and history of all the ages shows that the greater the volume of gold and silver produced, the higher intellectually was the standard of the times, as then arts, science and literature flourished.

The dazzling glory of Syria, Greece and Rome was when gold poured lavishly into their treasuries. History of the past, of nations and individuals, respecting the vast treasures of gold possessed by them, is romantic reading. The wealth of men of modern times does not begin to equal the adulation or riches of single individuals of 3000 years ago. * * * * Our purpose at this time, however, is not to deal in the gilded periods of the silent past, but rather to present the more practical and instructive picture of the present; so we will gather the volume of the world's gold at the time when the pioneers of California became fired with the spirit of adventure and launched their "Argo" for the land of gold in search of the golden fleece of the 19th century. As the mind rests, and reviews the historic golden periods of the world prior to the discovery of gold in California, then this of our own golden epoch, as the pioneer knows it, and as it has left the record of pioneer times, we, as actors in this drama, can feel and safely say that it was not only the grandest period of our individual lives, but it was the grandest of any age. It stirred the world to its outermost parts, electrified the human mind, and brought to these then far-off shores, in a single year, 100,000 of the brainiest men of every nation, who built cities and towns, opened highways and byways as by magic, and who, within a period of five years, extracted from the rivers and gulches of California $265,500,000, and by it saved the business world from an impending crushing financial crisis. At the opening of this brilliant period, say, 1st of January, '49, the entire bulk of gold in the world, as near as can be estimated, was $1,800,250,000, and from this date can we say was laid the foundation of the golden age of the 20th century.

The discovery of gold in California and the energetic work of the pioneers in disbursing over the world $550,000,000 in ten years, gave an impetus to explorations in other parts, which has resulted in great discoveries elsewhere, so that the bulk of gold in the world to day reaches close on to $4,500,000,000.

That there is opening a marvelous golden period, and one that should greatly enliven all branches of business, only those who keep up with the advancement and general output of gold all over the world can grasp. That the future may be comprehended as expressed, we will review the world's product of gold for the past twenty years.

Without going into details of the first ten years of this twenty, we will simply say that from 1877 to 1887 the world's total product was $1,055,000,000, and, that the advance of production may be clearly seen, I will now enumerate the yearly product from 1887 to 1897, as follows:

1887	$105,775,000
1888	110,197,000
1889	123,480,000
1890	128,819,000
1891	130,650,000
1892	146,293,000
1893	158,522,000
1894	177,642,000
1895	183,842,000
1896	210,000,000
Total	$1,475,220,000

Thus, you will see that within ten years the yearly yield has doubled, and thus it will be seen, also, that this latter ten years over the previous ten years has an increase of production of $420,220,000, and that the latter five years, over the preceding five, exceeds it by $277,378,000, and this ratio, even, will be exceeded in the coming years.

The year 1897 will produce not less than $240,000,000, and this without considering Klondike. South Africa alone will produce certainly $45,000,000, and, possibly, $50,000,000. Really, I would not be surprised should immigration flow into the Northern gold fields, as all indications lead us to think, but what the yield for '97 will reach $260,000,000. The opening of the 20th century, I am satisfied, will see the world's yearly product of gold reach the enormous sum of $300,000,000. To my mind, this vast accumulation of gold will soon become an exciting, if not an alarming, question for the financial world. There are many reasons for this:

First—The large area of the earth's surface that has of later years been found to be rich in gold.

Second—The great strides made in mechanical devices for cheapening the reduction of ores, and in explosives for extracting them.

Third—The great advance in metallurgical systems, whereby 40 per cent more gold can be saved, at one-third less cost, than twenty-five years ago.

Thus, it will be seen, that gold will soon be as plentiful "as stones in Jerusalem." In Klondike I have an abiding faith, and when I say Klondike, I mean the whole Alaskan and Northwest provinces and reaching on to the Arctic ocean. My reasons are not altogether founded on what gold has been taken from these parts, but on scientific grounds as well, which in as few words as possible I will explain.

The scientific world generally in later years concedes the fact that the metals are a product from solutions precipitated by nature's electrical forces. It is an established scientific fact, also, that there are continuous magnetic earth currents ever flowing from the south to the north pole, and that the electrical earth currents are the opposite, and, through this natural electro-magnetic action, precipitation of the metals, as carried by the thermal waters, from the surrounding rocks takes place. It is also an ascertained fact that the nearer we approach to the north pole the stronger are the electro-magnetic currents; hence, the heavier is likely to be precipitation of the metals.

This is no new idea; it reaches back, to my certain knowledge, for over fifty years; yet it is only in more recent ones that its truth has been fully recognized. So clearly is this principle now understood that in many of our advanced metallurgical establishments the metals are thrown into solutions and by electro-magnetic forces precipitated. It is a plain, simple, practical, every-day operation, but nature operates on a larger scale.

Thus, I am led to say that I would not be surprised at any time to hear of bodies of gold being found in this great northern gold field that will startle the business world. As corroborative of this idea, I will say that previous to the opening of the Lake Superior copper mines, nuggets of native copper of any size were not known. The largest and only piece up to that time was found in the Ural mountains of Russia; it weighed, if my memory is correct, about twenty-five pounds, and was the wonder of the metallurgical world, as much so as a 1000-pound nugget of gold would be to-day. Thus, for countless ages a mass of native copper was unknown and doubted.

Within a year after the opening of the Lake Superior mines, in 1846, at the Cliff mine, on Lake Superior, was unearthed a solid piece of pure copper that weighed 75,000 pounds. This mass I saw myself when uncovered in the mine. Since this time shiploads and carloads by the thousands of native copper have been mined. One may say but this was copper. I will answer: Nature places no more value on gold than copper, yet copper-bearing solutions may be more abundant than gold. Thus, you will see from the foregoing that my expectations are great from the gold fields of the North. I would not be surprised if in time the yield would overreach that of California; yet when we consider that California has produced $1,290,779,000 up to the 1st day of January, 1897, showing a yearly yield of $26,891,041 for forty-eight years, we can see that the great Northwest has some business on hand before she can claim to be the peer of California, notwithstanding her greater area of territory. That we are moving on towards a brilliant period, the figures I have given you clearly illustrate.

There is only one dark cloud on the clear sky of the future, and this is the crushing force of combined capital, nursed by the soulless greed of corporate power. To dispel this cloud wise and just laws must be enacted, that the many, as well as the few, may share in the riches and comforts of God's generous gifts.

The greatness and grandeur of the 20th century, with all the advantages of this coming wealth, and our present knowledge of astronomical, electrical, chemical and mechanical sciences, is beyond our present mental scope to grasp. About fifty-five years ago was published a work entitled "Vestiges of Creation." The writer, through scientific deductions, pictured this then wild, unforbidden Western world, meaning all west of the Rocky mountains, as, in the coming time, the seat of a people greatly advanced in intellectual and physical structure and the home of the noblest men and women of all the ages. The pioneers of this region have laid the foundation, and all things point to a realization of what then seemed but a fanciful dream. The pioneers of California have done their part, and the true history of their time is yet to be written, as the greatness of periods and men only come to the front when the actors are dead. A few of us still live to see the expanse, beauty and value of our planting, but our period will soon be closed. For our descendants and the new generation comes a new age, with new ideas, and issues, broader thoughts, and grander labors, and may they—the blood of the California pioneer—grasp the greatness of their period, and ever prove, in intellectual, moral and physical power, equal for the advance and greatness of the coming golden age of the 20th century.

Scientific Progress.

Calcium Carbide and Acetylene Gas.

The popular idea that calcium carbide is a discovery of very recent times is incorrect. It is a product that has been known for many years, although it did not come into commercial prominence until 1894.

It is a well-conceded fact that Davy had obtained calcium carbide when he noted that a residuum containing aurate of potassium in combination with water generated an evil-smelling gas.

In 1862 Wohler wrote, in the "Annalen der Chemie und Pharmacie":

"The mixture of zinc and calcium in combination with carbon will produce, through the agency of a very high temperature, a carbon calcium. The most remarkable peculiarity of this combination is that when it is brought into contact with water it decomposes into hydrate of lime and acetylene, the same carburetted hydrogen which was discovered by Davy."

In 1893 Travers heated a melted mixture of sodium, calcium chloride and powdered retort graphite for ten minutes in an iron flask, and thereby produced a smelted product containing 16 per cent calcium carbide.

In 1894 Maissan produced calcium carbide by heating in an electrical oven 120 grams of oxide of calcium and 70 grams of sugar coal. The oven was heated to 3500° C. through a current of 350 amperes and 70 volts for from fifteen to twenty minutes. The product weighed 150 grams. This reaction is shown in the following equations:

$$(I)\ CaO+C=Ca+CO.$$
$$(II)\ Ca+C_2=Ca+C_2.$$

Maissan did not look upon his process as being patentable, knowing that calcium carbide, its productions and leading properties were known to chemical literature.

Bullier received in February, 1894, from the German Government, under No. 77,168, a patent for the process of manufacture of "calcium-baryum-strontium-carbid," after the method or process of Maissan. This, when it became known, caused considerable surprise. Later in the same year the experiments of Wilson at Spray, North Carolina, became known.

Calcium carbide is generally produced in ovens similar to those used for aluminum, according to the Heroult system.

Calcium carbide is a hard, bluish-black, clear, crystalline body (exceptional bodies are reddish brown, shiny), and is impervious to light. It is insoluble in all known dissolvent elements; it possesses at 18° C. the specific gravity of 2.22, and its electrical conductibility nearest resembles that of carbon. Dry carbide can be submitted to the action of a powerful gas flame without exhibiting any changes; on the other hand, when heated in an oxygen atmosphere it readily ignites and burns with a strong development of light into calcium carbonate. Hydrogen does not affect it at either a high or low temperature.

When exposed for a short time to damp air it exhibits disintegration, the outer surfaces become crumbly and the color lighter, and a very penetrating odor, strongly resembling that of garlic, is emitted.

When water is poured over calcium carbide a violent generation of gas takes place. The carbide readily divides under the influence of water into acetylene and calcium hydroxide ($CaC_2+2H_2O=C_2H_2+Ca(OH)_2$). It is manufactured in this country at Niagara Falls, N. Y.

The Aluminum-Industrie-Actien-Gesellschaft in Neuhausen, Switzerland, as well as the Electrochemische Werke G. m. b. H., in Bitterfeld, Germany, manufacture calcium carbide which averages in quality 79 per cent. From this percentage 3118 kilograms (6002.9 pounds) of calcium carbide are necessary to produce 1000 kilograms (0.875 cubic meter) of acetylene. It is impossible to ascertain the cost of the production of calcium carbide from either of the above mentioned factories, but taking as a basis the lowest wholesale price of the carbide at 40 marks ($9.52) per 1000 kilograms (2204.6 pounds), then the cost of 1000 kilograms (0.875 cubic meter) of acetylene will be 1247.20 marks ($296.93).

It may be further added that, in addition to the above use of calcium carbide, it can be used advantageously in metal refining, especially for reductive purposes in the manufacture of ingot iron.

The principal feature of acetylene gas is that it burns with great intensity of light. The flame emits a fine soot when burned with an ordinary burner, therefore it should be burned with one specially constructed for this gas, so as to insure complete combustion; then, the flame is blinding white in color and possesses about ten times the intensity of common illuminating gas. When the proper quantity of oxygen necessary for complete combustion is mixed with the acetylene, as shown in the equation $C_2H_2+O_5=2CO_2+H_2O$, a strong explosion takes place when the flame is ignited. The acetylene must, however, be under water pressure, thereby insuring a proper distribution in the pipes as well as a steady flame.

This illuminant has the very great advantage of giving a great amount of light with very little heat; in comparison with the "illuminating" gas, it generates not quite one-half the amount of carbonic anhydride and vapor.

Additional importance is to be given to the fact that acetylene in a liquid state can be used for lighting purposes.

The fact that acetylene is poisonous demands consideration; but this point appears to be frequently exaggerated. As shown by Frank and Weyl, mice and rabbits can remain in a 4 per cent acetylene atmosphere without exhibiting any evil effects.

It may also be remarked that this gas should be handled with considerable care in experiments, as its tendency to severe explosions has been but too sadly demonstrated on both sides of the Atlantic. To this end, caution should be exercised in the following details:

1. Copper should not be used on any part of the pipes, cocks, burners or apparatus, as the contact of acetylene with this metal will shortly be followed by an explosion.

2. The gas should be under sufficient water pressure to insure proper velocity in its distribution through the pipes; if the pressure is weak, the flame is liable to sink through the burner into the pipe. The result of such an accident will be an explosion.

Possibilities of the Commercial Use of Liquid Air.

By Elihu Thomson.

The well-known effect of cooling by liquid air or like gases a conducting metal like copper is almost to abolish its electrical resistance. Consequently a conductor so cooled is able to carry very much larger currents with less loss than at ordinary temperatures. This fact has attracted the notice of electricians and physicists for a long time past. It has recently been found that liquid air is one of the most perfect insulators, and that insulating materials cooled to the temperature of liquid air are greatly improved in insulating qualities. It is known also that cooling renders it more difficult to cause a spark to occur between oppositely electrified conductors, the striking distance for a given pressure being diminished. The stability or permanence of liquid air in bulk, even when it is fully open to the ordinary atmosphere or kept at atmospheric pressure, is, of course, simply dependent upon the heat insulation provided, and if this could be made perfect, the air would never evaporate. Recent methods, such as those of Linde, make it possible to obtain large quantities of liquid air by simple means and with moderate expenditure of power. Cataract power is twenty-four-hour power, and as there are but few industries demanding power for the whole day, it must follow that in the case of many large plants surplus power is either not used or wasted, and that to keep the plant working night and day at full capacity is desirable, even if some of the power only yields a moderate return. Can it not be used in making liquid air? Cannot the excess at certain times of day be put to use in compressing air to be afterward liquefied on the large scale? It would seem that large tanks of liquid air can be heat-insulated very perfectly by layers of air and fibrous material properly placed outside. The evaporated air from the tank could traverse the jacketings in successive order from within outward, and help to keep down the temperature of the jacketings. A furnace with an internal temperature of 2000° to 3000° above the normal temperature is easily insulated by moderate thicknesses of asbestos or other fibrous coating, so that the outside temperature is but slightly above the normal. The temperature difference between liquid air and normal air is, say, one-eighth of that between the interior of the furnace assumed and the normal, so that it ought to be possible to insulate so that but little heat would enter. In most electric long-distance transmission lines a loss on the line of about 10 to 15 per cent is suffered. If the conductors were immersed in a pipe with liquid air, the loss might fall to not over 1 to 2 per cent, perhaps, leaving available a large power for condensing air to supply evaporation. It may be possible that a much higher voltage than is now used may be successfully used with conductors cooled and insulated by liquid air. If the potential could be raised, either the loss on the conductors for a given power transmitted would fall off as the inverse square of the voltage, or the conductors could be made smaller in the same proportion, or the distance of transmission increased with the same section of conductors as the square of the potential. These are matters worthy of experimental determination. The limit to the capacity of an electric transformer to transfer energy from its primary to its secondary circuit is found in the heating and loss involved in the copper conductors comprising these circuits, and upon the nearness with which the two circuits may be placed one to the other, which is in turn governed by the insulating material used to separate them. Could the conductors be kept cool by liquid air, and thereby their conductivity and insulation greatly increased, the work of transfer in a transformer could be much greater for a given size than it now is, although 3 per cent is sacrificed in ordinary practice. Transformers in liquid air might be made entirely of copper without iron. A transformer without iron would moreover avoid the loss in the iron and would permit a saving in material.

A new solvent for chloride of silver is found in accordance with the fact that much in the same way that most insoluble silver compounds dissolve in ammonia, so do they dissolve in the very similar volatile alkali methylamine—methylamine being ammonia in which one atom of hydrogen is replaced by the radicle methyl. Thus, ammonia is NHHH, and methylamine is NHH (CH_3). R. Jarry finds that when the solution of silver chloride is evaporated, bi-refractive crystals are deposited which consist of one molecule of silver chloride united with one molecule of methylamine. Gaseous methylamine unites with dry silver chloride to form the same compound.

The following are the compositions of some of the most prized of the Japanese copper alloys: One hundred parts of copper with from one to ten parts of gold constitute the varieties of skadko, which is colored bluish-black with copper sulphate, alum and copper oxide. The gray quishibuishi contains, besides copper, some 30 to 50 per cent of silver. Sinchu, the best Japanese brass, consists of 100 parts copper, 50 parts zinc. And, lastly, a bell-metal is made up of 100 parts copper, 15 parts zinc, 40 parts tin and 5 parts of iron.

Mechanical Progress.

Uses for Gilsonite.

The discovery that gilsonite, the new asphaltum which has been found on Indian lands in Utah, and will protect a ship's bottom from seaweed and corrosion, is likely to end the attempts of speculators to induce the Government to open these lands to entry. If the Government owns the only gilsonite deposit known, it will hardly consent to make it an article of commerce available for use to foreign navies. A monopoly will enable our war vessels to keep the sea indefinitely, while foreign ships are obliged to seek port at short intervals to be scraped and cleaned. It would be worth millions of dollars to this country in a war to always have the best speed of its cruisers available. At present a cruiser long in service, that made twenty knots on her trial trip, only makes fourteen or fifteen because of her foul bottom; but, with the hull painted with gilsonite, twenty knots could be run, if the stories about the new asphaltum are true, by a vessel which has not been docked in years, always providing that no accident should intervene. The probability that piles could be protected from the teredo by this new substance is not great, but it would bear looking into. At present, however, the chief advantage of its use is naval, and this is enough to warrant the Government in guarding it with jealous care. Inventions may be copied, naval plans stolen and engines and ships duplicated; but, if we have all the gilsonite there is, and that on Government land, we can keep it for our own use, no matter what the anxiety of foreign naval officers may be to get some of it for theirs.

Of Interest to Boiler Makers.

That galvanized sheets which are made of steel with the oxide formed in rolling removed, and then coated with spelter, are not more generally used in boiler or tank works is because the advantages thereof are not sufficiently understood. The extreme cheapness of steel plate and improvement in manipulating same has been followed by the general substitution of steel plate stacks and chimneys for brick. It is, however, well for boiler makers to remember that the action of moisture, especially when impregnated with sulphur arising from soft coal, has a destructive influence on steel plates, rusting rapidly, particularly in the lighter gauges. This may be delayed by frequent painting or varnishing. The coating of spelter or steel sheet is impervious to moisture, and therefore the life of the metal is preserved indefinitely, especially where it may be painted with ordinary commercial stack or boiler paints. Boiler makers should remember that unless they call the attention of their customers to this fact, they will find a large and profitable part of their business leaving them on account of the short life of the ordinary steel stack as now made, because the first cost of the brick chimneys will be of less importance than the inconvenience and cost of having to replace a steel stack or chimney.

A method of preserving boilers not in general use has been prescribed for the French navy. The boilers are completely filled with fresh water; in the case of large boilers with large tubes there is added to the water milk of lime; in the case of tubular boilers with small tubes soda is added, the solution, however, not being so strong as for the larger tubes, in order to avoid any danger of contracting the effective area by deposit from the solution. The strength of the solution is to be just sufficient to neutralize any acidity of the water. Care is enjoined to be taken to preserve the outside of the steel or iron tubes in those boilers which are not to be used for long periods; such are for this purpose painted with red lead or coal tar as far as is possible to reach, while for those portions which are inaccessible a protect-

ive coating is obtained by burning under the tubes a certain amount of tar or coal tar, the smoke of these forming a coating of soot, which prevents the air from reaching the surface of the tubes. Besides this treatment, the boiler casing is closed and kept airtight, after some quicklime has been placed inside. Periodical inspections of these boilers are made to insure the complete filling of the tubes.

In a paper recently read before the Institute of Mining Engineers by D. H. Bacon some interesting comparisons are drawn in regard to past and present production of iron ores in the Lake Superior district. Up to 1870 a 700-ton ship was an enormous craft as an iron ore carrier in that district, the loading of which required at least two days. In 1871 the largest ore barge carried 1050 tons, and made twelve trips per season. Now the cargoes reach 5000 tons, the loading requiring less than three hours and the unloading ten hours. The annual shipments have grown from a few thousand to 10,000,000 tons, and the ability of the mines to produce is not taxed. Great savings have been made in each detail of each department. As illustrating the cheapening that has been effected, ore is to-day sold at Lake Erie ports for $1 per ton less than in early times it actually cost to mine it, and this is done without loss, and further economies may be expected. Nitro-glycerine and power-drills have done more to reduce cost than any other two improvements. In 1871 a drift at the Cleveland mine cost $100 per foot. Now the cost would not exceed $16. As viewed from the present experience the early methods of mining were very crude. Horses furnished the power and they were worked in all possible places. The little machinery then in use was poor and often but ill-adapted to the work. Now single, compound, triple and condensing engines of large power are found throughout the iron ranges for hoisting, pumping and compressing. The striking hammer has been supplanted by the power drill, and electric motors and rope-haulage are common above and below ground. Underhand, back and breast stoping, square sets, caving sets, saddle-backs, and milling and filling are common. Steam shovels and locomotives have taken the place of hand shovels and carts.

Electrical Progress.

The Sacramento Meeting.

A meeting of the Pacific Coast Electric Transmission Association was held in Sacramento, Cal., last Wednesday, the 20th inst., and was well attended by members of the organization. Those present were C. P. Gilbert, president, manager of the Sacramento Electric, Gas and Railway Company; Robert McF Doble, secretary, manager of the Blue Lakes Water Company; L. M. Hancock, chief electrician of the Nevada County Electric Power Company; Dr. C. Van Norden, general manager of the Central California Electric Company; E. W. Sutcliffe, superintendent Central California Electric Company; R. W. Van Norden, assistant superintendent Central California Power Company; C. W. Hutton, chief electrician Sacramento Electric, Gas and Railway Company; August J. Bowie, Jr., assistant electrician Sacramento Electric, Gas and Railway Company; F. T. Vanatta, chief electrician Yuba Power Company; E. J. DeSabla, Jr., manager Nevada County Electric Company; John Martin, manager Yuba Power Company; T. A. W. Shock, Sacramento Electric, Gas and Railway Company; M. L. Osler, San Francisco; S. Morgan Smith, Yorke, Pa.; C. N. Beal, manager Power Development Company, Bakersfield; Theo. O. Theberath; T. S. Lee, San Francisco, and M. W. Stewart, electrical engineer.

The meeting was called to order by President Gilbert, who introduced Mayor Hubbard, who said Sacramento has a great deal of electricity, which is being largely utilized for all purposes, though as yet the people know very little about it, and he hoped that the present meeting of electricians would throw light upon a dark subject.

The membership of the Pacific Coast Electric Transmission Association is composed from the following companies: Blue Lake Water Company, Amador county; Big Creek Power Company, Santa Cruz; Southern California Power Company, Redlands; Central California Electric Company and Sacramento Electric, Gas and Railway Company, Sacramento; San Joaquin Electric Company, Fresno; Power Development Company, Bakersfield; Portland General Electric Company, Portland, Or.; Nevada County Electric Power Company, Nevada City; and San Gabriel Electric Company, Los Angeles.

President Gilbert stated that the meeting would be informal, and would be devoted entirely to the reading of technical and scientific papers on hydraulics and electricity and discussions of the same.

S. N. Smith read an interesting paper on hydraulics, and the discussion which followed covered a wide range. This was followed by an able paper on "Governors," written by S. N. Knight of Sutter Creek. Mr. Knight was not present, but his paper was the cause for a lengthy discussion, during which water governors of all descriptions came up for criticism, the consensus of opinion being that hand governors give best satisfaction.

Papers on "Insulation," from Henry B. Sears and C. S. Newell of Boston, were next read, and these were followed by John Martin of the Yuba Company, who gave exhaustive and practical reasons why glass insulators were preferable to those made of porcelain.

Superintendent Sutcliffe's paper on "Protection Against Lightning," was listened to with great interest, and several other essays on similar subjects occupied the attention of the meeting until a late hour.

The Southern California Power Company of Redlands this week filed a contract on the part of the company with Thornton & Leonhardt of Los Angeles, to construct a power house on the north bank of the Santa Ana river. Another contract entered into with the firm of Fairchild & Gilmore of Los Angeles is for tunnelling, etc., involving the expenditure of $100,000. The power house agrees to pay 20 cents per cubic yard for earth excavations, 50 cents for pan excavations, 50 cents for loose rock, and $1 for solid rock. The amount to be paid for masonry and the concrete work is also specified in detail. The building will be of concrete and granite boulder masonry, and the foundations and water-ways will be concrete. There will be foundations for sixgenerators of 1000 H. P. each and three smaller generators, all with their water-wheels. The structure will cost $20,000.

In the course of experiments, M. Hemptinne has discovered that a Crookes' tube in proximity to a high-potential electric discharge facilitates the action of the latter at a greater gaseous pressure than the normal. For instance, with the apparatus used, the pressure of hydrogen had to be reduced to 71 mm. before luminescence ensued throughout the extent of the gas. When, however, a Crookes' tube at short distance was put in action the same phenomena were produced at 94 mm. pressure. An aluminum screen was interposed to cut off all but x-rays. Tests with various organic and other elastic fluids were undertaken; and, although no constant could be deduced from the results, it appears that the higher the molecular weight of the gas the greater is the proportional effect of the Roentgen ray.

An unusually large multiplate static machine has been completed by a New York firm to the order of a medical practitioner. It is of the Holtz type, having eight ⅜-inch plate glass plates 5 feet in diameter, mounted upon a 4-inch steel shaft, supported on roller bearings. A Tœpler-Holtz machine, fitted in one corner of the glass case containing the apparatus, serves as a separate or initial exciter. The plates weigh nearly 1,000 pounds, and are intended to revolve at a speed of 250 revolutions per minute, it being anticipated that under favorable conditions a 30-inch spark can be obtained. The machine is enclosed in an oak and glass case 11 feet wide, 5 feet deep and 9 feet high, rendered practically airtight by rubber gaskets.

Deeds of assignment were filed in Marysville last Wednesday conveying from F. W. Page to John Martin, representing himself, E. J. Desabla, Jr., of Nevada county, and R. R. Colgate, of New York, the lease of waters in transit from the Brown's valley irrigation canal, and fifty years' assignment of franchises heretofore granted F. W. Page or assigns by the city of Marysville and the county of Yuba. They purpose erecting and maintaining an electric power plant. They have contracted with the Brown's valley mines to supply all necessary power, commencing April 1st next. Power will be supplied by the Sperry Flour Company of Marysville.

Electricity will henceforth be used as power for operating the W. Y. O. D. mill in place of steam, arrangements having been completed with the Electric Power Company for this purpose. Temporarily one of the Gold Hill Company's motors will be used. The W. Y. O. D. is showing great improvement and the twenty stamps will be kept running all the time.—Union, Grass Valley, Cal., Oct. 20.

Commercial Paragraphs.

The J. H. Montgomery Machinery Company of Denver, Colo., report the shipment of two cars of mining machinery to the Kassar Gold Mining and Milling Company, of Globe, Arizona, this week.

The Colorado Iron Works Company, of Denver, Colo., report the following shipments: One carload machinery to Boston Battle Mountain Manufacturing Company, Victor, Colo.; one carload machinery to Metallic Extraction Company, Cyanide, Colo.; 5-stamp mill, with crusher, etc., to Westchester Manufacturing Company, Breckenridge, Colo.

The pipe for the LaGrange Company, at Stewart's Fork, of which William H. Radford is superintendent, was manufactured for Schaw, Ingram & Batcher, of Sacramento, Cal., at Springfield, Illinois, of boiler steel and of various thickness up to ⅝ of an inch, the pipe being 30 inches in diameter. It weighed 586,000 pounds; railroad freight charges were $5500 to Redding, whence it was shipped on wagons to its destination by contract to F. N. Woods for $6400. The pipe shipped to the French company at Junction City, E. Saladin, manager, was made by Schaw, Ingram & Batcher in Sacramento, and was thinner than that for the LaGrange Company, but about the same diameter. This pipe weighed 450,000 pounds; railroad freight charges were $1600. The freight charges from Redding to Junction City were $5050.

The largest hoisting engine in the State of Montana will in a short time be in operation at the St. Lawrence No. 1 shaft of the Anaconda Company. The engine, which is being installed at the present time, was built by the Union Iron Works of San Francisco, its cylinder dimensions being 30x72. It will have a capacity of handling two four-deck cages to a depth of 5000 feet or over. The new engine room is of brick on a solid stone foundation and stands south of the old shaft house. To supply steam to the big engines five mammoth upright Berry safety boilers were recently installed in a building about 200 feet east of the engine room. The plant is a model one in every respect, no expense being spared in its equipment. The first steel gallows frame in the State will be in use at this mine. The frame is now in place and only the finishing touches are needed to the big engine to have the new plant in operation. The gallows frame is 113 feet from base to top, but its base being 18 feet below the collar of the shaft makes it 95 feet in the clear from top to mouth of shaft.

A notable addition to the already extensive electrical plant of the Niagara Falls Hydraulic Power and Manufacturing Company in the power house at the foot of the cliff, at Niagara Falls, New York, will shortly be made in the form of a General Electric Company electrolytic generator, which will be the largest of its kind ever constructed. It will be both liberally and carefully designed to enable it to cope with the very severe service of electrolytic work, i. e., for practically continuous operation. This machine will have fourteen poles and will run at 257 revolutions, giving an output of 5000 amperes at 175 volts, or a capacity of 875 Kilowatts. It will be of the largest type and will be directly connected to the water wheel shaft. It will be provided with a special panel switchboard with full form K equipment of instruments necessary to handle a current of 5000 amperes. The General Electric Company is already well represented in the power house of the Niagara Falls Hydraulic and Manufacturing Company. Two of its six-pole, 560 K. W., 300 revolution, 650 volt railway machines, both directly coupled to the same turbine shaft supply current to the Great Gorge Railway. In addition the station contains a General Electric booster and two other generators, one of 100 and one of 90 K. W.

Coast Industrial Notes.

—The San Francisco Chamber of Commerce last Wednesday adopted resolutions to be forwarded to the California Representatives, calling for the establishment of a Department of Commerce and Industry in the executive branch of the Government.

—At Eureka, Cal., the Dolbeer and Carson Lumber Company will on November 1 pay its eighty men an increase of 25 per cent. The Elk River Mill and Lumber Company, owing to an advance in the price of redwood of $2 per thousand, caused by increased shipments to Australia, will resume operations next Monday with a full complement of employes, after being closed down for fifteen months.

—Henry R. Woods of Scotland is in Victoria in connection with the proposal of an English shipping syndicate to enter into the carrying trade between there and the Yukon next spring. He estimates that 100,000 people will leave England for the Klondike, and his company wants a share of this trade. He proposes to put on four 1000-ton steamers, to load at London and bring out about 3000 passengers each. He will probably reconsider his idea after getting some information as to the facts.

—Beginning on the 31st inst. a new steamship service will be started from Portland, Or., to Yokohama and Shanghai and Hong Kong, China. It will be run in connection with the Oregon Railway and Navigation Company. Three steamers will constitute the service, the Braemer, the Mogulam and the Pelican. They will leave Portland in the order named, approximately every three weeks, beginning with the last day of the month. The new Transpacific service will be known as the Northern Pacific Steamship Company, Portland line.

—The steamship Alameda from Australia yesterday brought 400,000 English sovereigns, about equal to $2,000,000, consigned to the Anglo-Californian and the London, Paris and American banks of San Francisco, the third shipment of gold from the same source on as many consecutive steamships, aggregating nearly $8,000,000 within the last three months. The Mariposa came in August with 450,000 sovereigns; the Moana brought 740,000 sovereigns, and $310,000 in gold bars from New Zealand. Adding the $2,000,000 on the Alameda brings the total up to $8,000,000 for the fall season thus far, a pretty good Klondike for California.

—Edward Strasburg, manager of the American Crude Oil Company, has been appointed secretary and general superintendent of the Los Angeles oil producers' trustees. The *Times* says Mr. Strasburg took an active part in the executive control of the old Los Angeles Oil Exchange in the days of 30-cent oil. At that time a plan of exporting oil to San Francisco was successfully carried into effect, and after several weeks of hard work the price of crude oil was advanced, step by step, until dollar oil dominated the local market. If necessary the San Francisco market will again be resorted to for relief. Owing to better shipping facilities and a market having already been established in that city, oil may be shipped there with far more profit to exporters than formerly. Shipments now being made net the Los Angeles producer nearly 80 cents per barrel.

—The Manufacturers' and Importers' League of San Francisco proposes to bring dealers generally from the country and secure trade mutually advantageous to buyer and seller. Each member contributes $50 to a general fund for buying return tickets to country dealers who take advantage of the proffer. This week applications for 12,000 free return tickets have been received from local mercantile establishments. The time for dealers to visit San Francisco has been extended to embrace the period between October 23d and November 25th, and they may remain until November 30th. The travel is at present limited from and to stations located on the Southern Pacific Company's roads—El Paso and western stations, Ogden and western stations and Portland and southern stations—the Valley road and the Pacific Coast Steamship Company's lines. The conditions under which return tickets will be granted are all stated on the buyer's ticket. One sentence is as follows: "Tickets not good for free return trip by the Manufacturers' and Importers' League on steamer between Portland and San Francisco."

—The three big passenger locomotives placed in service in New Mexico by the Southern Pacific Railway Company have a remarkable capacity for high speed. One of them could pull at the rate of sixty miles an hour on a piece of level, straight track no less than thirty-three Pullman cars weighing forty tons each. Such a train would be more than two-fifths of a mile long. The six coupled driving wheels of these engines are each 6 feet in diameter, and the working steam pressure is 200 pounds to the square inch. The cylinders are of the ordinary simple type, each 21 inches in diameter, with piston stroke of 28 inches. This gives a tractive force, or drawbar pull, of 27,400 pounds, sufficient to haul a train load of 4279 tons, equal to about eighty-five of the largest loaded freight cars, at slow speed on a level track. The total weight of one of these locomotives is seventy-five tons, of which fifty-eight tons rest on the six driving wheels, the remaining seventeen tons being carried by the four-wheel truck in front. Reckoning the bite or grip on the rail at one-fourth the weight of the drivers, there is adhesion of fourteen and one-half tons, or 29,000 pounds more than the tractive force of the engine, thus leaving a margin for wet weather and slippery rails.

Mining Summary.

CALIFORNIA.

Amador.

Rich rock is reported struck in the Iron Mass mine, near Volcano, in a crosscut from the shaft at a depth of between 200 and 300 feet. A chute of ore was encountered from 1 to 2 feet in width.

Ledger: The shaft at the Esperanza is down 700 feet. The shaft has been enlarged, a second reel is being added, when completed the shaft will be driven 300 feet deeper.

A San Francisco company intends to reopen the old Centennial mine at Dry Creek east of the Cosmopolitan. T. B. Dillon will superintend operations.

The mill at the Red Hill mine was started up Thursday morning for a steady run. C. B. Zeek, superintendent.

At the Bellwether, Superintendent Knapp informs the *Dispatch*, the water has all been taken out and sinking will be resumed.

At the Zeila workmen are driving a drift at the 1000-level.

The Amador Queen No. 2 and mill, and Dewitt mines have been bonded to an Ohio company for $85,000—the first payment of $6-300 was made in Jackson last week. The properties will be developed.

In the case of the Argonaut vs. the Kennedy Mining Company, the latter company had the cause transferred to the United States Court, but the Argonaut Company's attorneys deny the jurisdiction of the Federal Court and have asked for a retransfer to this county. Lindley, Eickoff and McGee represent the Argonaut and J. M. Wright, the Kennedy. The suit is for $400,000 damages and ground considered to be worth a million.

Record: The Giualinni mine is six miles east of Sutter creek, and is owned by Nixon & Giualinni. There is a tunnel on the ledge of 106 feet. The rock shows free gold. Several assays run $37.

Butte.

(Special Correspondence). — Development work is being quite extensively carried on in and about Forbestown. At the Denver they have four tunnels. The lowest is 600 feet on the ledge, which is from 4½ to 10 feet and averages $5. The sulphurets average 3 per cent and their value is from $75 to $250 per ton. The footwall is slate, and the hanging is grano-diorite. The ore is mined and milled for $1.50 per ton. There is a 10-stamp mill and four concentrators in good order used for prospect work. H. H. Noble of San Francisco is the owner, and F. L. Noble is superintendent.

The Carlise mine has a 28-foot ledge of low grade ore in a slate formation. The sulphurets are profuse. The company has just completed a 10-stamp mill.

Burroughs & Son are operating quite extensively in the development of mining property. They have bonded one mine to San Francisco parties on which there are three tunnels 90, 50 and 30 feet, all on the ledge, which is from 3 to 5 feet and assays from $12 to $20 per ton, including the sulphurets. The same parties own the Golden State, which has a tunnel 100 feet and a crosscut tunnel of the same length on a ledge 20 feet wide. The formation is known in local parlance as greenstone and porphyry.

The same parties are working on the Ira, one mile west of town. The tunnels are 250, 130 and 200 feet. They can get 1000 feet of "backs." The ore will run from $10 to $20. The tunnels follow the ledge. Ore from this mine will be taken to the mill on the Bullion this week.

Burroughs & Son have another large low grade proposition, the ledge of which is 20 feet wide. There is some development work done.

The Gold Bank or Stowe mine, a quarter of a mile from town, runs 40 stamps and two concentrators to each battery. When leaving the concentrators the slimes are dropped to a canvas plant 60 feet long, divided into 25 sluices 18 inches wide. When leaving this they are caught on another canvas plant of the same dimensions. I am informed that these canvas plants yield $1000 per month.

The Oregon Gold Mining Company, Josiah Champion superintendent, has two crosscut tunnels and two drifts from each crosscut, and an upraise from the lower to the upper tunnel. The drifts are all on the ledge, which is from 9 to 20 feet. There is a 2-stamp prospect mill in operation.

Forbestown, Oct. 15th, '97.

The dredger now being built for mining in South Thermalito is expected to handle large quantities of dirt and gravel. It is estimated that 2000 cubic yards of earth can be handled in twenty-four hours, and that this will pay thirty-three cents to the cubic yard. If it pays one-fourth of that it will do well.

Register: The stamps used in the Banner mill which is now being erected will weigh 1050 pounds. They will be run by compressed air.

At the Little Hope mine eight men are now employed by Supt. Lambert. Preparations are under way for a 5-stamp mill to be erected this fall.

Calaveras.

The Oriole M. & M. Co. of Stockton, has a strike in the Big Bonanza mine. The mine is 300 feet from the Utica mine and has been worked years ago, when over $30,000 was taken out on the surface. A shaft was sunk recently and about $8000 taken out.

The California Lion Quartz mining claim in Railroad Flat district, is bonded to A. A. Dudley of Stockton for $1000.

El Dorado.

At the Saucerman, at Greenwood, the new mill is on the ground ready to be set up.

Democrat: At a depth of 700 feet the Boulder mine, in White Oak township, has developed a paying ledge 12 feet wide. The only drawback is the want of water for milling purposes.

Present owners of the Gray mine, on the east side of Gray's Flat, began operations this week.

Fresno.

A Pine Ridge report says: More mining and prospecting has been done in the mountains this summer than ever before.

Two thousand feet of pipe has been freighted into the Yellow Bottom placer mine, owned by W. Bennett & Co., San Francisco. They have men building a ditch to carry water for the 10-inch monitor.

A body of rich ore is reported uncovered in the Richmond.

Darby & Moore have built a water power arrastra at the Hancock mine.

Ritchie, Halbert & Company are developing the Chispa. They also have the Rolland mine bonded.

Kern.

In the hills to the southwest of the town of Randsburg nature has shown strange freaks in the deposit of gold. Veins of quartz run in every direction, appearing above the ground, disappearing far beneath, running straight for a few feet, then diverging with as many angles as a streak of lightning. These stringers perpiex all calculation. The tiny veins of quartz are rich in gold, and at first were supposed to descend only a few feet, and to be streams, as it were, cast off in the general upheaval, and scattered on the surface of the soil. When they were followed deeper, however, they were found to unite and form feeders to rich bodies of ore, and "the stringer district" bids fair to become the richest portion of the gold fields. From a consecutive run of 20 tons, 380 sacks of ore, $3,800 was realized by one of these stringer mines in the month of June. Another averaged $80 and a third $130 a ton for the same period, and the total average of all the stringer mines for the same time would be about $90 to the ton. The coyoting of a single mine in the Rand for six months produced $80,000, and in nine months the same amount was taken from the shaft on a triangular claim 300 feet on a side, the only machinery in use being an ordinary whim.

At Randsburg, the Meteor mine has been bonded for $25,000 by Carpenter, Price and Kelly, to McGrew & Ellis. Price and Kelly have bought the Combination, an extension of the Meteor, for $2000 cash. The Little Butte Company has established a level at a depth of 385 feet, and is now drifting both ways in a vein of good ore. The 25-horse power gasoline hoisting engine will be in position next week.

Wilshire and Blaisdell of Los Angeles have a working bond on the Pioneer, Garfield and St. Michael claims for $15,000.

Nevada.

The Spence Mineral Company has incorporated to work a copper mine at Spenceville, capital stock $100,000, subscribed $20.

This week the United States Circuit Court of Appeals affirmed the decision in favor of the North Star Mining Company of Grass Valley in the suit brought against it by the Carson City Gold and Silver Mining Company. The case was a suit for damages in tresspass. The plaintiff, as owner of the Irish-American claim, complained that the defendant, whose claim was adjacent to the Irish-American, had followed and worked its lode in its descent under the Irish-American property. The court decided that the defendant "has a right to pursue and follow its North Star ledge on its downward course to any depth underneath the surface of said Irish-American mine."

The United States Circuit Court of Appeals this week decided the case of the Carson City G. & S. M. Co. plaintiff in error, against the North Star M. Co., defendants in error, involving the question of whether an owner of mining property, formed by the consolidation of several mining locations, had the right to follow the ledge of vein under the surface of another mining property, when none of the owners of such locations that were consolidated would have had such right. While not deciding this abstract question, the appellate court affirmed the decision of the trial court, which specifically gave the North Star the right to follow the ledge outcropping on its property, under the surface of the mining property of the C. C. G. & S M. Co.

Transcript: L. S. Rose, secretary of the La Suerte Mining Company, with other San Franciscans and W. W. Kirkham of Nevada City, have bonded the Lyons & Eddy and J. C. Locklin's Mountain Chief quartz mines in Willow Valley. The new company will immediately begin working these properties on an extensive scale. The 500-foot drain tunnel in the Lyons & Eddy will be driven another 500 feet into the Mountain Chief, and a first-class hoisting and pumping plant will be erected. Mr. Kirkham will have charge of the operations. These properties adjoin the Texas and Murchie, and the ledges of both the latter run into them. The Lyons & Eddy and the Mountain Chief have been worked to a depth of about 100 feet, and have produced $200,000.

Union: That the mining situation in Grass Valley is on the improve is evidenced by the increased pay roll of the past month over that of the preceding months of this year. It is estimated by a gentleman who has looked closely into the matter that last month the pay roll of the Grass Valley mines was something over $50,000, and that over 600 men were employed on day's pay. This represents an increase of about $3000 over the preceding month and a proportionate increase in the number of men employed. During the past few months the North Star, Empire and Allison Ranch mines have given employment to an increased number of men.

Placer.

Following is the September statement of the Pioneer Mining Co.:

Gross receipts	$11,858
Pay-roll	4,441
Bills	1,271
Total expenses	$ 5,712
Net	$ 6,146

This $11,858 was from 610 tons of ore, being an average of $19.44 a ton. In August 765 tons of ore were crushed and the yield was $19.01 a ton. The smaller quantity of ore milled in September was due to the unusual shortness of the water supply, and not to any lack of ore of high grade. The superintendent says: "It would be no trouble to keep the mill running to its full capacity, if we had the usual supply of water." He expects soon to have sufficient water to run the mill to its full capacity of 1500 tons per month.

Three of the directors, Messrs. Cutler, Grose and Bickford, were at the mine last week, and expect to make arrangements for additional water power sufficient to run the mill to its full capacity.

The new pay chute on the 1000-foot level was opened on September 30th a length of 51 feet. The superintendent says: "The vein is now 5½ feet wide and the ore coming from it is very good."

Colfax *Sentinel*: The Drummond Quartz mine, eight miles west of Forest Hill, has a record of having produced over $110,000 from a rich pay chute of ore. E. A. Wiltsee, representing English capital, recently purchased this mine from C. F. Reed, of Auburn. The Company is developing the property under the direction of Supt. C. L. Lang. A Pelton wheel with water under a pressure of 835 feet is used to run a fifty-five horse power compressor used in working the power drills. The new lower tunnel, which has passed the 1000 foot mark, will tap the ledge 750 feet below the croppings, and 400 feet below the lowest point reached in the old works. Even with a very low head of water, Supt. Lang has been able to make 50 feet per week in hard formation. The ledge will be 200 feet farther, when an upraise will be made. A tramway from the lower tunnel to the five-stamp mill is building. It is hoped to erect a twenty-stamp mill near the mouth of the tunnel. Thirty men are employed on the pay roll.

During the week the Eureka upraise reached 245 feet.

At the Pioneer Supt. Sullivan will place location notices for water rights on the American river; to make a survey for a dam, and for a tunnel to strike the vein at the 1500-foot level. Work will be commenced immediately toward the erection of twenty more stamps. In the spring another compressor will be added, and those now in use will be moved to the new location near the river. Then the mill, as well as the drills, will be run by air.

Plumas.

(Special Correspondence).—Traveling from Gibsonville, at an altitude of about 6000 feet, one encounters on the mountain sides amid rugged peaks and deep canyons, old prospectors who remind one of the cliff dwellers written of in history and romance. I met one of the "old timers" who hasn't been out of the canyon in fourteen years.

About one mile from Johnsville the Little Jamison is prospecting with good success. The company has just completed an additional ten stamps and placed two concentrators and a canvas plant. They employ thirty men.

The Plumas-Eureka is running fifteen stamps. This, as is well known, is a low-grade proposition. The work has not gone below water level. Twenty-eight men are at work.

P. Laurenzi and others are developing a gravel property into which a tunnel 120 feet has been run and tapped the channel. At this point the bedrock pitches and the company needs capital to run an incline and place pumping machinery. It is a large property situated on Nelson creek.

Placito Laurenzi has bonded to Woodworth & Son of San Francisco, a quartz claim in Gold Valley, Sierra county. Considerable work has been done on the claim. The ledge in the middle tunnel is from 12 to 18 inches and fair grade. In the upraise from the lower tunnel the ledge is 3½ feet.

Johnsville, Oct. 18th, '97.

F. B. Whiting at the Rappahannock quartz mine, French ravine, East Branch district, will commence operations this week.

La Porte reports that work has been resumed on the Thistle shaft. Teams are hauling 1000 cords of four-foot wood to the mine.

San Diego.

(Special Correspondence).—A mill run of ore is now being taken out of the Mountain View mine, near the Stonewall mine, near Julian, by the Mountain View Mining Company, a new corporation, which is developing its property.

A report from the Laguna mountains is that chloride and ruby silver has been struck in the Alpine mine, the ledge being 7 feet wide.

The Laguna Mining and Milling Company is sending out men and supplies to further develop its property in the Lagunas—the late good reports from the camp being an incentive.

San Diego, Oct. 17th, '97.

Santa Barbara.

Santa Barbara reports a number of claims located in Romero canyon, eleven miles from Montecito. Some assays of the ore are reported to go $11 per ton.

Shasta.

Free Press: Development work is being done on the Ancient Channel Gravel mine on Indian gulch, near Reid's ferry, two miles northwest of Redding city, under bond to the Union Mines Company of San Francisco.

The company has put in a steam hoist and pump. They started to sink a shaft in the gravel some 50 feet from the point where the bedrock showed upon the side of the gravel channel. They sunk to a depth of 25 feet and struck the bench of bedrock just where it broke off into a second bench. Continuing downward, parallel with the wall of rock, for a distance of 14 feet, the gravel left them, but they went on for a distance of 11 feet. The gravel could not be found, and at a depth of 50 feet they began drifting from the bedrock wall. They have gone but a short distance and have not reached the gravel deposit. The gravel in the shaft is 31 feet in depth and prospects well, although not rich enough in free gold to pay a large return for working. They expect to find the rich gravel when they reach bedrock in the channel.

J. Conant has bought the North Drift mine, seven miles south of Callahan's, for $22,000, one-half cash, balance in six months.

The Utah and California Gold Mining Company, principal place of business Salt Lake City, Utah, capital stock, $150,000; Walker and Cheeseman. The corporation will operate the Providence and Josephine quartz mines in Old Diggings Mining district.

G. Senn, who has a bond upon the Delta mine, has almost completed arrangements for a 10-stamp mill.

The Mountain Copper Company has commenced the erection of a third rotary smelter. It will be much larger than the other two and will require 500,000 bricks in its construction. It will roast 100 tons of fine ore per day. To burn ore on the hill requires from sixty to ninety days.

A. McDonald has a contract with J. Kahny of Redding, to take out 40,000 tons of ore from the Bowery Bell mine, to be hauled to the smelters at Keswick.

Sierra.

(Special Correspondence.)—In and about Gibsonville considerable ground sluicing and drifting is going on in a very small way. Some work is being done awaiting spring and the melting of the snows. Great fields of gravel lie idle because of injunctions on hydraulics. The Thistle shaft has pumped the water, but whilst the shaft is clear and in good order, the drifts are filled with sand from the flooding that occurred last December. Mr. Wingate, the superintendent, is at present in Scotland, conferring with the company as to future methods of operations. It is certain that work will be started very soon upon some plan, but whether by opening the works at a new place or continuing through the present plant is at present the topic under consideration. This company employs over 100 men when in operation.

Gibsonville, Oct. 16th, '97.

Siskiyou.

The Spencer gold quartz mine, which has just been re-opened by the Golden Star M. Co. of Hollister, is on Humbug creek, at an altitude of 4,275 feet, twelve miles northwest of Yreka.

News: Hunter & Smith have bonded the Barnes ledge in Cherry creek district and are operating it with ten men. The vein is a clean fissure. They are down about 500 feet on the vein which shows 25 per cent galena, copper pyrites and sulphurets.

Mr. Bradley has men at work on the Spencer mine on Humbug creek, under the supervision of Thos. Hegler.

At the Hathaway brothers mine on Sugar creek, on the vein from which they are supplying ore to their arrastra the ground, goes about $25 to the ton, free milling, and at the bottom it is about the same with some sulphuret ore coming in that goes $72 per ton and four ounces of silver. The gold seems rusty and the arrastra only saves about $15 per ton.

Trinity.

The Cle Fse will mine this year on their property adjoining the Fred Haas mine, and are putting in a 36-inch pipe line.

The Enterprise group of mines is six miles from the town of North Fork, and consists of eight locations. The Enterprise location is operated by four tunnels and nearly $175,000 has been taken out. The vein is 18¼ inches in width, the walls being diorite and greenstone. Work is now being done on an extension of the Enterprise called the Lone Jack. The vein trends southeast and northwest and has a 30° dip to the north. The ledge averages 24 inches in width and in the winze has increased to 30 inches. This ledge is in granite. The ore is a hard white quartz carrying galena sulphurets. A tunnel has been driven in on the vein at a distance of 150 feet from the surface. They have crosscut in both directions from the end of the tunnel a distance of 350 feet along the pay chute.

News: The reported sale of the Union Hill group of mines at Douglas City was an error. Recently an extension of four months time was given on the bond.

Tuolumne.

The Grant G. M. Co. on the Grant mine, seven miles from Chinese Camp, have been receiving new machinery on a large scale. Chas. P. Keith has been appointed superintendent.

Jas. Broyson of the North Star and Black Warrior gold mines is opening up the mines.

The Santa Ysabel mill is reported shut down because of lack of water. Advices from the mine state that "the indications are that we shall have to wait for the fall rain. In the meantime we shall arrange to run our mill by the steam plant which we have on the ground as an auxiliary. The work from No. 3 crosscut on No. 3 level shows an improvement and indications of being near an ore body. There are at present stringers of quartz cutting through the mineralized slate showing gold at many points. The ore seems identical with ore in the Jumper mine. We have opened out another small but quite rich pocket on the Mascot vein. Development work for the week amounted to 212 feet, most of which was sinking and drifting on No. 2 shaft. No. 4 shaft was sunk 45 feet."

Democrat: R. M., T. T. and S. Swan, J. H. Howland, four mining men of Alaska, and later of South Africa, have made a deal with M. Davis for the lease, with the privilege of purchasing, of the White Lead mine, one mile north of Columbia.

Democrat: At the Rawhide the mine proper is being worked and the triple chlorination works kept running, but aside from these all other branches of the plant are temporarily closed down for lack of water. In the mine the main shaft is being driven, present depth 1270 feet, where there is a 30-foot ledge of the usual high-grade quartz. At the 1200 crosscutting is under way. Drifting north on the 900 level shows body of ore in the face. An

upraise is being run from the 700 to the 600 to tap the recently discovered ore chute on the latter level. The vein at point of this late strike is 18 feet wide, and includes some of the best rock ever seen in the mine.

Independent: The Sell mine near Sonora is reported sold to Fresno men who are now extensively operating the Kanaka mine south of Groveland.

Mr. Soulsby is reopening the old North Fork mine, about three miles northeast of Soulsbyville.

The Hibbing mine at Soulsbyville has passed into the hands of the Hibbing G. and M. Co. The company is putting in a steam hoist.

The Maryatt Company at Tuttletown is arranging for the construction of a 20-stamp mill.

The Shawmut mine is running only five stamps on account of little water.

NEVADA.

At the annual meeting of the Eureka Consolidated Mining Company this week, about 38,000 of the 50,000 shares of capital stock were represented. The old directors were re-elected. The company has $5000 on hand; no indebtedness.

The America Gold Mining Company, capital stock $200,000, owns the Young America mining claim, adjoining the property of the Dexter Mining Company at Tuscarora. There has been two openings on the vein in the Young America, one at a depth of 120 feet, at which point the vein was followed for 120 feet. Another shaft was put to a depth of 85 feet, and at present a permanent working shaft is being sunk to the vein. R. L. Andrew, Salt Lake city, Utah, is secretary. The ground of the company is favorably located.

The Sutro tunnel taps the C. & C. mine at a point 10 feet above the 1750-foot level, but the water stands 3 feet below the 1750-foot level, so that when a cage is lowered down until its upper deck is on a level with the floor of the 1750-foot station the lower deck is submerged. The *Enterprise* says a singular phenomenon is observed at this point; there is an ebb and flow of the waters as if they were directly connected with the waters of the ocean. This phenomenon has been noticed by all the miners. A most singular thing is that each Sunday the water rises several feet higher than during any other day in the week. When the men go to work Monday morning there is always a clear high water mark where the water has encroached on the 1750 level during the day before. Mr. Hawkes, foreman of the mine, is of the opinion that somewhere in the country water is used during Sunday. This may lead to an interesting clew regarding the course of subterranean water courses.

The Pioche *Record* says the lesses of the Lyndon mine in Comet district have concluded to quit work. The low price of silver is the principal cause. They have been working quite a force since last July and have done a considerable amount of dead work. The mine shows large quantities of sixty-ounce ore, but this is not high enough to bear the heavy expense of extraction, freight and working charges, with silver at its present price. Several cars of shipping ore will be sorted out from what has lately been extracted, and the mine will be turned over to the owners.

At the annual meeting of the Consolidated California and Virginia Mining Company Superintendent Lyman reported that for the twelve months ending September 30, there was produced from the 1550, 1650 and 1750 levels of the mine 2901 tons of ore, which yielded bullion of the gross assay value of $104,136, of which $46,372 was gold and $57,765 was silver. The average yield of the ore in bullion was $35.89 per ton.

Following is an official statement of the dividends paid to date by the companies composing the Consolidated California and Virginia Mining Company: California, $51,320,000; Consolidated Virginia, $42,930,000; Con. Cal. & Virginia, $3,898,800; total, $78,148,800, a record unsurpassed by any other mine in the nation.

White Pine *News*: The erection of hoisting works at the North Mountain Company's mine at Cherry creek, is being proceeded with, and plans for the erection of more rolls for the mill have been forwarded to Salt Lake City for the approval of the directorate. The capacity of the mill will be increased to eighty tons a day.

OREGON.

Near Baker City, the North Pole mine, the Bonanza, the Red Boy, the Don Juan, the California and the Columbia will, it is locally reported, add enough stamps to their plants to almost double their present ontput. The Union-Companion is reported to have produced $50,000 last month.

At Ontario placer mining is the chief industry. J. Morton has sold his Island placer, cotaining 1200 acres, to Omaha parties for $15,000, and his homestead mine and ranch to D. Wilson for $10,000. The bars are low but rich, some of the gravel and black sand running as high as $9 per yard. One company is using gasoline engines and centrifugal pumps on the bars and cleans up $100 per day to the machine. Mr. Franks is manager. Miners are making good wages all along the river with rockers.

At Davis Island Netherby & Davis have cleaned up $600 in thirty days with a beach machine. This is a dredging proposition, as the richest ground is under water.

The Baker County Mining and Development Company will operate quartz and placer claims in Baker county; amount of stock is $600,000, non-assessable.

About forty-five men are on the pay rolls of the Oak Flat placer mines. The companies' ditch from Soldier creek to the opening of the mine on the Illinois river, 6 feet at the top, 4 feet at the bottom and 3 feet deep, is practically completed. It has a capacity of 2100 miner's inches.

From A. M. Brown, manager Oak Flat placer mines, the observer learns that the ditch from Soldier creek to the opening of the mine at Illinois river is practically completed. This ditch is 6 feet on top, 4 feet bottom and 3 feet deep. The capacity is 2100 inches of water, between 600 and 700 feet of flume will have to be put in, and then everything is ready for the winter's run. Forty-five men are on the pay roll at present, but this number will soon be cut down as soon as the preliminary work is completed, which will be in a short time. A saw mill has been put in with a capacity of 2000 feet per day. Two giants are to do the work of moving gravel, 1900 feet of hydraulic pipe, 11 to 26 inch, is all in place. Also a new hydraulic power derrick with a capacity of five tons has been constructed for the handling of large boulders that will not pass through the tailings flume.

JACKSON AND JOSEPHINE COUNTIES.

A strike is reported made in the Elk creek country of a large body of low grade ore. "The ledge is 400 feet wide and is a contact vein between granite and porphyry walls. The ore assays on surface from $2.65 to $6.80 per ton."

Fitzgerald & Frakes on Elliott creek, at the mouth of Silver Fork, have opened up a bed of talc, lime and quartz near the head of Dunamoor creek, from which they claim they have been able to get seventy-five cents to the pan by pulverizing the stuff, which is soft and largely decomposed, by hand. There appears to be a wall of porphyry, but the formation is peculiar and a remarkable one in which to find gold in quantity, if at all. Other parties who have examined the ore found colors but nothing rich. These men exhibit some fine specimens of dust which they claim to have panned from their mine.

In Josephine county, southern Oregon, M. Keller, manager and consulting engineer, has fifteen men employed, principally on the main tunnel which is 480 feet long and within 30 feet of the main ledge.

WASHINGTON.

At Boundary, the Belle of Waneta group on Fish creek has been sold to Davenport & Co. of Trail, for $12,000.

BRITISH COLUMBIA.

(Special Correspondence). — The Klondike fever is about over for the season on the Canadian coast. Hundreds of Canadians have returned from the Yukon with the idea of going back in the spring. In the meantime merchants in Victoria and Vancouver are laying in big supplies for the anticipated rush next March. There is no doubt that the sad face of ex-Mayor Fred Cope of Vancouver who was drowned in Shallow lake September 18th, will deter many from going to Klondike from Vancouver. The late Mr. Cope was active, energetic and widely popular, and the sad ending of his venture has visibly influenced others.

The Bleweths, of Chicago, father and son, are still working energetically on their Van Anda properties on Taxada island. They have now over 3000 tons on the dump, which will average $40 a ton, while 200 tons were shipped to Swansea to-day which would average about $40.

There is nothing new in smelter matters. Big bonuses are still asked from the citizens in Vancouver and Victoria, and the citizens think that if their locality is a good place for a smelter, some company will be forthcoming to erect one without a bonus. The fact that a smelter is to be erected in the interior, in a measure makes the scheme less attractive, because a coast smelter would then only be able to treat coast ores. However, it is believed than enough mines are now producing ore to supply a large smelter.

The Excelsior, next to the Golden Cache, Cayoosh creek, Lillooet, have a tunnel in 120 feet, and have struck ore running from small values to $79 in value. This week for the first time the company placed 25,000 shares on the market at 30 cents to raise money to push work in the lower tunnel.

Vancouver, B. C., Oct. 16th, '97.

(Special Correspondence.) — Vancouver's smelter is an assured fact, but it is not to be built in the city limits. The City Council, provided the people agree, have promised to give the Harry Symons syndicate, in which one of the London Rothschilds figure, $65,000 in cash in exchange for $65,000 worth of stock in the new smelter, provided the Symons people will erect a million dollar smelter within a year, or failing to do this will forfeit $5000. The smelter will be situated at Hastings, about four miles east of the city limits on the Canadian Pacific Railway. This agreement disposes of the offer of Mr. Remington, of Salt Lake City, who offered to build a million dollar smelter for a bonus of $100,000 or forfeit $10,000. The Remington people were practical American mining men. The Symon syndicate are financial people.

The Poorman mine, Nelson, worked by the Davenport Bros. for four years at a profit of $25,000, a 10-stamp mill being used, has been sold to Johann Wulffsohn and others of this city. The new company are running a tunnel in vertically below the present tunnel to tap the vein. This will be done, they believe, at another 100 feet.

Vancouver, Oct. 18th, '97.

The daily output of the Payne mine, Kaslo, is seventy-five tons. Its shipments are divided between the Everett and Pueblo smelters. The new three-track tramway for the Payne is one and a half miles long. The Reco ships sixty tons per week to Omaha. The output will be greatly increased when the rawhiding season opens.

The Miners' Union of Rossland warns miners to stay away from the camp, as there is a surplus of men there now.

Nelson *Tribune*: During a period of 33 days ending September 30th, 6210 tons of ore were treated by the Hall mines smelter, producing 522 tons of matte, containing approximately 249 tons of copper, 141,860 ounces silver, and 98 ounces gold.

During September there was entered at the port of Nelson for export, ore and matte of the value of $188,184, more than half of which was smelter product from the Trail and Hall mines smelter. A new feature of the exports for the week was an entry of 753 ounces of gold bullion from the Trail smelter valued at $12,841. This week's exports brings the total value for the year up to $6,250,701. The returns from the outport of Revelstoke for the month of September have also been received, which shows that during the month 674 tons of Slocan ore valued at $96,492 were exported via Revelstoke. These figures added to the returns of the port of Nelson show that during the month of September the mines and smelters of southern Kootenay exported ore and matte to the value of $810,717.

The Rio Tinto Mining Company of Spain, which owns the greatest copper property in the world, is also the real owner of a most valuable group of mines on Pyramid creek, in this district, says the Fort Steele *Prospector*. The claims number fourteen in all, and on several of them good development work has been done. At one place there is a dump of silver-copper ore valued at $5000 and a force of forty men are now at work. Next year a 6-drill air compressor is to be put in, and preparations are already being made to receive it.

ALASKA.

The Alaska Treadwell Gold Mining Company during September crushed 21,354 tons of ore; 417 tons sulphurets were treated, the former averaging $2.50 per ton and the latter yielding $18,159. The bullion product for the month was $53,563. The company also sent down $13,815 in gold for account of the Alaska Juneau Company.

The Alaska Mexican Mining Company worked 13,118 tons ore in September, averaging $1.80 per ton, and treated 249 tons sulphurets, yielding $6399. The gross expenses for the month were $19,849. The company reports a bullion product of $23,356 for the month, besides $4598 shipped on account of the Alaska Juneau Company. There was also a shipment by the same steamer of $11,073 on the October account of the Alaska Treadwell Company, a clean-up of the chlorination works.

The Alaska Treadwell Mining Company has a bullion shipment on October account valued at $11,073; a clean-up of the chlorination works.

IDAHO.

At Florence it is expected ten or twelve mines will be put on a paying basis this fall, among them the Banner, Gold Bug, Hiyu, Blossom, Poorman, Trilby, Waverly and Briscoe.

The Blossom was recently sold to Captain N. D. Moore of Spokane, who has a 10-stamp mill en route.

At the Hiyu C. King of Spokane is putting in a new 5-stamp mill.

The Watsen, a new discovery on the Salmon, is proving rich, and a stamp mill will be put in next spring.

There are 500 prospectors and miners in Florence district, of whom 200 are on pay rolls.

The dredge operated by the Warren Placer Mining Company at Warren, excavates 700 yards of gravel per day, the average value of which is 30 cents per yard. Twenty men are employed and work will continue thirty days longer.

Cusick & Thompson of this city are at work on a gravel bar on Snake river, near the town of American Fork, using a new gold catching appliance of their own invention, made in Butte. While its capacity is meager, it is said to save 92 per cent of the very light gold found in this gravel.

Silver City *Avalanche*: The Alpine Group, owned by Messrs. W.N. Nichols and E. Lewis, has been purchased this week by the Trade Dollar Mining and Milling Company. The purchase price has not been made public, but is upwards of $30,000. The Alpine group lies just west of the Trade Dollar group, and can be worked to unusual advantage by crosscutting from the levels of the latter property.

UTAH.

"The best tonic that can possibly be prescribed for the diggings at this time," says Manager A. Hanauer of the big plant which bears his name, to the Salt Lake *Tribune*, "is a reduction of the rate on ore, and that can be done only by the railroads. Some persons who have made comparison between smelting charges at Denver and those in this valley have suggested that the local smelter might reduce its charges, but they are awfully lacking in information. One item alone in the operation of the smelter at the respective points is sufficient to show the disadvantages under which we in this valley labor in the attempt to compete with the smelters of Colorado. At Denver fuel is unloaded at the furnace for $6. Here we are compelled to pay $9.75 for the same thing that costs them $6. Other supplies correspond. The railroads, it appears to me, however, have it in their hands to relieve the situation without making any great sacrifice, and were a reduction in the rate on ore only until such time as the struggle for bimetalism is settled it would infuse new life into the camps, loosen up capital and stimulate development throughout the State."

It was upon the producer of lead that the present blow from the metal market is visited, the market opening at $4 per hundred pounds and dropping down to $3.75, at which figure it closed. The blow was not unexpected. At least that was what was said by the management of the Hanauer and repeated in the offices of the Germania. Each referred to how the advance in lead, which on September 7th, last, reached $4, had stimulated the production of that metal, which has been pouring upon the market until it is said to have become a drug. The demand having been exceeded, the smelter men contend that it was but natural for the price to decline, and the decline having started no one will undertake to foreshadow its fate.

Salt Lake *Tribune*: The present reign of inactivity at the Ontario and Daly mines, Park City, will continue indefinitely. This is the information with which Hon. R. C. Chambers yesterday returned from California, where he was closeted with some of the directors: "The mill must necessarily shut down, as we cannot produce bullion with any profit for less than 75 cents per ounce. At the solicitation of Senator Stewart of Nevada we, some three years ago, prepared a statement in which it was demonstrated that at that time the actual cost of producing an ounce of silver under most favorable circumstances, was 65¾ cents an ounce, that with the mine open, with the ore bodies accessible and in good shape and everything in condition for economical extraction. As a matter of course, the above figures do not include the capital invested in machinery, the cost of equipment of mine and mill, nor do they represent the vast amount of money that has been expended in the driving of a long tunnel that the cost of extraction might be even further reduced. Then there is the endless list of incidentals with which all experienced miners are familiar. Let me assure you, however, that both companies will be glad to resume at any time, but that resumption must be at a small profit to themselves."

The *Patriot* predicts an early revival of operations throughout the district of which Park City is the center and that it will continue without cessation through the year '98. "There is now ample truth for asserting that the Daly-West will resume operations in a short time. On the dumps of the Daily-West are several thousand tons of ore which will be treated as soon as the new machinery is set up."

MONTANA.

The Anaconda Copper Co. is developing a coal mine at Joliet, sinking a double compartment shaft 7x17 feet in the clear. To reach the coal requires a depth of 1000 feet to have been reached before the coal can be mined. This will take five or six months to complete and a big outlay of money. The Anaconda company expects that when in operation these coal mines will have an output of 2000 tons a day.

Inter-Mountain: The history of the copper industry in Montana extends back fifteen years, in 1882 the present great producers of the district were passing through the crucial test of early development. The year preceding the Alice had paid in silver dividends about $350,000, the Lexington had been transferred to a French syndicate for $1,000,000 and its great silver properties were attracting the attention of Eastern and European capitalists.

It was during the year 1881 that the active search for copper began. In May the Anaconda had been purchased for $30,000, and in October of that year the Mountain Consolidated Mining Company had been incorporated with a capital of $4,000,000, by W. A. Collinwood of New York, and Marcus Daly, J. A. Talbot, R. S. Jones, Prof. J. E. Clayton, O. P. Blaine and H. S. Clark of Butte. The claims included in that group were the Burnett, Buffalo and Mountain, now owned and operated by the Anaconda Company. At an eatlier date, in July of the same year, 1881, Prof. Clayton had made his famous report on the Bell mine. He reported the value of the visible supply of first, second and third-class ore in sight at $1,380,000, and was derided and scoffed at. That his judgment was correct may be determined from the fact that sixteen years later the Bell is considered the banner shaft of the Anaconda Company. At a depth of 1400 feet 50 per cent copper glance, six sets wide is being daily broken and hoisted to the surface.

The Colorado smelter had been running in a small way since 1878. The Parrot smelter started up two stacks under Mr. Migeon in July, 1881, and in September of the same year the Bell smelter was blown in. Most of the ore treated during that year by the smelters was the silver produced in the camp, and in 1882 the *Inter-Mountain* heralded it as an important factor in the growth of the new camp, that the daily output was 300 tons of ore per day. In this year the output is not less than 10,000 tons, of which the Anaconda Company produces considerably more than one half.

In March, 1882, copper reached a high mark —19½ cents—and with the knowledge that there was almost exhaustless quantities of the mineral in the district the development increased and has kept increasing at a wonderful rate. The following figures of production of copper in pounds fine for Montana from 1882 to 1897 (the output of the present year being estimated), will prove interesting:

1882	9,058,284
1883	24,698,364
1884	43,098,346
1885	67,797,881
1886	57,611,621
1887	78,699,677
1888	97,897,968
1889	98,222,444
1890	110,955,733
1891	112,389,340
1892	161,051,477
1893	154,300,100
1894	183,094,755
1895	194,768,925
1896	228,958,164
1897 (est.)	250,000,000
Total	1,872,571,629

What a hole in the earth this more than 850,000 long tons of copper represent! Taking copper at an average value of 11 cents, it means a total value of over $200,000,000 for the copper produced in Bunte alone, for outside of a very inconsiderate portion, Butte produced it all. But Butte is capable of even better things.

Bystander: The Anaconda Company is sinking on most of its mines. At the Diamond the shaft is down close to the 1300-foot level. At the Green Mountain a station is being cut on the 1600-foot level. The High Ore shaft is down close to the 1500-foot level, the High Ore No. 2, 1600-foot; the Mountain Consolidated No. 1, close to 1500-foot; No. 2, 1500-foot, with station cut. At the Never Sweat sink-

ing is in progress below the 1400-foot. At this mine a skip, holding eight tons of ore, is used in one compartment of the shaft, with a four decked cage in the other hoisting compartment, the cage being the most convenient to hoist men and timber. At the Ramsdell Parrot about 200 tons of ore is hoisted daily. About forty men are employed. At the Gagnon about 200 men are employed. At the 1500-foot level the vein is from 30 to 40 feet wide; preparations are being made to sink below this level. About 500 tons of ore are hoisted daily.

WYOMING.

G. F. McLaughlin, Harry Eckline and C. Henschaw of the Edison Mining Company at Paterson, N. J., are at Sheridan, Wyo., for the purpose of inspecting the development work done upon the company's platinum property on Piney creek. A large amount of machinery, consisting of drills, air-compressors and other mining tools, has arrived and will be put in operation at once. The mines will be worked during the winter. The product is used by the Edison manufacturing works in New Jersey.

COLORADO.

(Special Correspondence).—Ward, Boulder Co., is eighteen miles west of the town of Boulder, in the proximity of Bald mountain and Long's peak. The district is well watered, well timbered, rough, rugged and at an altitude of from 9000 to 10,000 feet above sea level. It is in the sulphide belt, which trends through Clear Creek, Gilpin and Boulder counties. The mines produce here the same character of iron and copper sulphides that abound in Clear Creek and Gilpin counties. The product here is divisible into two classes: first-grade smelting ore having an average value of $100 per ton; second-grade or milling ore averaging in value $10 per ton. The first-grade or smelting ore constitutes about 5 per cent of the product of the camp, the second-grade or milling ore making up the 95 per cent of the product. The first-grade is all shipped to the smelters direct, while the second-grade is either milled on the ground or it remains on the mine dumps. About forty-five tons per week, valued at $4500, are shipped to the smelters, which is figured at 5 per cent of the camp's output. About 900 tons a week, valued at $9000, would be the product of milling ore taken from the mines. At this rate the district is producing about $700,000 per year. The second-grade or mill ore runs as low as $3 and as high as $15 per ton. As an example, the Dew Drop mine in the course of its development milled 7000 tons, which averaged in value $6.78 per ton. At a better stage of development the same mine is producing ore which runs from $10 to $12 per ton. Ore in the stopes of this property is 12, 15 and 20 feet in width. The Dew Drop tunnel is in 1125 feet, with 1000 feet timbered and having 600 feet of levels. The Adit tunnel is in 1800 feet, and this is to be driven 3000 feet farther to cut the Ni Wot grounds, which latter property was recently acquired by the parties controlling the Dew Drop and Adit mines.

The Ni Wot has a history. The property is situate on the saddle between Ward and Camp Frances. It was opened in 1862 by wealthy New York parties. For fifteen years it was one of the noted mines of the State. It was the cause of the establishment of Ward camp. Under the crudest conditions it produced $48,000 in six months. During its entire career it is credited with a production of $1,250,000. In 1868 a 50-stamp mill was built at a cost of $250,000. At that time it was the largest mill in the State. When the mill was practically complete, and before a wheel was turned, it was totally destroyed by fire. It was rebuilt at a cost of $150,000 and was operated for about twenty years, ending in 1888. The ore bodies are claimed to have been very remarkable. In places the vein matter was 30 feet wide. Twenty years of operating shows a dump of only a few thousand tons, which suggests very little waste. It is asserted the ore yielded $80 per ton on the plates and that the mill product reached as high as $2500 per day. These great values were close to the surface, as is evidenced by the fact that the lowest workings were only 450 feet. Through disputes and litigation the mine fell into disrepute and remained idle from 1888 to this time. The new corporation now in control has purchased the property and assumed the claims against it, which are said to have aggregated $217,000. The new company state that they will expend $350,000 in developments. The Ni Wot will be developed and worked through the Adit tunnel.

The Utica mine and mill, which have been operating for nine years, have a shaft 750 feet deep and extensive underground developments. The mine is now producing at the rate of about $6000 per month. This rate of production has kept up for eight or nine years and in that time it has not ceased to be a steady producer. The Utica tonnage amounts to about 650 per month.

The Ward-Rose mine, in Puzzler gulch, possesses a new plant of machinery and in the course of its development has produced some ten ounces gold ore.

The New Market mine was recently sold by Walters, Larson and Kline for $25,000, the purchaser being B. I. Potter, trustee for his Boston associates. The ore in the New Market runs about $40 per ton in gold.

The John Jay mine is being provided with a mill having the Beam process of roasting and converting. Six muffles are being put in and the mill will have a capacity of 30 tons per day. This property is in the tellurium belt, five miles from Ward.

The San Blas mill, having ten stamps and concentrators, will soon be in operation.

The Star mine, in Spring gulch, is being being worked largely by leasers. It is producing sulphide ore, having gold values running as high as six ounces.

The majority of the mines of the district belong to New York, Pennsylvania and Massachusetts people.

The B. and M., close by Ward, is developing from a 400-foot shaft and is under a bond and lease to the operators. A recent shipment of sulphide ore yielded about $70 per ton in gold.

The Ruby mill, with stamps and concentrators, located in Puzzler gulch, is complete and operating on ores of the Ruby mine.

At Col. Brainard's camp, two or three miles from Ward, is his very modern power house, where a system of water wheels are driven by 740 feet head of water, which is flumed and piped from Mout Audubon. The power thus produced runs a system of dynamos by means of which power is transmitted to the several mines, mill and concentrator some distance away.

The Colorado & Northwestern Railway Company, which, it is claimed, is backed by heavy capitalists, is constructing a line of road from Boulder to Ward. A large force of men are at work and the plans contemplate that the line will be completed by the close of this year. It is claimed the destination of the builders is Routt and Rio Blanco counties in northwestern Colorado, thence on into Utah. The completion of this road will give Ward shipping facilities which will be greatly to her advantage. It may lead to the enlargement of Ward's milling facilities to handle her low grade ores. I predict that this will become a mining and milling camp the equal of Gilpin county. WASCOTT.

Ward, Colo., Sept. 20th, '97.

A Denver dispatch of the 18th says: The flooded mines of Leadville will not be pumped out. Eben Smith, chairman of the committee appointed by the mine owners to secure funds to buy and operate the necessary pumps, said to-day the pumps would not be started as long as silver remained at the present low price. In addition to $50,000 contributed for the purpose of unwatering the mines, it was found that $25,000 more was needed, and it is impossible to raise this, as David H. Moffat, one of the principal mine owners, has flatly refused to give another dollar.

ARIZONA.

(Special Correspondence).—The Copper King of Arizona is making progress. No. 1 shaft is now down 300 feet in black sulphide copper ore and drifting has begun. As soon as ground sufficient is opened up the company will erect a smelter of 100 tons daily capacity.

Bisbee, Oct. 12.

At the Congress mine, W. F. Staunton superintendent, 425 men are employed; monthly pay-roll $30,000. The daily output is 120 tons ore, averaging $20 and a shipment of twenty-five cars per month of high grade ore. The 40-stamp mill crushes the ore from three shafts. No. 1, 1750 feet deep; No. 2, 1400 feet; and No. 3, 1100 feet. No. 1 is lighted by electricity. A new hoisting plant has been ordered for No. 2, capable of going to a depth of 3000 feet, and in shaft No. 3 a similar hoist will be placed, capable of hoisting a load of 20,000 pounds at the rate of 1000 feet per minute, for 3000 feet depth.

At the cyanide mill 100 tons of tailings are handled daily. The company intend to enlarge this branch of the business.

G. O. Pearce, representing the Rio Colorado Gold Extraction Co., is in Yuma making arrangements to erect a 5-stamp mill on twelve mining claims in the Chocolate mountains, about eighty miles up the Colorado river. The mill will be shipped up the river on the steamer Mohave as soon as it returns from the sulphur mines in Lower California, and used developing the claims on which the Colorado company holds a bond from Taylor D. McLeod.

The machinery for the Kasser Gold Mining Company, near Globe, is in place. The hoist is capable of sinking 1000 to 1200 feet; general manager, M. Gibbons.

It is reported from Globe that four copper mining companies of that camp have tired of waiting for the new railroads promised and have concluded to begin work on a broad-gauge line of their own. The road is to be constructed to Phœnix on as direct a line as possible, running near Goldfields and possibly including Mesa and Tempe. The reason why Phœnix has been preferred is that here competitive rates could be secured over both the Santa Fe and Southern Pacific. Not a furnace is running in Globe, though development is being pushed on all the mines and thousands of tons of rich ore are piled up on the dumps and in the smelter bins. New machinery is as well being installed, and only low freight rates for coke and copper are necessary to make the camp a lively one.

News: At Willcox, Manager Payne of the Grand Reef copper mine in Aravaipa canyon, is putting in new machinery. There are 200 men working in the Aravaipa canyon, at the head of Sulphur Springs valley. Fifteen miles southeast of Willcox lie the mountains in which is located the Dos Cabezas gold mining district. About thirty men are scattered about the district working claims. On the Cottonwood property there is a 5-stamp mill. The shaft on the Cottonwood is down 200 feet and three levels are run.

The Golden Rule copper mines at the east end of the Dragoon mountains are being worked by Kansas City parties. The shaft is down 135 feet and levels run 150 feet.

In the old Benson smelter building there is in operation a concentrating plant, put up by F. S. Webster, run by two 6 H. P. gasoline engines and handles twelve tons per day. The ore is from the Golden Rule mine, on the coast side of the Dragoons, and is hauled by the railroad for $1 per ton. The ore carries lead, silver and gold. The old slag dump of the Benson smelter contains on estimate 5000 tons of slag, which is being worked at a goood profit.

Oasis: C. J. Eames, Sr., ex-superintendent of the Columbia Smelting Co., at Rollin, formerly the Empire Smelting Co., is in Nogales on mining business. His company at Rollin have in contemplation the construction of an ore railway from Rollin on the N. M. & A. to Washington Camp. This will give an outlet to the rich mines at Washington Camp, and gives those operating them a chance to get the ore to a smelter at a nominal cost. The new ore road will be fitted with twelve ton engines and five ton cars. There will also be added to the smelter at Rollin two more stacks, one for lead and one for copper. Mr. Eames is looking for more copper mines for his company, and was in Sonora during the week making some examinations.

NEW MEXICO.

Of the Mogul Mine Company, the Socorro *Advertiser* says: The shaft is down 125 feet, and the drift is in 25 feet. A good body of ore is in sight.

ALABAMA.

(Special Correspondence.)—The following tables give the mineral production and manufactured product therefrom, for the State of Alabama, during the month of August, 1897, as reported by the producers to Dr. Eugene A. Smith, State Geologist and Secretary Alabama Ind. and Sci. Soc.

Material.	*Tons.*
Coal	401,506
Coke	109,270
Iron Ore	136,958
Pig Iron	62,279
Flux	21,874
Bauxite	808
Building Stone	5,000 cubic feet
Total number of employees	12,960

WM. M. BREWER.

Birmingham, Alabama, Oct. 8.

Recent California Mining Incorporations.

Poor Man's G. M. Co., Groveland, Tuolumne county.—F. Lindsay, J. Carlton, F. Akinson, J. C. Moody, C. McZurnaham; capital stock $250,000; subscribed $27,500.

Towle and Stetson Alaska Commercial and Mining Co., San Jose.—B. F. Towle, W. B. Hayford, C. H. Johnson, J. B. Stetson, J. Parmer; capital stock, $250,000; subscribed, $200,000.

Contact G. M. Co., Los Angeles.—E. E. Perrine, G. Woods, H. A. Howard, S. Littlefield, F. C. Smythe; capital stock, $200,000, all subscribed.

Yosemite Mining and Development Co., Fresno.—J. A. Hacker, A. J. Pedar, C. A. Shattuck, T. M. Hayden, C. H. Emmons; capital stock, $1,000,000; subscribed, $717,000.

Columbia G. M. & M. Co., San Francisco. G. Gall, N. Hansen, T. Forniski, D. Meyer, T. B. Dillon; capital stock, $1,000,000; subscribed, $500,000.

Tuolumne M. L. M. & D. Co., Fresno. N. W. Moody, T. R. Brown, J. Scott, J. L. Marble, H. E. Barnum; capital stock, $250,000; subscribed, $1575.

Recently Declared Mining Dividends.

Alice Mining Company, Utah, $20,000; payable Oct. 25; a total of $1,035,000.

Standard Con. M. Co., Bodie, Cal., 10 cents per share, $20,000; October 20th.

The Boston and Montana Mining Company, Montana, $3 per share, $450,000; payable November 20th—total dividends, inclusive of this one, $6,725,000.

The Alaska Mexican Mining Company, quarterly dividend, 10 cents per share, $18,000; payable 28th inst.

Alaska Treadwell G. M. Co., 37½ cents per share, $75,000; payable Oct. 28th.

Personal.

A. B. CARDWELL, of San Francisco, is now foreman of the Ione Mountain mine, Shasta county, Cal.

Dr. J. M. MERRILL of Montana, is in San Francisco seeking California investment in Montana mines.

E. R. ABADIE, formerly of Grass Valley, is now general manager of the Grand Central mines, Torres, Sonora, Mexico.

F. W. EDELSTEN, proprietor Los Angeles *Mining and Metallurgical Journal*, is in San Francisco en route to the north.

MAJOR HEUER of the U. S. Corps of Engineers has returned from protracted official duties in the Mississippi valley.

H. W. TURNER of the U. S. Geological Survey, who has had charge of government work in the Yosemite for the past ninety days, is in San Francisco en route to Washington, D. C.

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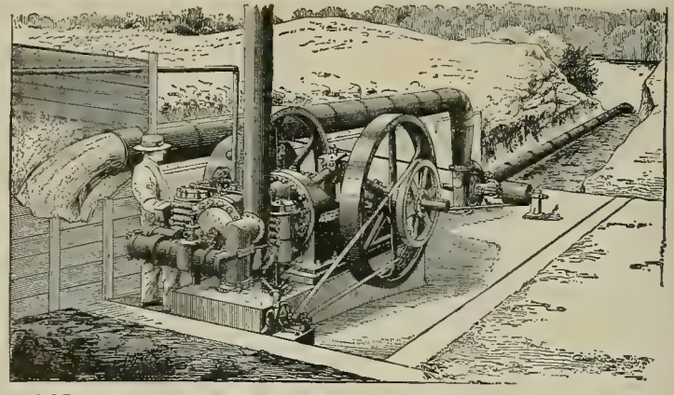

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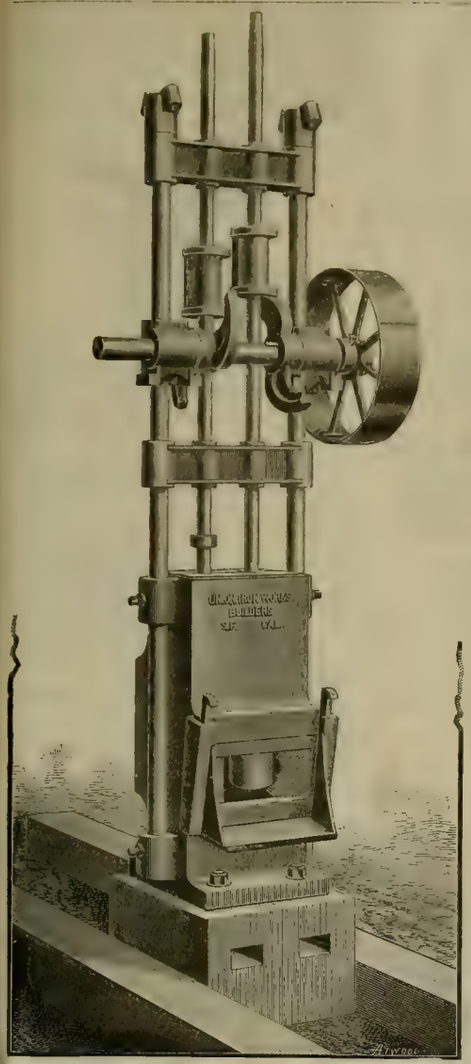

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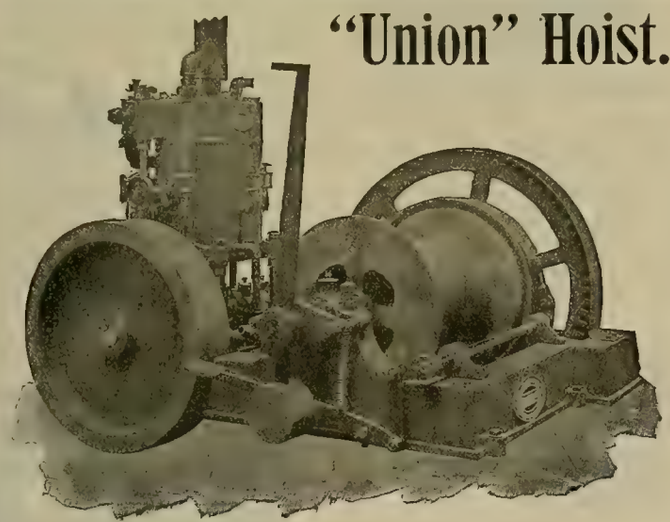

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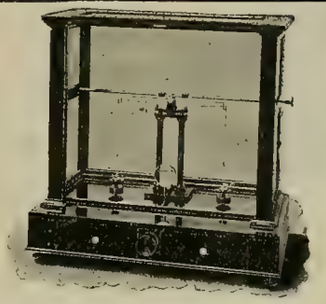

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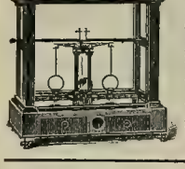

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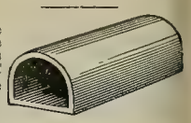

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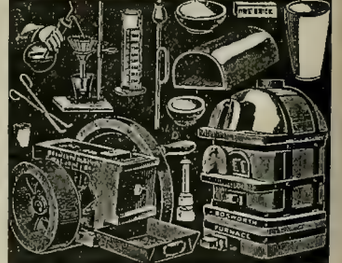

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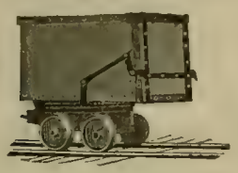

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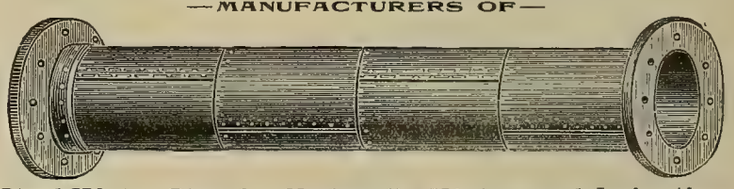

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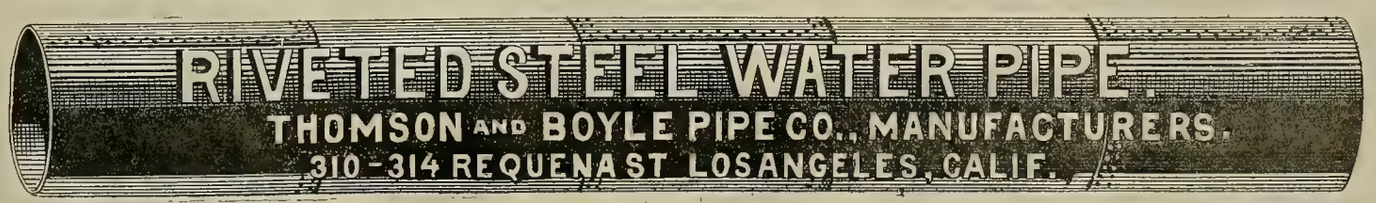

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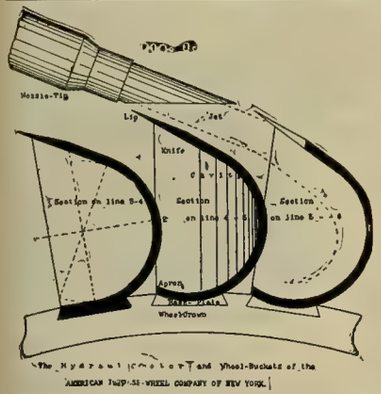

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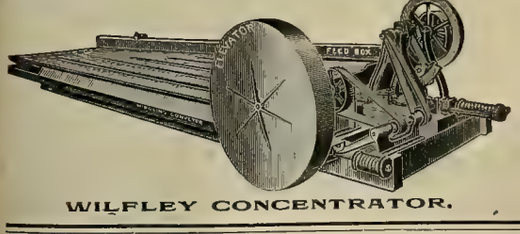

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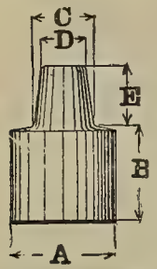

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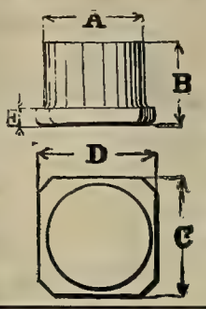

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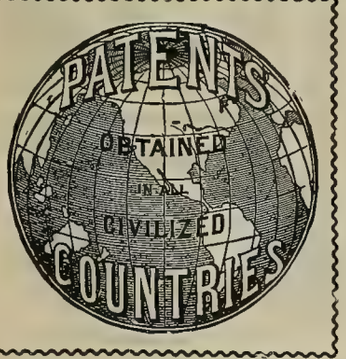

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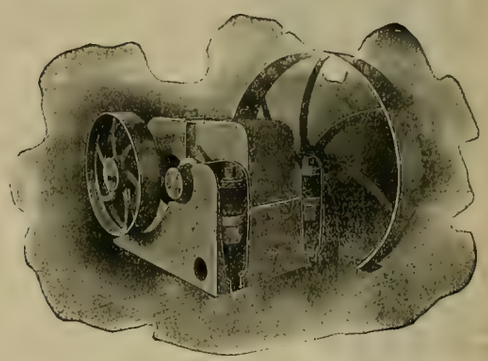

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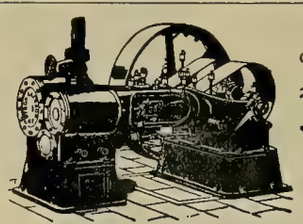

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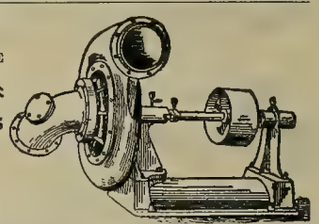

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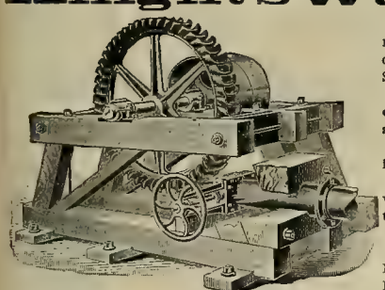

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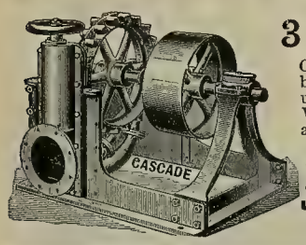

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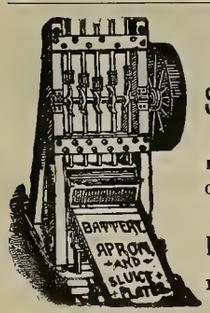

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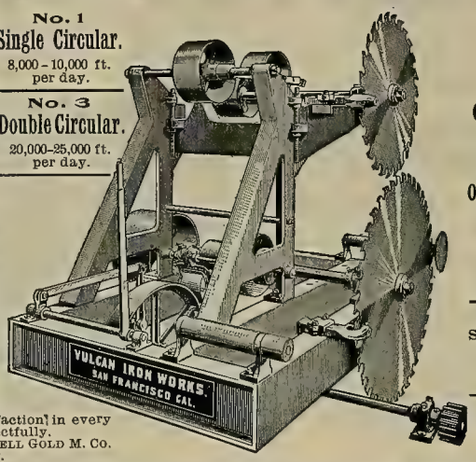

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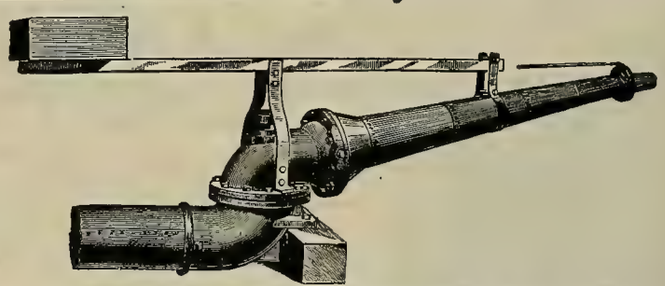

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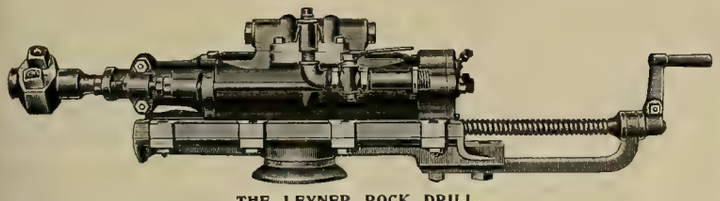

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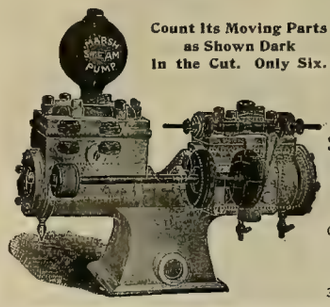

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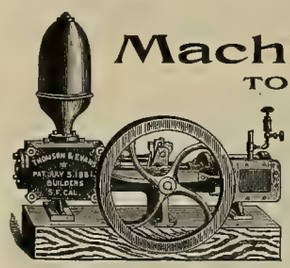

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Market Reports.

The Markets.

SAN FRANCISCO, Oct. 21, 1897.

Business the past week has been fairly active notwithstanding the more distant points have laid in the bulk of their winter supplies. It is the prevailing belief that winter stock purchases have not been sufficient to tide over snow-bound places until 1898 spring opening. It is the opinion also that the purchases from other points have been too light which will necessitate constant sorting up. The general tendency of the market is to steadiness with some lines stiffening. The move that is being made by manufacturers and merchants to get cheaper ocean freights from this port looks to be a success, for if older established lines do not give lower freights then competing lines will be established. The low freights from here to points tapped by the Valley Railroad emphasizes the necessity of lower rates. Another move is taking form and that is to get the different transportation companies to give half rate passage twice a year to merchants to visit this city. The Valley Road is the first to come in on that proposition, and it seems quite safe to affirm that others will fall in line. Our manufacturers have had to contend with cheap freight from the East and high inland transportation from here.

The local money market is practically unchanged. The supply of available funds seems to be steadily increasing, notwithstanding the free shipments eastward. Much of that going East is in payment on exchange differences for the gold brought from Australia, which aggregates about $8,000,000 with, it is said, other shipments to follow. There does not appear to be any demand for funds outside of the usual routine of business requirements. Advances made on grain in warehouses have been made mostly by interior banks and capitalists. For speculative purposes the market is dull, but it is stated that the outlook is favorable for an active demand next year. There is a fairly good inquiry for good to gilt-edge bonds—municipal and otherwise. The East reports a fairly active money market, with a better demand for commercial and manufacture paper. A New York exchange says that the country banks were in the market for paper, which shows that the interior is well supplied with funds, but this does not apply to the South, where there is a continued good demand for cotton moving. European advices are rather conflicting, but the trend appears to be to more steadiness. The short crops abroad necessitating heavier importing at higher prices had been the main factor in promoting strong money markets. Gold commands a good premium abroad.

New York Silver Prices.

NEW YORK, Oct. 21.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	26¾	57¾
Saturday	27 3-16	58⅝
Monday	27 3-16	58⅝
Tuesday	27 3-16	58⅝
Wednesday	27⅜	59¼
Thursday	27⅛	58⅝

	Copper.	Lead.	Iron.	Tin.
Fri.	11 10 @11 25	4 10	10 00@12 25	13 80
Sat.	11 10 @11 25	4 00	10 00@12 25	13 85
Mon.	11 15 @11 25	3 95	10 00@12 25	13 85
Tue.	11 10 @11 25	3 92½	10 00@12 25	13 85
Wed.	11 10 @11 25	3 95	10 00@12 25	13 85
Thur.	11 10 @11 25	3 95	10 00@12 25	13 85

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	15c Prem
New York Telegraphic Transfer	17½c Prem
London Bankers' 60 days	$4.83
London Merchants	$4.81
London Sight Bankers	$4.85
Refined Silver, per oz., 1000 fine	58⅝
Mexican Dollars nominal	46@46½

SILVER.—The markets at the East and abroad held strong throughout the week, with sales up to 59¾ cents per ounce fine at New York and 27⅜ pence in London. The latter price is the highest since last July. The New York *Journal of Commerce* of Saturday, October 16th, reports the market there on Friday, October 15th, as follows: "Bar silver in London was quoted at 27 3-16d, with a scarcity of cash or spot silver. New York market for large commercial silver bars, 50@60c. Fine silver (Government assay), 59⅜@60¼c. The 'official' price was 59c at the close." By referring to prices given above, which are telegraphed to the Merchant's Exchange of this city, it will be seen that the market was higher on that day than reported here. The advance in silver is said to be largely due to a short interest filling and also an active demand for India. If press telegrams are correct that China has negotiated an eighty million dollar loan, then it is quite likely that the country will want more silver next year. The production of silver, it is stated, has been stimulated by improved prices.

MEXICAN DOLLARS.—The market is quiet. Owing to the uncertainty regarding silver, operators in Mexican dollars do not care to anticipate wants.

COPPER.—The market has held steady throughout the week. D. Houston & Co. of New York report as follows in their circular: "The market for copper at this center the past month developed no radical changes, the prominent features being the steady tone and the continuance of the remarkably heavy exports. Home consumption is using up considerable copper without making much show of demonstration. The large mills of the country, however, could undoubtedly consume more copper were they operated up to their maximum capacity of output; but with fundamental business and trade conditions so much improved, a gradual return to increased consumption here is expected. Foreign demand continues to furnish bone and sinew to the market. Exports keep up on a scale of great magnitude, and give conclusive proof of the heavy consumption going on throughout Europe. For the first eight months of this year foreign shipments have absorbed all but 36.7 per cent of the total United States production during this period. The exports this year are 14.3 per cent larger than last year, while the increase in production in this country is only 4.9 per cent."

Our market is quoted as follows:

Ingot casting, jobbing	13	@	—
Ingot " wholesale	12½	@	—
Sheet copper	—	@	16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½		

QUICKSILVER.—The market has held remmarkably steady. There were exported the past week 150 flasks to Mexican ports.

Our market is quoted at $38 for domestic consumption and $34@34.50 for export to the west coast of Mexico.

LEAD.—Our market is reported weak at quotations. The markets at the East sold down under more obtainable supplies and a falling off in the consumptive demand. Unless production is restricted, it looks like still lower prices, for from now on until spring the demand is usually offish.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	4 75	@	5 00
Sheet	6 25	@	6 50
Pipe	5 50	@	6 00

TIN.—The market for pig has held steady both here and East. Plates are irregular and in buyers' favor.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing		—@	15
Plate, I C coke, heavy, per box	$4 10	@	4 25
" " " light, "	4 00	@	—

SHOT.—The market is easy.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 40		
Drop, B and larger sizes, " "	1 65		
Buck, Balls and Chilled, do, " "	1 65		

POWDER.—There is a continued free demand.

COAL.—The market shows more steadiness, with a tendency to more firmness in foreign, owing to lighter supplies on the way.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$8 00	@	—
Greta	6 00	@	6 50
Nanaimo	6 50	@	—
Gilman	5 50	@	—
Seattle	5 50	@	—
Coos Bay	—	@	4 75
Cannel	9 50	@	—
Egg, hard	12 00	@	—
Wallsend	6 75	@	—

TO ARRIVE—CARGO LOTS.

Australian	5 75		
Liverpool Steam	6 75		
Scotch Splint	7 50		
Cardiff	7 50		
Lehigh Lump	12 00		
Cumberland, bulk	10 50		
Egg, hard	9 50		
West Hartley	6 75		

COKE.—The market is quoted as follows:

Gas Companies'	—	—	—
English, to load	—	@	—
" spot, in bulk	10 00	@	—
" in sacks	11 00	@	12 00
Cumberland	—	@	—

IRON.—The market is fairly firm for both foreign and American. The production at the East of pig has increased quite fast. It is now larger than at any time since February, 1896.

AMERICAN.

	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4½

PLATINUM.—The market is steady.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is firm.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

NAILS.—The market is steady.

Wire, carloads, basis per keg			
" jobbing, " "	$2 45		
Cut, carloads, " "			
" jobbing, " "	2 35		

ANTIMONY.—The market is steady.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 8c for Cookson's, 7½c for Hallett's and 7c for Japanese.

Chemicals.

Business continues of a jobbing character. While there are no advances by jobbers, yet as stocks of cheap purchases lessen, there seems to be a disposition to strengthen views. At New York, so far as our advices go, the market has exhibited very few changes, and these have been of no material consequence.

A New York correspondent writes: Recent advices from abroad stated that the South American nitrate combination was about to break up owing to outside competition by the Salar del Carmen Company, which refused to join in the agreement. While local receivers of nitrate appear to anticipate such a break it is understood that the combination is still intact and will not be given up until the Salar del Carmen Company actually begins operations, which, according to latest cable advices, it has not yet done.

SULPHURIC ACID.—The demand is fair.

We quote in a jobbing way at 1¼c per lb for 66%.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported easy from store at 6¼@7c per pound in carboys.

BLUE VITRIOL.—Our market is steady.

We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is steady.

Our market is quoted in a jobbing way at $1.40 a pound.

BONEASH.—The demand is good for export.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is firm.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firm at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is steady at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—The market is quiet at 2½c a pound from stores.

NITRATE OF SODA.—The market is barely steady.

Our market is quoted from store at 4c for 95%.

Mining Share Market.

SAN FRANCISCO, Oct. 21, 1897.

The market ruled weak, with a heavy, sick look, up to Tuesday afternoon, when a steadier tone prevailed, which resulted in more active trading at better prices yesterday. At the decline there can be no doubt that many margin accounts were uncovered, while many strong holders sold under the belief that the "jig is up" for this year. So rapid a break from $2.15 to 41 cents a share, as was done by manipulators in Belcher, is enough to demoralize anyone. The advance from about 23 cents to $2.15 was not warranted by any prospects in the mine, and the rapid decline can not be justified by any unfavorable news from the mine, and can only have been done so as to uncover accounts and draw in sellers of more desirable shares. As yet there are not many outsiders dealing; but, at present low prices, it only takes a few to buy large lines, which prevents any contemplated—if there should be any in contemplation—big up move. It looks very much to an outsider as if the market is under strong manipulation for the purpose of getting out long lines of shares for assessment purposes, for the long, wearisome drag, with only small rallies, had cut off a very large majority of outside assessment holders, and, as many companies were accumulating treasury shares, something had to be done to create new interest. The Brunswick lode fiasco did not prove the success looked for, and it would seem as if something had to be done on the Comstock, and therefore the present revival of interest in Crown Point and Belcher. Unless information at hand from these two mines is at fault, it seems a safe proposition to assert that no large development of ore will be made, but there may be enough to encourage holding of shares. If there was any big showing contemplated, Seg. Belcher, on the south of Belcher, and Kentuck, on the north of Crown Point would be selling for considerable more money. The work in several mines on the Comstock points to more interest before long, unless it should be stopped until more favorable times.

From the Comstock mines the news is apparently growing in interest, or, at any rate, attention is being diverted more to them by uninterested parties. Reports are, as usual, conflicting when the share market is under manipulation. Yesterday it was reported that when the 3 o'clock shift in Crown Point came out yesterday afternoon there was an improvement in the mine, but in Belcher the work was a failure. This favorable information caused a buying demand for Crown Point, which spread to both Yellow Jacket and Belcher, but Kentuck lying between Crown Point and Yellow Jacket, as was Seg. Belcher next to Belcher, neglected. It is quite safe to affirm that what is found in the present workings of Crown Point will extend into adjoining mines and be found when desirable. The work under way in Chollar, Potosi and Savage, and one or two of the north end mines is being closely watched by mining men, yet nothing may come of it, as has been the case in years gone by. They are still drifting northwesterly in Utah, with no changes reported. They are raising above the tunnel level in Sierra Nevada, and also pushing ahead on the new tunnel. They raised over thirty tons of low grade ore. They are still running west in crossdrift No. 4 on the 900-foot Union shaft level. At last advices it was in favorable material. In Union they are going south from a raise above the 900-foot level. There is no change in the Mexican workings. All work is confined to the 1000-foot level. Fairly active work is being done in Ophir on both the 1000-foot and old central tunnel levels. As yet nothing of an encouraging character is reported. The 269 tons of reduced, turned out $18 assay values. The concentrates have been sent to this city for reduction by the Selby Smelting and Lead Works.

In Con Virginia work is confined to the 1550-foot, 1650-foot and 1750-foot levels. No changes are reported in the work since our last issue. Last official advices from Best & Belcher and Gould & Curry work had been discontinued from the Bonner shaft so as to make needed repairs. In Savage fairly active work is being done with no material change reported. No work is reported in Hale & Norcross. In Chollar repairing is still being done on the main incline above the 1100-foot level station. In Potosi active work is the order on the tunnel level and also on the 100-foot level. They are saving a fair quantity of fair-grade ore. This quantity, it is expected, will be increased shortly. Nothing comes to hand from Bullion. They are running a northeast drift from the top of the upraise above the 500-foot level in Alpha. In Con. Imperial they are drifting west from the surface tunnel level. In Confidence, Challange and Con. Imperial long distance west crossdrift is still in favorable grounds. From Confidence and Challenge nothing new is reported. There are reports afloat about Yellow Jacket. In Kentuck they are still going west. Advices from Crown Point report active work started towards the recent find. While this is undoubted, grapevine telegrams will be the order to raise and depress the shares. They will soon be in position in Belcher to run for the ore found in Crown Point. They are still cleaning out the north drift on the 1200-foot level. A few tons of ore are raised each week. Nothing new is to be heard from Seg. Belcher, Overman, Alta or Justice.

From the Brunswick lode our advices report active work in Occidental, Chollar, Savage and jointly in Gould & Curry, Best & Belcher and Con. Virginia. The work in all of the mines is practically unchanged, being about of the same character reported last week. There are miners who look for good results but it may take more time than is now expected by them.

The market opened weak this morning, with fair sales reported. After regular call it strengthened, with Sierra Nevada selling up. At the 2:30 session the market was lower, under a raid on Belcher, Crown Point and Yellow Jacket. The seller hardly waited for bids, but sold until about 1000 shares of each were placed. Other sellers helped to swell the aggregate. It looks more than ever like manipulation for shares—uncovering margins and scaring others into selling.

They expect to be into the ore in Crown Point within two or three days. There is better news from Justice. They ran into 4 feet of ore where none was looked for, which looks very encouraging. In Kentuck no work is being done, but a proposition is being discussed to wait until Crown Point runs a west crossdrift in its ground for the ore, and Yel-

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Alta S M Co, Nev	57	10c	Sept 3	Oct 6 Oct 27	J E Jacobus, 309 Montgomery
Andes S M Co, Nev	44	10c	Sept 1	Oct 4 Oct 25	J W Twiggs, 309 Montgomery
Belcher S M Co, Nev	56	20c	Sept 18	Oct 21 Nov 11	C L Perkins, Mills Building
Caledonia S M Co, Nev	47	10c	Oct 6	Nov 10 Dec 2	A S Groth, 414 California
Chollar M Co, Nev	44	25c	Sept 1	Oct 7 Oct 28	C E Elliott, 309 Montgomery
Confidence S M Co, Nev	29	30c	Sept 10	Oct 15 Nov 5	A S Groth, 414 California
Con Imp M Co, Nev	39	1c	Sept 27	Nov 2 Nov 23	C L McCoy, Mills Building
Eureka Con D M Co, Cal	10	3c	Sept 14	Oct 16 Nov 6	D M Kent, 330 Pine
Gold Ridge Con M & M Co, Cal	5	4c	Aug 3	Sept 18 Oct 28	H Sylvester, 43 Sixth
Hale & Norcross S M Co, Nev	112	10c	Aug 18	Sept 22 Oct 28	R U Collins, 331 Pine
Potosi M Co, Nev	48	25c	Sept 8	Oct 12 Nov 4	C E Elliott, 309 Montgomery
Red Cap M Co, Cal	1	$9	Aug 25	Oct 1 Nov 6	F deK Townsend, 125 Beale
Savage M Co, Nev	93	20c	Sept 2	Oct 5 Oct 25	E B Holmes, 309 Montgomery
Silver Hill M Co, Nev	35	5c	Sept 7	Oct 12 Nov 5	D C Bates, 309 Montgomery
Thorpe M Co, Cal	8	2½c	Sept 28	Nov 6 Nov 29	A F Frey, Phelan Building

WILL NEGOTIATE with owners or their duly authorized agents only.

WILL INVESTIGATE only thoroughly bona-fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

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WILL EXAMINE on reasonable terms all kinds of Mines, Mining Properties and Mineral Lands as to their value, method of working and the condition of their titles.

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Working Capital for Mines.

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Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

AMERICAN AND FOREIGN
PATENTS
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330 MARKET ST. S.F.

low Jacket ore in its ground, or take up independent work and run a west crossdrift of its own.

The following illustrates the changes of the week:

Mines.	Oct. 14.	Oct. 21.
Alpha		$ 11
Alta Consolidated	$ 17	15
Andes	33	30
Belcher	70	68
Best & Belcher	63	52
Bodie		
Bullion	11	09
Challenge	53	39
Chollar	73	62
Confidence	1 40	1 15
Consolidated California and Virginia	1 50	1 35
Consolidated New York		
Crown Point	81	65
Exchequer		
Gould & Curry	51	63
Hale & Norcross	1 15	1 20
Justice	38	32
Mexican	54	45
Ophir	1 05	91
Overman	19	17
Potosi	61	54
Savage	52	44
Sierra Nevada	1 15	82
Union	52	44
Utah	25	17
Yellow Jacket	73	55

Under date of October 15, J. A. Pollock of Salt Lake, Utah, says:

With a few exceptions, stocks in both sections were fairly well sustained during the week. The volume of business was somewhat in excess of that recorded last week and with a still increased betterment, even should it not be great, prices would be materially advanced. This is usually the season of low prices, even under normal conditions, and stocks purchased at this time of the year have heretofore nearly always given very good results. The gold stocks, especially the dividend payers, appeal strongly to investors as good purchases.

Next week the annual meeting of the Ajax will occur. Some very high grade ore is being broken at the mines. Alice has declared a dividend of 5 cents, or $20,000. Anchor was slightly stronger, on the strength of the continued good showing. On very light business, the quotations on Bullion-Beck held at about last week's figures. It is intimated from inside sources that operations at the mines will soon be resumed. A slight weakening in Buckeye followed the recent sharp advance, but offerings were not heavy and quotations did not suffer seriously.

The night force at the Centennial-Eureka was laid off on Monday, in keeping with the management's policy of curtailment of ore extraction. At the mines the showing is reported to be very fine, especially on the 800, 900 and 1000-foot levels. Little was done in the stock. Somewhat better prices were made on Chloride Point. Work on the mill is progressing favorably. The Dalys were again inactive and last week's figures ruled nominally. Daly is now selling at a price that does not give the capital stock a total value as great as the amount of cash reported to be in the treasury, to say nothing of the mines and great surface improvements. An assessment of ½ cent per share has been levied on Dalton. Dexter was fairly active, but at unchanged figures. The new mill is going in. Dalton & Lark was inactive. Four Aces has just held its special meeting. The stock sold slightly lower again.

Geyser-Marion was in good demand for investment account, with prices fluctuating each way slightly. The October earnings are showing up in a highly satisfactory manner. The properties are in excellent condition and both mills are doing well. Mr. John Dern was to-day elected general manager, and E. H. Airis, also of the Mercur Company, was selected as treasurer. No action as to this month's dividend has yet been taken.

San Francisco Stock Board Sales.

SAN FRANCISCO, Oct. 21, 1897.

9:30 A. M. SESSION.

500 Alta	15	500 Mexican	44
100 Andes	90	50 Ophir	91
1300 Belcher	68	700 Overman	17
300 Bullion	09	100 Potosi	54
500 Challenge	39	500 Savage	44
500 Chollar	62	300 Seg Belcher	13
350 Con Cal & Va	1 35	100 Sierra Nevada	80
300 Confidence	1 15	100 Union	43
1100 Crown Point	65	100 Utah	16
700 Gould & Curry	36	1200 Yellow Jacket	55
50 H. & N	1 20		

SECOND SESSION—2:30 P. M.

200 Mexican	45	100 Confidence	1 05
200 Gould & Curry	35	1650 Sierra Nevada	82
150 Best & Belcher	52	700 Utah	17
700 Con Cal & Va	1 30	800 Seg Belcher	12
600 Savage	41	500 Overman	15
500 Chollar	59	900 Justice	32
600 Potosi	51	1600 Union	44
3850 Crown Point	59	300 Alta	15
900 Yellow Jacket	49	300 Silver Hill	06
500 Alpha	11	100 Challenge	36
400 Kentuck	07	100 Andes	29
550 Belcher	50		

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING OCTOBER 12, 1897.

591,583.—ENGINE REGULATOR—Barbour & Hansen, S. F.

591,584.—AIR COMPRESSING ENGINE—Barbour & Hansen, S. F.

591,375.—RELIEF VALVE—J. H. Beare, Stockton, Cal.

591,587.—AMALGAMATOR—W. L. Brown, S. F.

591,778.—BOTTLE—Donahue & Leach, Los Angeles, Cal.

591,646.—BOOT—F. Ephraim, S. F.

591,753.—OBTAINING PRECIOUS METALS—E. J. Fraser, S. F.

591,629.—ENGINE—H. B. Gale, S. F.

591,698.—IGNITER—M. O. Godding, Monrovia, Cal.

591,471.—CIGARETTE HOLDER—G. Hara, San Mateo, Cal.

591,604.—ALLOY—C. F. Hitchcock, S. F.

591,409.—HEAT INSULATOR—J. Lumley, S. F.

591,772.—ROOF BRACKET—J. Matter, Lincoln, Cal.

591,676.—PLOW—F. Moore, Hanford, Cal.

591,787.—BICYCLE TIRE—J. D. Parker, San Diego, Cal.

591,425.—LUGGAGE CARRIER—J. H. Quinton, San Diego, Cal.

591,642.—POTATO DIGGER—J. Schwartz, Portland, Ogn.

591,701.—BRAKE—H. S. Smith, San Jose, Cal.

591,509.—OAR LOCK—J. R. Supple, San Diego, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

DELINQUENT SALE NOTICE.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 5) levied on the 3rd day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No Shares.	Amt.
John A. Heninger	16	250	10 00
Nils Johnson	120	100	4 00
Nils Johnson	121	100	4 00
Hattie E. Gray	124	100	4 00
Wm. Westhoff	144	250	10 00
A. O. Lindstrom	148	250	10 00
Wm. Westhoff	177	500	20 00
Richard Phelan	188	5	20
Wm. Westhoff	200	100	4 00
Wm. H. Lillie	202	10,500	420 00
Mark Strouse	208	5	20
P. E. Robertson	215	250	10 00
Sarah Spalding	218	100	4 00
Abe MacCreadie	220	500	20 00
Alfred H. Hogg	221	300	12 00
Abe MacCreadie	222	250	10 00
J. W. Brown	231	4,099	163 96
C. D. MacNeill	236	200	8 00
Paul Muller	239	50	2 00
Paul Muller	240	100	4 00
Paul Muller	242	1,000	40 00
Chr. W. Heyer	243	755	30 20
Chr. W. Heyer	246	606	24 24
Abe MacCreadie	247	200	8 00
Wm. Westhoff	250	200	8 00
Mary Ann Robertson	251	250	10 00
Mary Ann Robertson	252	250	10 00
R. H. Daley	268	1,000	40 00
C. M. Howe	272	1,000	40 00
C. M. Howe	274	500	20 00
R. H. Daley	275	1,500	60 00
Francis Brady	277	700	28 00
R. H. Daley	278	100	4 00
Dr. H. Sylvester	280	51,278	1,971 12
(2,000 shares of this cert. have been paid by H. Sylvester, being part of his stock.)			
L. V. Merle	286	10	40
J. T. M. Kelly	289	500	20 00
R. H. Daley	290	100	4 00
R. H. Daley	294	750	30 00
R. H. Daley	295	185	7 40
E. Swenson	296	1,750	70 00
Mark Strouse	297	5,000	200 00
Mark Well	289	750	30 00
C. W. Heyer	300	400	16 00
Mark Strouse	301	100	4 00
Geo. Day	302	1,000	40 00
Dr. H. Sylvester, Trustee	305	1,105	44 20
Dr. H. Sylvester, Trustee	306	5 000	200 00
R. H. Daley	307	250	10 00
R. H. Daley	308	240	9 60
F. Heard	309	125	5 00
Mark Well	310	125	5 00

And in accordance with law, and an order from the Board of Directors, made on the 3rd day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Rooms 12 and 13, No. 43 Sixth St., San Francisco, California, on SATURDAY, the 9th day of October, 1897, at the hour of 12 o'clock M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

The day of sale of the above delinquent stock has been postponed by order of the Board of Directors to THURSDAY, October 28th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

DELINQUENT SALE NOTICE.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 25th day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
Harvey M. Binckley	2	1	9 00
Alice E. Binckley	20	4	36 00
Alice E. Binckley	23	20	180 00
Alice E. Binckley	24	20	180 00
Alice E. Binckley	25	20	180 00
Alice E. Binckley	26	20	180 00
E. de Kay Townsend	14	1	9 00
E. de Kay Townsend	29	2	18 00
Caroline S. Townsend	18	20	180 00

And in accordance with law, and an order from the Board of Directors, made on the 25th day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, 125 Beale Street, San Francisco, California, on SATURDAY, the 23rd day of October, 1897, at the hour of 3 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

H. H. MARTIN, Secretary.

Office—125 Beale Street, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to SATURDAY, November 6th, 1897, at the hour of 1 o'clock P. M., at the office of the company, 125 Beale St., San Francisco, Cal.

H. H. MARTIN, Secretary.

Assessment Notices.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 28th day of September, 1897, an assessment (No. 8) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, Room 44 Phelan Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of November, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 29th day of November, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—Room 44 Phelan Building, San Francisco, California.

NOTICE OF SPECIAL MEETING

OF THE

STOCKHOLDERS OF THE

SUNOL LAND AND IMPROVEMENT COMPANY.

Notice is Hereby Given that a Special Meeting of the Stockholders of the Sunol Land and Improvement Company, a Corporation, is hereby called and will be held at the office of the Company, at 240 Second St., in the City and County of San Francisco, California, at the hour of 4 o'clock P. M. of the 26th day of October, 1897. The object of such meeting is the election of a Board of Directors of said Corporation, to serve and act as such until the next annual meeting of the Stockholders of said Company, or until their successors are duly elected and qualified. The said meeting has been called by the order of Stockholders holding more than one-half of the votes of the Corporation, to-wit: W. J. Wiley, Thos. Alton, C. B. Stone.

Dated San Francisco, California, October 8th, A. D. 1897. C. B. STONE, Secretary.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from Sam Ahtye, in the Emerton mine, near Gibsonville, Sierra Co., to deposit tailings in Slate creek, and in the Doherty mine, near Table Rock, Sierra Co., to deposit tailings in Slate creek; from Victor Montre, in the Grizzly Canyon mine, near Pike City, Sierra Co., to deposit tailings in Grizzly canyon; from B. F. Atkinson, in the Homestake mine, No. 2, near Sierra City, Sierra Co., to deposit tailings in the impounding basin of the Homestake mine, and from C. R. Scott, et als., in the Gold Nugget mine near Gibsonville, Sierra Co., to deposit tailings in Canon creek, gives notice that a meeting will be held at room 59, Flood building, San Francisco, Cal., on October 25, 1897, at 1:30 P. M.

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NEVADA CITY, ... CALIFORNIA.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from J. F. Cowdery, in the Sackets Gulch Mine near St. Louis, Sierra Co., to deposit tailings in old pits; from the Santa Clara Mining Co., in the Richardson Ranche Mine near Shasta, Shasta Co., to deposit tailings in Clear Creek; from W. T. Sherman and O. F. Caya, in the Canada Mine near Fort Wine, Sierra Co., to deposit tailings in French Ravine; from R. Cordez, in the Mosquito Mine near Comptonville, Yuba Co., to deposit tailings in a ravine; and from C. N. Foote, in the Montalgo Mine near Uno, El Dorado Co., to deposit tailings in Cedar Creek, gives notice that a meeting will be held at room 59, Flood building, San Francisco, Cal., on November 8, 1897, at 1:30 P. M.

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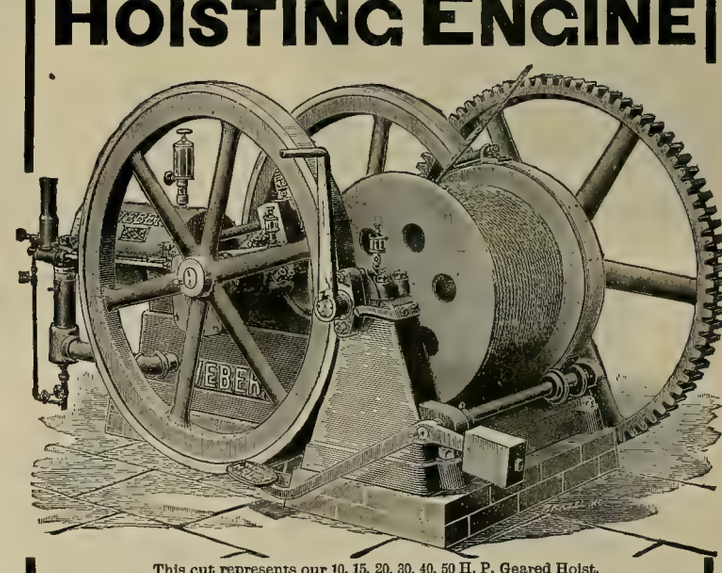

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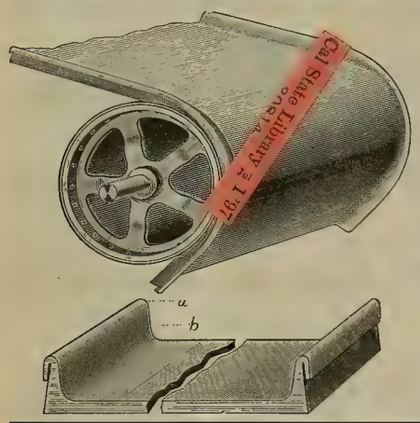

It has taken years of ceaseless testing and experimenting to produce the superior belt which we now offer, with elastic flanges and pliable body reinforced with specially woven duck. Every belt is manufactured by experienced workmen, and carefully tested on machines especially built for that purpose; consequently we are to-day manufacturing the best belts that mechanical ingenuity, combined with honesty of construction, can possibly produce.

SUPT. OFFICE WILDMAN GOLD MINING COMPANY,
SUTTER CREEK, AMADOR CO., CAL., Feb 22, 1897.

MR. JAS. S. BROWNELL, 132 Market St., San Francisco, Cal.—DEAR SIR: Replying to your favor of the 18th inst., will say that in the two mills operated by this company we have nineteen of your Patent Lip flange concentrator belts in use; some of them have been in constant use for the past two years and have given entire satisfaction. I know of no better flange for a side shake machine.

Yours truly, JOHN ROSS JR., Superintendent.

MEXICAN MILL, EMPIRE, NEV., March 28, 1897.

MR. J. S. BROWNELL, San Francisco, Cal.—DEAR SIR: For some years we have used three different styles of belts on our Frue vanner at the Mexican mill, and for smooth working and endurance the Brownell Patent Lip flange belt has proved its superiority over all others, and I unhesitatingly recommend it to all who are using Frue machines.

Yours truly, EUGENE MAY, Foreman.

For any information regarding Frue Vanner or Belts, call on or address

JAS. S. BROWNELL, Western Agent FRUE VANNING MACHINE CO.

(Successor to Adams & Carter.) 132 MARKET STREET, ROOM 15, SAN FRANCISCO.

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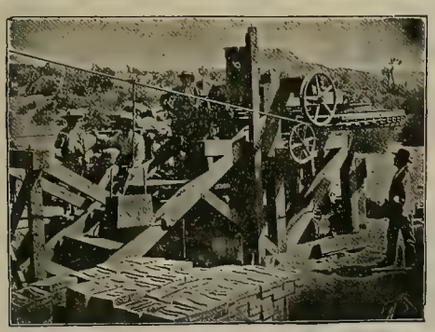

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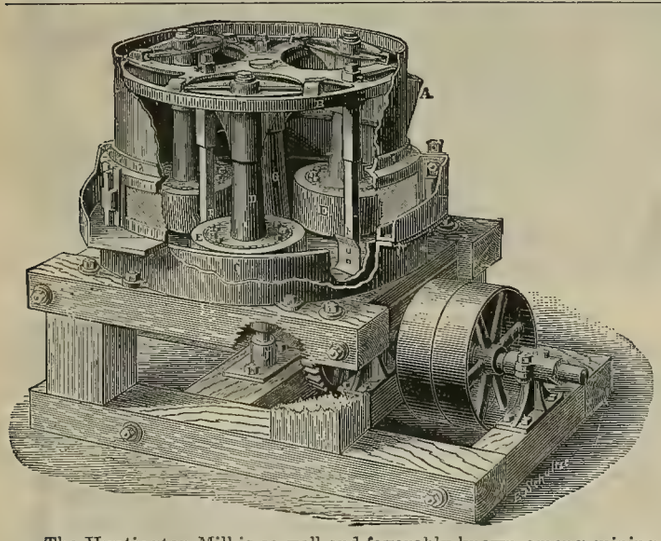

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MINING AND SCIENTIFIC PRESS.
AND PACIFIC ELECTRICAL REVIEW.

No. 1947.—VOLUME LXXV. Number 18. SAN FRANCISCO, SATURDAY, OCTOBER 30, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

The Chicago Drainage Canal.

At a recent meeting of the American Institute of Mining Engineers in Chicago, J. F. Lewis of that city read a paper on the inception and progress of the Chicago drainage canal, the greatest engineering work of recent years in the United States, and one that presents several points of interest to mining engineers. The Chicago Drainage Board, organized December 8, 1891. To carry out the plan of the engineering department, it was necessary to divert the Desplaines river, by cutting a channel 200 feet wide and 4 feet deep. On June 8, 1892, bids were opened; work on the canal was commenced September 3, 1892.

The total length of the Chicago drainage canal, 28.05 miles, is divided into twenty-nine sections; fourteen of them practically all in earth or glacial drift; six in glacial drift and rock; and nine all in rock. There are five sections which exceed a mile in length each.

The dimensions are: for 14.9 miles through the rock cut, 160 feet wide at bottom, 162 feet wide at top; and in the glacial drift for 13.15 miles, 202 feet wide at bottom, and 290 feet at the water line when the channel is carrying 22 feet of water. The channel at the junction of the Chicago river is 24.45 feet below datum; at the Lockport end, 30.1 feet below datum.

The excavation of glacial drift has been 28,059,488 cubic yards; of rock, 12,243,416 cubic yards; total excavation, 40,402,804 cubic yards. There are 371,969 cubic yards of retaining wall. The average contract price was 76.3 cents per cubic yard for rock; 28.9 cents for glacial drift; for all retaining wall on the canal, $3.27 per cubic yard. The cost of machinery and equipment was about $2,750,000; the greatest number of employes, 8500; the consumption of explosives, about 10,000,000 pounds. The maximum work excavated in one month was as follows: Glacial drift, 555,737 cubic yards; solid rock, 120,780 cubic yards. Of retaining wall there were built 45,380 cubic yards, at an aggregate price of $403,464.92.

FIG. 1.—COMPLETED ROCK CUT, CHICAGO DRAINAGE CANAL.

The entire cost of the work is approximately $30,000,000. Besides being a drainage channel for the 887.321 miles of Chicago's sewers, it will also be a ship canal for vessels drawing less than 22 feet.

Fig. 1 is of a completed rock cut on section 8; the span is 700 feet long, showing, in part, the manner of moving the blasted material. The cable-way illustrated had a daily capacity of 600 cubic yards. About twenty such devices were in use. Mining engineers are of course familiar with the use of cableways, but it is believed their use in canal making is a new feature. The kind illustrated cost $14,000 each.

Fig. 2 shows the manner of building the retaining walls, the machines for which were of a type of combination stone-crusher and cement-mixer, which crushed the stone, mixed the sand, cement, crushed stone and water, and delivered it to the wall cast, the machines moving on tracks along the berm. The average height of the wall is eighteen feet.

The discharge from the drainage canal leading into the Desplaines river is controlled by sluice gates, of riveted steel, weighing each fifteen tons, and a bear-trap dam.

The enormous work was simultaneously carried on, with little delay, and the great amount of money was disbursed honestly and economically by the Chicago officials in charge.

FIG. 2.—BUILDING RETAINING WALLS, CHICAGO DRAINAGE CANAL.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....General Manager

TO THE PUBLIC.

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San Francisco, October 30, 1897.

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The Mining Engineer.

In some recent remarks by Henry A. Gordon on the subject of "Mining Engineers," he says it is essential that a mining engineer should have, in addition to the practical experience in working mines, a technical training and a knowledge of the sciences on which mining is based—geology, mineralogy, chemistry, metallurgy, mechanics and mine surveying.

While it is essential to have a technical education, it must not be supposed that this is the only requirement. Mining cannot be termed an exact science, but is an industrial art or occupation for purely economic purposes. A mining engineer's success is judged from a financial aspect; economy and results are the criterions by which he must stand or fall. Unless he can carry on large operations more economically and get better results than a man without any technical education, then his training has been of no value either to himself or his employers. Mining is based on scientific principles. The treatment of the ore after it leaves the mine is a subject which requires considerable scientific knowledge in order to secure the highest percentage of its contents with the greatest economy. A mining engineer may have high theoretical attainments and yet fail from lack of practical qualities for conducting mining operations. Mr. Knopp, a mining engineer recently engaged by the Government of British Columbia to report on the mines in that province, in his report to the Minister, as taken from the blue-books of that colony, says: "If you wish to employ a mine manager get one from the Pacific Slope who has cost a company half a million dollars. That man may make slight mistakes again, but other companies have paid for him gaining his experience. The manager of a mine should be able to run an engine, know how to run a mill in all its branches, know when each stamp is doing its duty, detect a loose mortar-hole, cut out any timber for a shaft or drive or elsewhere, sharpen a pick or drill; in fact, he must be a miniature encyclopædia."

Some knowledge of geology is necessary to understand the formation of different rocks met with in mining, how faults occur, and the effect these have on lode displacement. In different parts of the world certain metals are found in certain formations, and although not the same in different countries where the same metals and minerals are found, yet have a geological relation to each other which enables a geologist to form an idea as to the metals and minerals likely to be obtained in the different rocks in the country under his examination. Mineralogy and crystallography also deserve more attention than is generally given to them. A general knowledge of these sciences enables the engineer to recognize the mineral he meets with, while his knowledge of chemistry assists him in determining its parts and value. A mining engineer has, in the constant practice of his profession, to make or get assays made of the different ores in the mine under his superintendence. It is necessary that he should have a theoretical knowledge of chemistry and have been sufficiently in a laboratory to become proficient in qualitative and quantitative analysis and assaying. Without a knowledge of chemistry he cannot understand the principles of metallurgy and the reasons why different classes of ore require different modes of treatment. There is no subject at the present day that demands more attention than the intelligent treatment of ores.

A knowledge of surveying and leveling is also indispensable to a mining engineer. He should be able to make accurate underground surveys, and understand the principles of construction of all works in connection with every branch of mining, and the machinery and appliances connected therewith. It is impossible to acquire this knowledge solely from theroetical training. The mining engineer must have had practical experience in the different systems of working mines, and this can be got neither from lectures nor from literature. Mining must be learnt in a mine, and, even although a man may have a good practical knowledge of quartz mining, he may have very little knowledge of hydraulic or other forms of mining. Hydraulic mining, although apparently simple, requires the man who superintends operations to have a good deal of practical experience to carry on the operations successfully with the greatest economy. The desideratum of the profession is to have men qualified in every particular to carry on mining operations successfully at a minimum cost.

The education of a mining engineer in following his profession is continually proceeding; he is learning every year of his life something new; scarcely a day passes without bringing with it some fresh subject for investigation. The number of questions he is supposed to be able to solve is perplexing—questions which a mining engineer is expected to answer every day of his life, unless he chooses to shut himself up so that nobody can see him.

It is essential that a mining engineer should have a knowledge of the geological structure of the rocks in the district where he is to conduct mining operations, and that he should make a study of the ore deposits—a subject which is too often lost sight of by those engaged in mining.

An engineer may develop a mining property successfully by simply following the ore bodies, guided by empirical rules which experience has taught him, without regard to the phenomenal appearance of the country rock, its structure, condition, or the probable origin, character, and formation of the ore deposits; but in carrying on his operations it is to be expected that unless he carefully studies this subject he will be liable to make mistakes which may involve a large useless expenditure.

Railway Statistics.

The ninth statistical report of the Interstate Commerce Commission, prepared by its statistician—being the complete report for the year ending June 30, '96,—has just been issued. The total railway mileage in the United States on June 30, 1896, was 182,776.63 miles, an increase of 2,119.16 miles, or 1.17 per cent during the year. California shows an increase of 202.05 miles, next to Georgia the greatest increase of any of the forty-five States. The aggregate length of railway mileage, including all tracks, on June 30, 1896, was 240,129.12 miles. The total number of locomotives in service on June 30, 1896, was 35,950, or 251 more than on the same date of the preceding year. Of this number 9943 were passenger locomotives, 20,351 were freight locomotives, 5161 were switching locomotives, 495 unclassified.

From summaries in the report indicating the density of equipment and its efficiency in the transportation of passengers and freight, it appears that the railways in the United States employ 20 locomotives and 713 cars per 100 miles of line. Referring to the country at large, it is shown that 51,471 passengers were carried and 1,312,381 passenger-miles accomplished per passenger locomotive. It is also shown that 37,634 tons of freight were carried and 4,684,210 ton-miles accomplished per freight locomotive.

The number of men employed by the railways of the United States on June 30, 1896, shows an increase of 41,586, being 826,620, which, assigned on a mileage basis, gives 454 men per 100 miles of line.

For the first time, a summary showing the amount of compensation paid to the several classes of railway employees is presented in this report. It includes the compensation of over 99 per cent of the employees for 1895 and 1896. The aggregate amount of money paid in wages and salaries, as shown in the summary for the year ending June 30, 1896, was $468,824,531, or 60.65 per cent of the total operating expenses of railways.

The amount of railway capital on June 30, 1896, was $10,566,865,771, which assigned on a mileage basis, shows a capital of $59,610 per mile of line. It should be noted, however, that these figures do not include current liabilities, which, if included as a part of capital, as in former years, would increase the amount of outstanding capital about $613,000,000, making the amount per mile of line $63,068.

The total amount of dividends was $87,603,371, which would be produced by an average of 5 62 per cent on the amount of stock on which some dividend was declared.

The number of passengers carried during the year ending June 30, 1896, was 511,772,737, an increase of 4,351,375 as compared with the year ending June 30, 1895. That year, however, showed a decrease of 33,266,837 as compared with 1894. The number of tons of freight carried during the year under consideration was 765,891,385. This is the largest tonnage ever reported for railways in the United States. The increase during the year was 69,130,214. The number of tons of freight carried one mile was 95,328,360,278, there being an increase of 10,100,844,387. The density of freight traffic is shown by the number of tons of freight carried one mile per mile of line, which was 523,832. These figures, as compared with those of the preceding year, show an increase of 44,342 ton-miles per mile of line.

The gross earnings of the railways of the United States for the year ending June 30, 1896, were $1,150,169,376, having increased in comparison with the previous year $74,797,914. The sources of the income comprised in gross earnings from operation during the year were: Passenger revenue, $266,562,533; mail, $32,379,819; express, $24,880,383; other earnings, passenger service, $6,691,279; freight revenue, $786,615,837; other earnings, freight service, $3,885,890; unclassified, $579,398. The expenses of operation for the year covered by the report were $772,989,044, being greater by $47,268,629 than the preceding year. The operating expenses were assigned as follows: Maintenance of way and structures, $160,344,950; maintenance of equipment, $133,381,998; conducting transportation, $442,217,582; general expenses, $36,083,285; unclassified, $961,229.

The income from operation, that is, the amount of gross earnings remaining after the deduction of operating expenses, was $377,180,332, which exceeds the corresponding item for 1895 by $27,529,285. The income from other sources, mainly from leases and investments, was $129,024,731, which, added to the income from operation, makes a total income of $506,205,063. The total deductions from income were $416,573,137, so that the net income out of which dividends and surplus were declared was $89,631,926. The dividends declared were $87,603,371, leaving a surplus of $1,534,169, after the satisfaction of adjustment claims amounting to $494,386. This small amount of surplus, however, shows an improvement, since the results of railway operations during the years 1895 and 1894 showed deficits of $29,845,241 and $45,851,294, respectively.

An analysis of the total deductions from income, $416,573,137, shows that they were composed of the following items: Salaries and maintenance of organization, $545,468; interest on funded debt, $249,624,177; interest on interest-bearing current liabilities, $8,469,063; rents paid for lease of road, $92,972,322; taxes, $39,970,791; permanent improvements, $5,162,240; other deductions, $19,829,076.

The number of railway employees killed during the year ending June 30, 1896, was 1861; number injured, 29,969. The number of passengers killed was 181; the number of passengers injured, 2873. The number of persons other than employees and passengers killed was 4406; and the number injured, 5845. These figures include casualities to persons reported as trespassers, of whom 3811 were killed and 4468 were injured.

In the conclusion of his report the statistician repeats the recommendations contained in previous reports, to the effect that reports should be secured from express companies engaged in interstate traffic; that reports should be secured from corporations and companies owning rolling stock which is used in interstate traffic, and special reports from corporations and companies owning depot property, elevators, and the like; and that reports should be secured from carriers by water, so far as their business is interstate traffic.

Concentrates.

THE California State Debris Commissioner at present has no secretary.

THE Le Roi smelter at Northport, Wash., will begin operations Dec. 29, '97.

GEORGETOWN, El Dorado Co., Cal., has organized a branch miners' association.

COLORADO figures a total mineral output aggregating a value of $40,000,000 in '97.

THE Mount Morgan, Australia, mine in August treated 12,732 tons of ore for 13,533 ounces of gold.

A CHINESE "mining expert" is reported experting mines in Nevada county, Cal., for a Chinese company.

THE Randsburg, Cal., *Miner* says the automatic dry concentrator recently tested there is a success.

COMMISSIONER OF THE LAND OFFICE HERMANN has ruled that an Alaska Indian may take up a mining claim.

THE Salt Lake *Tribune* suggests that the tariff on lead be made a political issue. Free lead vs. free silver.

AUSTRALIA will add its quota to the rush of gold hunters to the Klondike next year. Several hundred will sail from Sydney.

NEW MEXICO papers say there is an urgent demand for the diamond drill in that Territory, especially in the Cochiti mining district.

KILPATRICK BROS. are reported to be operating a coal mine at New Castle, Wyo., "the coal from which carries $4 to the ton in gold."

THE next meeting of the California Debris Commission to hear applications for permits to resume hydraulic mining will be on November 8th.

THE electric plant recently put up at Cottonwood, Churchill county, Nev., is reported to be successfully working the nickel ores of that district.

THERE has been a change in the Canadian customs laws and miners are permitted to take in an outfit, free of duty, when not exceeding $100 in value.

SINKING began this week on the twenty-second level of the Empire mine, Grass Valley, Cal. A new ore chute has been struck on the 2000-foot level.

AT Austin, Nev., the Austin Mining Co. say they want fifty competent miners, "first come, first served." About 150 men are employed at present.

BEGINNING next Monday, shipments of refined bullion from the De LaMar—Nevada's biggest mine—cease. Hereafter it will go out in the form of a cyanide.

DURING the first half of the present year 9335 mining claims were "patented" in Mexico. During the same months in '98 the number of patents was only 241.

THE possession of a United States patent to land, agricultural or otherwise, precludes any attempt to "prospect" thereon against the wishes of the owner.

BESIDES being honest it is more materially satisfactory in the long run—or the short run—to defer the sale of any mining stock till the title to the ground is perfected.

THE number of Klondike and Yukon companies organized in London is increasing. Up to the 18th inst. thirty had registered with capitals ranging from £7000 to £25,000.

IT is estimated that over eighty tons of diamonds have been unearthed in the South African fields during the last eighteen years. These represent a total value of £56,000,000.

THE narrowest gauge railway known to the writer is the 20-inch road of the Arizona Copper Company, at Clifton, Arizona, on which a 17-ton engine runs on a 24-pound per yard rail.

THERE is no limit to the number of mining claims an individual or corporation may take up, but there is a limit to the number that can be worked, and that limit should not be exceeded.

PEGAMOID, for rendering asbestos, paper, etc., impermeable and proof against acids and grease, is a liquid made by dissolving celluloid in alcohol. On applying, the alcohol is driven off by heat.

THE Colorado *Mining Review* says: "California is keeping even pace with Colorado in its increasing gold production, and when the year's results are known it will probably be found as usual in the lead."

THE old base metal district of Eureka, Nevada, now claims that development work will show abundant bodies of high-grade gold ore. 'Twould be singular if "Charcoal Flat" should turn into a gold camp.

AGREEMENT has been made by the New Zealand minister of mines and the Cassel Gold Extracting Company, by which the company agree to sell the patent rights within that colony to the Government for £15,000.

A DISPATCH from Kingman, Arizona, announces that the largest mining deal ever transacted in Mojave county has been consummated in the sale of the Minnesota and Connor mines to Thomas Ewing of Oakland, Cal., for $250,000 spot cash.

THE Bonanza gold mine of South Africa produced 8031 ounces of gold in September; the management declared a dividend of 50 per cent, payable to-day. The Crown Reef mine produced 12,909 ounces of gold in September at a profit of £22,958.

THE London *Statist* says that in the current year Russia's purchases of silver in connection with its arrangements for a return to a metallic currency have amounted to $25,000,000 in value, about one-fourth of the world's total production of silver for that period.

PROBABLY the wettest mine in Colorado, says the Denver *Mining Industry and Review*, is the Free Silver at Aspen. It is said to flow 2800 gallons per minute. This is equal to almost 4,000,000 gallons in twenty-four hours—enough to supply a city of 40,000 people.

AUSTRALIAN gold still pours toward San Francisco. The Mariposa, now on the way, has $1,350,000 for this port, making a total of $7,000,000 from Australia during the last six months. It is found cheaper to send gold direct to San Francisco than via London and New York.

LONDON mining papers call attention to the production of the Witwatersrand, South Africa, mines for the year and say: "There is absolutely no reason, political or economic, for the present fidgety and feeble state of the South African market. For the producing mines the year has been a record one, the output of gold having far exceeded that of the boom year."

WRITING from Sinaloa, Mexico, a subscriber says: "The Mexican method of working a gold mine simply prevents ever ascertaining the true value of the property; therefore, unless the development of a property is under the management of a foreign company, it is not known whether it is a producing mine or not." The same criticism applies largely to California.

WHAT is believed to be the best information regarding the Klondike appeared in three articles written for this journal by specialists, in the issue of Aug. 7, '97. The demand was so great that a reprint of the entire edition was exhausted. Nearly all the subsequent pamphlet information regarding that region has been copied from the issue of this paper of that date.

INCREASED activity in mining in California has caused the revival of railway and telephone projects all over the State, several of which are materializing. It is now possible to talk from San Diego to Redding, 906 miles, and the telephone lines are extending to remote mining districts. The narrow-gauge railways building and in embryo will go far toward solving the transportation problem in the foothills and mountains.

THE San Giuseppe mine, adjoining Sonora, Tuolumne county, Cal., according to the *Democrat*, has yielded the purest gold ever mined, either quartz or placer. Gold 1000 fine, chemically pure, is worth $20.67 per ounce. That from the San Giuseppe has an average fineness of 985, "while selected specimens of the virgin metal just as they came from the rock have reached 988⅔, worth per ounce within a slight fraction of $20.44."

SOME Nevada holders of unpatented silver claims say it is hardly worth while doing the annual work in '97 required to hold them. Where claims represent a past outlay of money the question is a difficult one. But sixty-one days remain, and, if possible, every holder of any mining claim anywhere should do sufficient work to legally hold it. Now and for the next few years no property equals in prospective value a mining claim.

SOME TIME ago was reported a mine in Bingham, Utah, where the sulphurets were on the surface and gave way to free gold as depth was attained. Now comes a statement that in the Socorro mine, eighty miles northwest of Phœnix, Arizona, samples of galena ore, lead sulphides, carry free gold. It may be so; since gold was found in coal in Utah, and in the bark of trees in Washington and hen's gizzards in Oregon, no statement is to be accounted incredible.

"MINING is a risk." What in life isn't a "risk"? Mercantile pursuits, manufacturing enterprises, business propositions of all kinds involve big risks. The slightest movement is a "risk." To eat or drink or travel is a "risk." The farmer is the riskiest one of all. He bets on the rain and the European markets; on the weather six months ahead, and the likely demand for his crop; yet men are not dissuaded from any ordinary pursuit of life by the element of "risk." They rather like it.

THE shareholders in the Wonderful Group Mining Company, Slocan district, B. C., object to the development that there was no money in the company's treasury and no ledge in the company's mine. Manager Field tells them that he has been unable to find any ledge; that a further small expenditure might result in its discovery, but again it might not. Since the Wonderful Company took the property over, $39,133 was realized through the sale of float washed out of the side hill and $49,554 was spent. Among the disbursements is an item of $5000 paid for the mine.

THE Register and Receiver of the land office at Redding, Cal., has a ruling regarding the title to mineral lands—the case known as the Mineral Affiants and Protestants vs. the C. P. R. R. Co.; the hearing was had June 14th. According to the ruling all land claimed by miners who appeared at the land office was conceded as mineral. "Those who did not appear at the land office in person or by attorney are allowed thirty days from October 11th within which to appeal from the decision, and if not appealed within that time the decision will become final as to all question of fact."

THE cost of cyaniding varies largely with the character of the ore. There are a number of mills which crush and cyanide ore for less than $2 a ton, exclusive of royalty paid to the company owning the patents. The lowest cost recently reported in this country is 85 cents a ton, at the Mercur, Utah. No company has yet been able to reduce the cost of treating tailings to the minimum reached in South Africa—59 cents per ton; but one plant, operating under exceptionally favorable conditions, is working at a cost of 69 cents a ton. In general, the tailing plants working in this country do not obtain a high extraction.

WHEN the gold standard was established in Japan the authorities did not think it necessary to provide against a return for redemption of the Japanese silver yen in circulation in China and the Straits. The Japanese Government did not expect the decline in silver, which has given Chinese holders an opportunity to return Japanese silver to Japan for redemption, making a profit thereby. These Japanese silver yen are being returned to Japan for redemption in gold at their face value, thus accumulating a good deal of silver in this form, and may be obliged to dispose of it for what it will bring in the market.

STEAMERS from St. Michaels bring men who failed to reach the Klondike but who saw and heard enough to confirm the warnings of this paper in the earlier months of the year that death in its most ghastly form awaited those who started for that region without thorough equipment. As for "news" from there, little worth publishing can be added to what has already appeared herein. The articles on the Klondike originally published in these columns have been reproduced in every part of the earth, and while accurately stating facts, have contributed in some degree to inducing sober thought on the part of those inclined to fling away all judgment in the mad rush.

"IS CYANOGEN capable of dissolving gold?" is a question asked and answered by Mr. Skey of Wellington, N. Z., who says that cyanogen as used in cyaniding would have but very little tendency to form, by its decomposition, products that are solvents of gold; that cyanogen can never be profitably used for the alternative to an alkaline cyanide as proposed or patented by the patentees of the cyanide process; that cyanogen is not the solvent, but that an alkali is just as necessary for it as the gas. If first cyanodized, a partial decomposition of the cyanide used takes place, but this cyanide or oxide of gold thus formed, being insoluble in water, requires an alkaline cyanide to bring it into solution for its subsequent extraction, which it does by forming the salt, auro-cyanide of potassium; and that free cyanogen is practically unable to bring gold into solution.

"CONCENTRATES" is reminded by an Aspen, Colo., subscriber that the flashlight signals used by a Butte, Mont., mining superintendent, and noticed in the issue of the 16th inst., are an old thing so far as Aspen miners are concerned. Very likely; nearly all the new devices noted have been in use somewhere, some time, by somebody. The same mail brought a letter from San Bernardino, Cal., regarding the "novel" scheme of irrigating land by water from a mining shaft there. "Concentrates" remembers doing the same thing twenty-three years ago in Lincoln Co., Nevada. Doubtless the tin miners of Phœnicia did the same thing twenty-three centuries agone. In the days of old Rameses these "new" things had paresis.

FROM an article in the *Eisenzeitung* on the output of platinum in Russia is taken the following notes: The Russian production of platinum is forty times greater than that of all other lands together. In Russia it is found exclusively in the southern Oural region. It is shipped in its crude state to Germany and there refined. (This statement is surprising, as it has been commonly supposed that most, at least, of the Russian platinum is worked up by Johnson, Matthey & Co. of London.) The output in 1895 was 4413 kilos as against 2946 kilos in 1880. The cost of crude platinum in Russia is at present about $216 per kilo. The amount of iridium found with the platinum is very small, being in 1895 only 4.1 kilos, in 1894 only slightly more than this.

THE use of sodium dioxide in connection with cyanide is the chief element in the Kendall process. Prof. Kendall says that the better results are obtained by adding the freshly-made solution of dioxide to the cyanide solution; some chemists claim that much oxygen is lost in this way, which is made available when the dioxide is mixed, dry, with the ore. The object of the dioxide is to furnish nascent oxygen, which acts on the cyanide to liberate cyanogen, hastening the reaction. Partial experience with the use of dioxide has been that, in general, a greater extraction is obtained in a short time (twenty-four to forty-eight hours); and that at the end of a long time (seventy-two to one hundred and twenty hours) the extraction with dioxide is about the same as with cyanide alone.

TO ASCERTAIN where the loss in sulphurets occurs, a good way is to pass one of 10,000-grain samples through a 60-mesh wire screen; weigh that which passes through and that which remains on the screen, and pan out each lot carefully by itself, from one pan into another, as long as the sulphurets can be recovered; then weigh each batch separately. The use of 10,000 grains is recommended, as every 100 grains is 1% and each grain is 1-100 of 1%. It is also a convenient size for obtaining accurate results. By using pulp samples instead of tailings, the amount of sulphurets in the ore may be ascertained. If the sulphurets assay $75 per ton, and the quantity per ton is 1.7%, the value of the sulphurets in one ton of ore is found by multiplying $75 by 0.017, which would be $1.27 per ton. If the loss of sulphurets in the tailings is 11 grains out of the 10,000-grain sample, and the value of the sulphurets is $75 per ton, then multiply $75 by 0.0011, and the value of sulphurets in the tailings is found to be $0.0825 (8¼ cents) per ton of tailings.

SPEAKING of the cost of producing copper and its bearing upon the future of the copper market, a mine official says: "In my opinion it will be impossible to much further reduce the cost of mining copper. The system now has reached an almost perfect state, and experiments which have been made recently with a view to still further reducing the cost of mining, by using higher explosives, have proved valueless. We have tried high explosives, but find that the results are far from satisfactory as compared with lower grade explosives, inasmuch as a smaller quantity of rock is displaced by the higher grades, than by the lower grades. The force of the high-grade explosives, undoubtedly, is much greater, but is expended so quickly that it does not perform as much work as do the low-grade explosives. If the cost of electrical power could be cheapened, it would make considerable difference to mines like the Tamarack, for instance, where a vertical shaft is sunk, say 5,000 feet, then changed to follow the incline of the lode. The danger from fire and the physical and mechanical difficulties are too great to install a steam plant a mile under ground, and compressed air cannot be used for hoisting from great depths. Possibly the future may develop a cheaper electrical power, but, until it does, the cost of mining copper, or of handling a ton of rock, will not be materially reduced from present figures."

THERE is considerable diversity of opinion among mine owners as to the time they should allow on mine bonds, but there is a tendency to give less time than formerly, owing to the objection of tying up the property to people who may, after all, do nothing with it. This objection to long time depends, however, on the individuals who bond. If they only tie up the claim hoping to make a commission on a sale, and then fail to dispose of it, the shorter time given them the better, though they always want six months or a year in which to carry on their negotiations. When a claim is, however, bonded to a company, who are to develop it and become the possible purchasers themselves in the event of success, they need considerable to prove the worth of the property. A provision enforcing "continuous work" is a good remedy in this case, since if they stop, the claim reverts to the original owner without the loss of too much. Those who intend negotiating "deals" complain that sixty or ninety days time is too short to carry one through, while the mine owners do not like to tie up their property too long. Long and easy termed bonds of course give plenty of time for investigation and examination, but are not always fair to the original owners. It is not unusual to give one, two or three years time or lease, where companies obligate themselves to develop the claim during the period. But people who bond only to sell should not be given any such time. In fact, six months, at furthest, is plenty of time for such an operation, and unless it is to be abroad, ninety days should suffice in most instances. Hawking a mine about from one to another does it no good, and it is for this reason many large owners decline to bond at all, though they may sell at a stipulated price agreed upon. Owners of small mines often bond them for long periods without knowing much about the men with whom they negotiate, and are thus prevented from making a sale themselves, even after the other party has failed to do so. It is proper therefore, to inquire carefully into the standing and the intention of those who wish to bond mine properties.

Notices and Certificates of Locations.

In response to some inquiries regarding correct forms for notices and certificates of location under the recent California enactment, the following are published, and are believed to fill all necessary requirements. It is of course unnecessary to say that the descriptions are all fictitious. These notices have been prepared by a prominent mining lawyer, and their importance, as they constitute the basis of the miner's title to the ground, justifies the prominence herein given them. Particular attention is invited to the necessity for properly describing the claims located with reference to natural objects and permanent monuments, and likewise to the proper marking of the location made on the ground at the time of location:

Preliminary Notice of Lode Location—Under Act of March 27, 1897.—Notice is hereby given that I, John Williams, a citizen of the United States, have discovered a vein of rock in place carrying gold, silver, and other valuable deposits, upon which I have erected a discovery monument and posted this notice, as hereinafter set forth:

That in accordance with the provisions of title thirty-two, chapter six, of the Revised Statutes of the United States, and the laws of the State of California, I hereby claim fifteen hundred linear feet of said vein, measured as hereinafter set forth.

Said discovery was made on the 29th day of May, 1897. Immediately upon making the same, and on said May 29, 1897, I erected at the point of discovery a substantial monument and mound of rocks, and posted thereon this notice.

The general course of said vein is north and south. I claim in length thereon five hundred feet northerly and one thousand feet southerly from said discovery monument. I also claim three hundred feet on each side of the center of the vein.

This vein or claim shall be known as and called the "Elizabeth." It is situated in Jackson mining district, Amador county, California, in section 20, township 6 north, range 11 east, Mount Diablo meridian, the discovery monument being placed four hundred feet westerly from the point where the Jackson and Volcano road crosses the west bank of Dry creek.

This notice is the first, or preliminary, notice required by the provisions of section two of the Act of the Legislature of California, approved March 27, 1897, entitled, "An Act prescribing the manner of locating mining claims upon the public domain of the United States, recording notices of location thereof, amending defective locations, and providing for the deposit of district records with county recorders, and prescribing the effect to be given to recordation of notices of location and affidavits."

In accordance with the provisions of said Act, I claim sixty days from the date of said discovery to enable me to perfect the location of said claim.

Dated and posted on the ground, May 29, 1897.

(Signed.) JOHN WILLIAMS, Locator.

N. B.—A duplicate of this notice is required to be recorded in the county recorder's office of the county wherein the claim is situated, within twenty days from the date of discovery.

Final Certificate of Lode Location—Under Act of March 27, 1897.—I, John Williams, a citizen of the United States, hereby certify that on the 29th day of May, 1897, I discovered a vein of rock in place bearing gold, silver, and other valuable deposits, in section 20, township 6 north, range 11 east, Mount Diablo meridian, Jackson mining district, Amador county, California. On said day I erected at the point of discovery a substantial monument and mound of rocks, and placed thereon a preliminary notice, as required by the provisions of section two of an Act of the Legislature of the State of California, entitled, "An Act prescribing the manner of locating mining claims upon the public domain of the United States," etc., approved March 27, 1897;

That on June 10, 1897, I caused said preliminary notice to be recorded in the county recorder's office of Amador county, and the same is now of record in book B of quartz mining claims, page 50, to which record reference is hereby made for all the particulars therein contained;

That within sixty days from the date of said discovery I performed labor in the development of said discovery, which labor was, and is, reasonably worth the sum of sixty dollars, and consisted of sinking a shaft of ordinary dimensions on said vein to the depth of ten feet, said shaft having been sunk at the place of discovery;

That within said period I distinctly marked the location of said claim on the ground, so that the boundaries can be readily traced, and perfected said location;

That the following is a description of said location as finally marked on the ground:

Commencing at the discovery monument in said section 20, township 6 north, range 11 east, Mount Diablo base and meridian, which said monument is four hundred feet westerly from the point where the Jackson and Volcano road crosses the west bank of Dry creek; thence north five hundred feet to a stake in mound of rocks, said stake being marked "E. 1 N. L. P.," as and for the north lode post, from which post a pine tree, three feet in diameter, blazed and marked "E. 1 B. T.," bears northeasterly sixty feet distant; thence at right angles west three hundred feet to a stake in mound of rocks at the northwest corner of claim stake, marked "E. 2"; thence at right angles south fifteen hundred feet to a stake in mound of rocks, stake marked "E. 3," the southwest corner of claim; thence at right angles east three hundred feet to stake in mound of rocks, stake marked "E. 4 S. L. P.," as and for the south lode post; thence continuing east three hundred feet to stake in mound of rocks, stake marked "E. 5," the southeast corner of the claim; thence at right angles north fifteen hundred feet to a stake in mound of rocks at the northeast corner of the claim, stake marked "E. 6," from which an oak tree, three feet in diameter, marked "E. 6 B. T., bears northeast, distant ninety feet; thence at right angles west three hundred feet to stake in mound of rocks marked "E. 1 L. P.," embracing fifteen hundred linear feet of said lode. All of said stakes are four feet long, four inches square and set one foot in the ground.

This claim is known and called the "Elizabeth."

This certificate is the final notice of location required by section three of the Act of the Legislature of the State of California, hereinbefore referred to.

Dated July 6, 1897. JOHN WILLIAMS, Locator.

STATE OF CALIFORNIA, } ss.
County of Amador. }

John Williams, being first duly sworn, deposes and says: I am the locator named in the foregoing final certificate of location. The facts stated in said certificate are true. JOHN WILLIAMS.

Subscribed and sworn to before me this 7th day of July, 1897.

[Notarial seal.] D. B. SPAGNOLI,
Notary Public, Amador county, California.

N. B —No posting of the certificate is required. It must be recorded in the county recorder's office within sixty days from the date of discovery.

Notice of Location of Placer Claim for Posting.—Notice is hereby given that I, Fred Zeitler, a citizen of the United States, have, this 1st day of August, 1897, discovered a valuable placer deposit within the limits of the north half of the northeast quarter of the northeast quarter of section 12, in township 16 north, range 8 east, Mount Diablo meridian, Washington mining district, Nevada county, California.

By virtue of such discovery, I have located, and hereby claim, said north half of the northeast quarter of the northeast quarter of section 12, in township 16 north, range 8 east, Mount Diablo meridian, containing twenty acres.

Said claim is hereby named the Searls placer claim.

The said claim is marked upon the ground as follows: At the northeast corner of said tract I have placed a stake in mound of rocks, stake marked "S. P. N. E. Cor.," from which a nut pine, one foot in diameter, blazed and marked "B. T. S. P. N. E. Cor.," bears south twenty feet distant; at the northwest corner of said tract a stake in mound of rocks, stake marked "S. P. N. W. Cor."; at the southwest corner of said tract a stake in mound of rocks, stake marked "S. P. S. W. Cor."; at the southeast corner of said tract stake marked "S. P. S. E. Cor."

This notice is posted on mound of rocks at point of discovery, sixty feet southeast from the stake and mound marking the northeast corner of the claim.

Dated and posted on the ground August 1, 1897.

FRED ZEITLER, Locator.

N. B.—If location is upon unsurveyed lands, description should follow suggestions contained in final certificate of lode location. A duplicate of this notice must be filed for record with the county recorder within thirty days from the discovery.

Affidavit of Performance of Discovery Work Upon Placer Claim.—

STATE OF CALIFORNIA, } ss.
County of Nevada. }

Fred Zeitler, being first duly sworn, deposes and says: I am the locator of that certain placer claim known as and called the Searls Placer, notice of the location of which is of record in the office of the county recorder of Nevada county, in book 8 of mining records, page 9, to which record reference is hereby made for all the particulars therein contained; that within sixty days from the date of discovery of said claim I performed labor upon the same, which labor was, and is, of the reasonable value of twelve dollars. Such labor consisted of sinking a shaft ten feet deep to the bedrock, and removing and washing the gravel therefrom.

FRED ZEITLER.

Subscribed and sworn to before me, this 5th day of September, 1897.

[Seal.] F. H. POWER, Notary Public.

N. B.—This must be recorded within sixty days after discovery.

The above is published at this time for two reasons: First, as has been said, in answer to several inquiries as to the proper method of complying with the recent California enactment; and, second, because of the fact that where a lode location is made in this State after November 2nd, '97, it will be possible to do the $50 worth of work required by the California statute and make it a part of the $100 assessment work specified in the Federal statutes, for the next fourteen months. The new mining law of this State says that $50 worth of work shall be done on a claim within sixty days after location. The Federal statute requires an annual amount of work or improvements to the extent of $100, the time for which such work begins being the 1st of January next after the date of location. Then, as stated, where a lode location is made, say, next Tuesday, the 2nd prox., the locator has until the 31st of December, '98, to comply with the requirements of the Federal statute; and as he has until January 1, '98, to do the $50 worth of work required by the State statute, he can have such $50 in work or improvements apply on the $100 required by the national law.

Crowding the Foreigners.

American manufacturers have strong reason for encouragement in the growing foreign demand for products of their workmanship. This result has been attained in the face of the most formidable competition. Naturally enough, the long established nations of Europe are reluctant to believe that their inventors and mechanics can be outstripped or undersold by the same class in a country just turned its first century, but the proof that this can be done is now before them in more than one form. Our manufacturers are honestly entitled to be called the most progressive in the world. They are quick to welcome improvements and they study the whole range of invention with keen interest. In this respect they differ from many European manufacturers who stick to old methods and processes as long as possible, assuming that their way must be right because they were formerly successful.

A few days ago London woke up to the fact that the entire equipment of its new electric underground railway must come from America. The trams and appliances offered in England are inferior and more costly. Electric transportation has reached by far its highest development in the United States and our manufacturers may be depended on to hold their ascendency in this important field. Our bicycles the world over are preferred to any others. American steel rails can be delivered in India at a price shutting out the British mills. Japan, which is not at present disposed to be friendly, has nevertheless recently ordered fifty locomotives to be built in Philadelphia. Their equal can not be obtained in Europe, and that settled the matter as a business transaction. British consuls in Uruguay and Brazil report that the Americans are taking the lead in iron-mongery, cotton goods and silver-plated ware. A colonial blue book states that in Australia there is a general demand for American implements, clocks and boots. Our agricultural machinery has captured the Australian market, and it easily takes the lead everywhere.

Some have contended that foreign markets would be closed to us unless we allow tariffs to be shaped by foreign influences. But events are showing that the higher wages which protection insures to workmen increases their skill, sharpen their ingenuity, and add to their individual effectiveness. The goods they turn out in many lines are more serviceable, adaptable and stylish than any competing kinds, and they sell on merits. When a foreigner wants a reaper, electric outfit, steel rails, bicycle or clock he does not think of tariffs, but invests his money to what he considers the best advantage. Our manufacturers are winning a world-wide reputation for introducing the latest and best devices, and if they will scrupulously maintain the quality of their wares the time is not distant when their general leadership will be acknowledged.

Recent Additions to the State Mining Bureau Collection.

Gold quartz, from Granite King and Mineral Hill mines, Kern and Inyo counties, Cal.; W. C. Rice. Iron ore, good quality, from Humboldt county, Cal. Quicksilver ore, from Redington mine, Napa county, Cal. Yellow ochre, from Valley Springs, Calaveras county, Cal., producing 1 carload per week; Comanche Ochre Company. Chrysoprase, from a new locality in Tulare county, Cal; Dr. S. E. George. Lignite, from 18-inch vein two miles from Garlock, Kern county, Cal.; C. C. Derby. Auriferous gravel, vein matter and wall and dyke rocks, from Coffee Creek, Trinity county, Cal.; Geo. Madeira. Phlogopite, from Sierra Madre, Cal.; Dr. S. Bowers. Quartz crystals, etc., from Mt. Bullion, Mariposa county, Cal.; Miss M. Pothast. Rich copper ore, from a large ledge on the McCloud river, Shasta county, Cal.; Harrington & McNaughten. Handsomely finished model of self-closing trap-door, as used in the drifts of the New Almaden mine, and model of lad-

der; C. C. Derby. Gold quartz, from Black Prince and Caledonia mines, Granite Basin, Plumas county, Cal.; Mrs. A. Christie. Opal, from Dunsmuir, Siskiyou county, Cal.; P. A. Molson; first known occurrence of this mineral in California. Gold in granite, from Amargosa mine, Inyo county, Cal.; A. B. Paul, M. E. Platinum, from Highland Bar hydraulic mine, Taylor Flat, Trinity county, Cal. Gold quartz showing free gold, from Midas mine, Harrison gulch, Shasta county, Cal.; J. H. Roberts. Fossils, crinoid stems, from the auri'erous strata at Mercur, Utah; M. Lindley; interesting as throwing light on the geological age of these remarkable deposits. Native tin, from Orleans Bar hydraulic mine, Humboldt county, Cal.; P. L. Young; second time the occurrence of this very rare mineral has been noted in California. Crude carbonate of soda, from a large bed about ten miles from Mojave, Kern county, Cal.; H. A. Wolff. Menaccanite (oxide of titanium and iron), from Sierra Madre, Cal.; Mr. Quitzow; first specimen received by the Bureau from any California locality. Auriferous sand, from an extensive bed partly owned by the Golden Sands Mining Company of Westport, New Zealand; Capt. M. H. Harrington; this sand, under the microscope, shows a large number of double-terminated quartz crystals —a very unusual feature; the gold is very fine and offers a field for some machine adapted for saving "flour gold." Quartz gold, rich in free gold, from Crawford's mine, 250 miles northeast from Kalgoorlie, West Australia; W. E. Darrow, M. E. Gold on hematite, from Great Eastern mine, Burlong, West Australia; W. E. Darrow, M. E. Telluride of gold, two rich specimens from mines at Kalgoorlie, West Australia; W. E. Darrow, M. E. Electrum (native alloy of gold and silver), from Kalgoorlie, West Australia; W. E. Darrow, M. E. And sundry other specimens.

H. S. DURDEN, Sec'y.

A Mine Dam.*

WILLIAM KELLY.

An exploring drift on the bottom level of the Curry mine, at Norway, Mich., on the Menominee range, cut a stream of water, which increased considerably the expense of pumping. The hope that the supply would drain off was not realized. It was decided to build a dam in the exploring drift, as it was estimated that the cost would be recovered by the saving in fuel in less than two months.

The 8th and lowest level of the mine is 780 feet below the surface. The exploring work had started north from the shaft at right angles across a slate to a jasper formation parallel to that which contains the principal ore body. In this north jasper several hundred feet of drifts had been opened in different directions. The dam was located in the slate near the jasper. The drift at this point is 6 feet wide and 7½ feet high. The amount of water enclosed by the dam would be less if it had been built nearer the face of the openings; but the jasper, though hard to drill, is not firm, while the slates, though softer, are dense and solid, and the impermeability and strength of the adjoining measures were of commanding importance.

The dam was built of local sandstone in the shape of an arch upon its side, with a radius of 6 feet and a thickness of 10 feet. The mortar was made of one part Hilton cement and two parts sharp sand. The abutments were formed by cutting out the sides of the drift in line with the center of the curve of the arch, but leaving the rock rough. The floor was excavated 15 to 20 inches below the bottom of the drift, and the top was made 2 feet higher in front and 5 feet higher at the back. In laying the masonry the front courses of stone were cut to fit the arch and care was taken, particularly at the top, to leave no crevices. Two openings were left through the dam: one, a 5-inch pipe to carry off the water, fitted with a gate valve at the outer end; and the other, a manway of 20-inch steel pipe, plain at the inside end, and with a heavy flange shrunk on at the other, to which a heavily ribbed blind flange, 2½ inches think, was bolted. A small pipe tapped into the blind flange carried a hydraulic pressure-gauge. The 20-inch pipe was anchored in the masonry by three clamps, and the flanges were bolted to three long rods passing through the wall with washers inside. The 5-inch pipe, with a flange on the inside end, was also anchored by three clamps, the arms of which radiated in different directions. As it is nearly 800 feet below the surface, and the source of the water was unknown, the pipe and fittings were designed to withstand a pressure of 350 pounds to the square inch.

The water was shut off about 4:30 P. M., May 13th, 1897, and a little before noon the next day the pressure was 100 pounds, rising to 215 pounds at 3:30 and 240 pounds three-quarters of an hour later. The dam leaked about thirty gallons a minute, the quantity increasing with the pressure. This condition was not satisfactory, and the water was let off. In two hours the pressure fell to forty-five pounds, and the water rose at the shaft about a foot over the floor. A high pressure was produced by a small quantity of water, showing that part of the watercourse was very small.

The closing of the dam seems to have increased the flow. For the thirty days previous, the record of the pumping, measured by displacements, gave an average of 370 gallons per minute. After opening the dam, the average for fourteen days was 413 gallons.

To put in an impervious stratum, a brick wall 22 inches thick was built 2 feet 2 inches from the inside of the dam and the space between was filled with concrete. This was made by mixing four parts of limestone, broken to egg size, with three parts of cement mortar. A short length was added on the inside to the 5-inch pipe, and a piece of old smokestack, 18 inches in diameter, was used for lining the extension of the manway. Owing to the increase in the water after the dam was opened, there was some delay in draining the mine, and it was seventeen days before the addition to the dam was completed. Before closing it, three loads of horse manure were put against the brickwork and held there by a plank partition.

The water was shut off the second time on June 1st, at 9:30 A. M. While the water was accumulating in the drifts, the pressure increased slowly. The following are the readings of the gauge taken every two hours, beginning eight hours after the dam was closed.

Date.	Time.	Pressure, pounds. Per square foot.	Equivalent head of water. Feet.	Increase in 2 hours. Feet.
June 1,	5:30 P. M.	5	12	
"	7:30 "	13	30	18
"	9:30 "	22	50	20
"	11:30 "	30	70	20
June 2,	1:30 A. M.	45	105	35
"	3:30 "	71	165	60
"	5:30 "	130	300	135
"	7:30 "	220	510	210
"	9:30 "	260	600	90
"	11:30 "	268	620	20
"	1:30 P. M.	270	622	2
"	3:30 "	271	625	3
"	5:30 "	272	628	3
"	7:30 "	273	630	2

On June 8th the pressure was 277 pounds to the square inch, equal to a head of 640 feet, and the total pressure against the dam was over 800 tons.

During the morning of June 2nd, before the pressure had reached the maximum, the water which flowed from the dam was collected in a small stream and caught in a pail. It took twenty-two seconds to fill the pail, which held a little over nineteen pints, showing a flow of about seven gallons per minute.

The second day after, though the pressure was higher, the flow had decreased to five gallons, and four days later it had fallen to two and one-half gallons per minute. The water which came through the dam trickled out in eight or ten different places, most of them near the top or one side. The water was milky and left a heavy calcareous deposit on the face of the dam and in the ditch.

After the dam was closed, the record of the pumps for six days showed that the mine was making 115 gallons of water per minute, a decrease of 295 gallons.

The cost of the dam was as follows:

For stone, brick and sand at top of shaft	$ 41 25
" cement	151 70
" pipes, valves and gauge	95 00
" labor sending down materials	16 54
" " breaking stone for concrete	17 77
" " cutting out drift	21 00
" " building dam	141 01
Total	$484 27

The stone was taken from an old foundation, and the cost of quarrying is not included.

* Lake Superior Meeting, July, 1897, of the American Institute of Mining Engineers.

What They All Say.

The MINING AND SCIENTIFIC PRESS is pre-eminently a Western mining journal and labors to develop Western mining interests. Its reputation for accuracy and reliability in its reports stands high in the estimation of mining men everywhere, and rightfully entitles it to confidence and respect. —Telluride, Colo., Journal, Oct. 18.

In the case of Campbell vs. Galloway et al., recently decided by the Supreme Court of Indiana, it appeared that a real estate agent executed a written proposition to sell an oil lease for $250, and procured its acceptance by a person who gave him in return a check for that amount payable to the agent, which was never transferred nor delivered to the owner of the oil well, the agent having no authority except what was conveyed in a letter written by a clerk employed by the owner of a fourth interest in the well, who in answer to a letter asking the employer to "notify me if the lease is for sale and what the price and terms are, and what there is in it for me," replied by letter stating that he would "not sell for less than $250 net to me; all over that you can have," to which he signed his employer's name, although he had no authority to do so. The court held that such written authority of sale could not be enforced, that authority to bind a purchaser at a certain price does not include authority to make a contract of sale at that price, and that letters written by a clerk concerning matters in which he has no authority and signed by his employer's name with the addition of the clerk's initial do not bind the employer.

The famous Eiffel tower and the celebrated Ferris wheel are to be rivaled at the Omaha Exposition by the greatest umbrella of modern times. Standing upon a bluff facing the Missouri river, it will carry passengers in its cars to a height of 575 feet above the level of the river. The umbrella will be anchored in a stone foundation 30 feet deep and 75 feet square. Its structure will be of iron and steel, rising 350 feet above its foundation. With a diameter of 40 feet, it will have a circumference of 126 feet. On the sides of the standard, running from the bottom up. will be forty rails, forming ten tracks for the lower platform to move up and down. On this platform will be a circular track on which another platform is to revolve, the latter platform holding the standard which supports the arms of the umbrella. The arms are to be 110 feet in length, at the extremities of which the cars are to be suspended. From the outer end of the arms cables will reach to the top of the standard. The cars will be constructed on the same principle as those of the Ferris wheel, built of iron and steel, and will hold forty passengers each. There will be sixteen of these cars. The lower platform will also be used by passengers, having a carrying capacity of about 200. This platform will rise to the height of about 240 feet. The whole machine will be operated by electricity. Each car will be lighted with different colored electric lights, and on the top of the standard will be a searchlight, which the exposition company will provide. The umbrella will make three trips an hour.

The London *Statist* has published an article on the world's gold production since 1850, differing materially from the summing up of this paper. With the article a chart is given showing the variations in production in each year from 1851 to 1896, showing what has heretofore been pointed out, viz., that the production of 1896, compared with the average production of the years 1881–90, is practically double the value. The *Statist* takes the exaggerated view usually noticed in journals that do not devote special attention to the subject, and says: "The yield of gold for 1896 may be stated as £45,000,000, against an average of £21,738,000 for the period of 1881–90. For 1896 the production by fields was as follows: United States, £10,800,000; Australasia, £8,988,000; Transvaal, £8,604,000; Indian, £5,911,000; Russia and other countries, £10,697,000, or a total of £45,000,000. The grand aggregate of the gold production since 1850, inclusive, is, in round figures, £1,163,000,000, or approximately 300,000,000 ounces of gold."

On the 8th inst. more than 10,000 students were on the rolls as members of the first freshman class of the Cosmopolitan University. The confusion into which the plans regarding the Cosmopolitan's educational work were thrown by the retirement of President Andrews, in order to meet the urgent wishes of his friends at Brown University, has been met by the acceptance of the presidency by Dr. Eliphalet N. Potter. President Potter has been at the head of two great colleges for nearly twenty-five years, and brings to the work exceptional talents and common sense ideas. He is already at Irvington engaged in organizing his staff of professors. The work of the university has been grouped under fifteen heads, covering the various branches of knowledge. Each of these will be in charge of a professor. As soon as the task of selection is complete the students will be assigned their work, and the largest freshman class in the history of the universities of the world will begin its studies.

H. M. S. VULKAN is the only craft of her special class in existence. She is at once a cruiser, fighting ship, repairing shop, torpedo depot and floating dockyard. As a cruiser and fighting ship, she mounts twenty quick-firing guns and torpedo tubes, as a repairing shop she is fitted up with lathes, drilling, planing, slotting and punching machines, circular saws, workshops and smithery, forges and furnaces; as a torpedo depot she carries on board large supplies of torpedoes, torpedo stores, mines and mining apparatus; as a floating dockyard she contains a small flotilla of torpedo boats with cranes for lifting them, as well as all sorts of special appliances. Her raison d'etre is torpedo nurse and general repairing establishment afloat for general service with a fleet. The Vulkan measures 150 feet between perpendiculars, with a breadth of 58 feet, mean draught 25 feet, and a displacement of 6630 tons.

The population of Massachusetts by the last census taken—the State census of 1895—was 2,500,000. The population of California at the same time was 1,250,000, or just one-half. Massachusetts has long had a high rank in all matters connected with education and public enlightenment. It is the State of several universities, it is prominent in all educational matters, and it is one of the very oldest of the States of the country in point of settlement. Yet Massachusetts has only 88 daily papers, whereas the Golden State with one-half the population of the Bay State, has 113.

Amendment of Federal Mining Law.

TO THE EDITOR:—Please permit a criticism of your correspondent "R." in your last issue. Mr. "R." is not correctly informed as to the occurrence of the beds of amygdaloidal trap forming the lodes of the Lake Superior copper districts.

If there is or ever was a district on this earth where the extra lateral right could be conceded it is precisely on the upper Michigan peninsula. Mr. Houghton, a very prominent engineer for a long time engaged upon these mines, informed me the lodes were so regular that, were it not for the intervening timbers, a cannon ball discharged from one face would, or could, pass along a drift for a distance of 7000 feet and would strike the opposite face without once touching either the hanging or footwall of the beds.

That location by surface boundaries would not tend to monopoly is proven by the testimony of Engineer S. W. Hill of Michigan and Colorado. On page 283, Report Public Lands Commission, he says: "The privilege of purchasing land in whatever quantities needed or desired does not tend to concentrate the landed property of the country in the hands of monopolists. The land is only useful for mining purposes. Our vein is say 9 or 10 feet wide running through the property. Take the Quincy, for example, which owns about 10,000 acres of land: *The company would gladly sell that land for less money than the taxes levied on it.* No mining company has neglected to pay taxes on all its land, and by so much does it impair its dividend fund. Yet there is an immense amount of land held by private parties which is offered for sale constantly, owing to non-payment of taxes."

The proposal of Mr. Freeland to commute the annual amount of work by a payment in cash is an effort to do away with the abuse caused by neglect to do the work as required by law, or its shirking by false affidavits. My own opinion is that such payment should be merely permissive, and that the miner who chooses to work should be allowed to do so. I have a letter from a well-known mining man in the gold belt who writes, "The doing $100 worth of work annually is a perfect farce."

A well-known delegate to the last convention held in this city informed me that in his county he knew of a vast number of locations held for more than twenty years on which not a stroke of work had been done since the original location. The same thing was said to me by one of my colleagues at the meeting of the National Committee in Denver. His precise words were: "Whole districts in my neighborhood have been held for years without any work; the claimants will neither work themselves nor will they let any one else work. It is a crying evil which has become intolerable. Some means should be found to make these men either work or let go." How large a percentage of the California gold belt is so held I do not know, but it is, I am sure, very great.

Mr. "R." does not think that the abrogation of the extra lateral right would sensibly diminish litigation. Senator Stewart is a pretty fair witness on this question. I quote from Eliot Lord, fourth monograph of the Geological Survey, page 145. Speaking of the Chollar-Potosi litigation which he proposed to end by the establishment of vertical boundary planes, he says: "All pending suits should be adjusted as rapidly as possible, and *the main cause of litigation having been removed* he foresaw that the mining industry of the district would expand with natural vigor."

The surface boundaries gives peace and security—inures most to the benefit of the poor man in that he need not go into the courts to assert his rights. A claimholder will have something definite to sell, and the man of means "will know he is getting what he thinks he is buying."

The worst of all monopolists is the locator who will neither work nor allow any one else to work.

San Francisco, Oct. 26th. W. S. KEYES.

Krupp's Great Hammer.

The greatest steam hammer of Germany is still the one called "Fritz," at the Krupp Works in Essen; but, although great care had been taken in providing a very strong foundation, it has settled almost sixteen inches. The construction of the foundation was started in a hole forty feet deep on a grill made of piling. Then there comes a deep layer of sawdust, upon which very large and heavy cast-steel blocks solidly fastened to each other are resting. Next follow three alternate layers of heavy wooden planking and more steel blocks. On top there is a layer of cork forty inches thick, carrying the anvil block, which weighs upwards of thirty tons. This foundation has to carry a total weight of about 2300 tons, and in consequence of its settling the hammer is but seldom used now, having been replaced by a hydraulic press able to exert a pressure of 12,500 tons. This hydraulic press is the largest at the present time in Continental Europe, England being the only country having one of the same size, at the foundry of Beadmore at Parkhead. In this connection, it may be interesting to note that the Bethlehem Iron Works have now a hydraulic press furnishing an equivalent of power of 14,000 tons pressure.

A Case Where Theory Failed.

Did you ever observe the difference in the appearance of a piece of mchanism that had been designed on scientific principles, with every part figured out to stand the strains that theoretically should come upon them; every journal having just the proper amount of surface for the load; and another piece of mechanism for the same duty, but which had been developed by experience with the working of many predecessors? No scientific reason could be given for the forms into which certain parts had developed, except that they would not work satisfactorily in any other form.

A vessel was built on the Atlantic coast several years ago and was engined by a scientific man. Every part was evidently planned in accordance with correct principles, so far as that particular part was concerned. The engine was triple expansion; the forward part of the shaft was made the correct size for the high-pressure cylinder; the middle part was made the correct size for the intermediate pressure cylinder, with the after part was made the correct size for the low-pressure cylinder, with the intermediate and high-pressure added.

I had a talk with the designer of this strange-looking machine, and he was positive that the general practice of marine engine builders was all wrong in this particular, and on many other points.

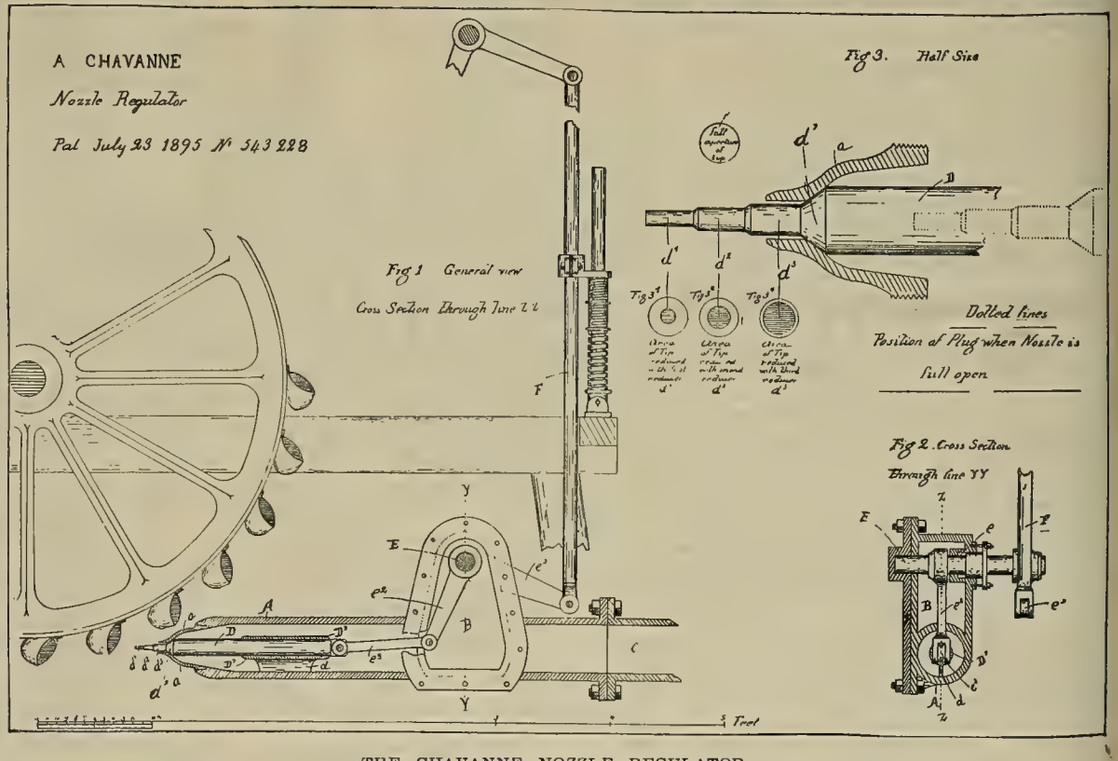
"Why?" he asked, "should the crank shaft be made of the same size throughout, when, if the engine is properly designed, the forward part transmits but one-third the work, the middle part two-thirds, and the after part the whole work of the engine?"

Here the want of experience resulted in a failure, because the designer thought that the general practice was the result of lack of knowledge. He could not foresee that his journals and crank pins, being all of different diameters and lengths, and consequently having different velocities, would wear unequally, and that the shaft could not be kept in line.—George W. Dickie in Cassier's Magazine.

WITH the November issue the title of "The Colliery Engineer and Metal Miner" will be changed to "Mines and Minerals." There will be no change in the ownership nor in the editorial management. The form and size of the publication will remain the same and the policy of taking advantage of every opportunity to improve it will be continued. The new name has been adopted because it expresses the scope of the publication better than the old one.

The Chavanne Nozzle Regulator.

The claims of the manufacturers of the Chavanne nozzle regulator for tangential impact water wheels are: "First—A simple device, no sliding surfaces in contact and no leaks. Referring to the sketch, Fig. 1, the nozzle *A* is of the usual cylindrical form, terminating in a tip *a*. The outlet of the tip is bored to a sufficient size to give the maximum amount of water required. Inside the main body of the nozzle and forming part of the casting will be noticed a guide sleeve *D*. This is bored out to receive the regulating portion of the device, a bronze plug valve *D*, which by suitable connections (Figs. 1 and 2) can be moved back and forth at the will of the engineer. The head of the plug *d'* is made tapering to fit the inside taper of the tip, so that when pressed forward it closes the opening and shuts the water off completely and effectually. There are no sliding surfaces in contact, as in the ordinary gate, and therefore no cutting, consequently no leaks. Second—There is also an easy and perfect regulation of the water. Its quantity can be varied to suit the requirements of the work. Its pressure is constant. Every drop that passes through the nozzle gives the maximum amount of power, and consequently no water can be lost. Jars and shocks to the pipe line are effectually precluded. Referring again to the same sketch (Figs. 1 and 3), it will be observed that the plug terminates in a series of reduced diameters, d^1, d^2, d^3. The surfaces are in all cases parallel



THE CHAVANNE NOZZLE REGULATOR.

with the flow of water. Therefore the water must issue in parallel lines, meeting no obstruction until its concentrated volume impinges upon the wheel. The action of the regulator while being operated is as follows: Suppose, for the sake of illustration, that a load is being hoisted from the bottom of a shaft to the surface. Fig. 3 shows that the third reducer d^3 on the end of the plug almost fills the outlet of the tip, so that when first opened the flow of water is barely sufficient to move the wheel. This assures an easy and quiet starting of the load. A further opening (Fig. 3) gives more water and increased speed, but whether the amount of water passing be small or large, it will always have its full effective pressure. In truth, if there is any change at all, the pressure will be increased when the stream is reduced, and this results, by reason of the fact, that in reducing the outlet to suit the load the flow which supplies the nozzle is never interfered with. As the load approaches the surface the motion is reversed and the stream is gradually and gently cut down to a minimum, when there is so little water passing through that the final closing is accomplished without any perceptible shock—the whole operation being as quietly and easily performed as the handling of the throttle on a steam engine."

The Joshua Hendy Machine Works, No. 42 Fremont street, San Francisco, have been appointed agents for the manufacture and sale of the Chavanne nozzle regulator.

Electrical Progress.

Surface Contact Street Railway System.

The introduction of a commercial electric traction system, involving the principle of surface contact, while eliminating the distinguishing feature of the overhead and underground contact systems, is an event which street railway men have long been expecting, and which is now an accomplished fact. Experiments stretching over many months have been carried on continuously at Schenectady, N. Y., and the occasion of the visit of Lord Kelvin was taken advantage of by the General Electric Company to make public their successful outcome.

The demand for a commercially practical system of surface contact electric traction has existed since electric traction was first introduced, but such a system had to come to its appointed place after the overhead and underground contact systems. Various schemes have been evolved in the past which have either been discarded as impracticable or have appeared before the demand for them has become acute enough to encourage their development. To-day the demand for a surface contact system exists and, peculiarly enough, this demand comes from Europe. In an European city the first practical surface contact electric railway is already far advanced toward completion.

The experiments at Schenectady have been carried out upon a stretch of the track which forms part of the extensive factory tramway system of the General Electric Company's works. As the illustration shows, the addition to the road bed between the rails of the track consists simply in two parallel rows of iron discs, convexed to a height of about one inch above the level of the rail. The car shown in the illustration is a simple factory tramway to which the controller, motor and storage battery equipment have been fitted. It may be said here that the General Electric Company is now engaged in changing over to the surface contact system the entire trolley tramway system in its yards.

The main requirements in a surface contact system are four: Low cost of installation and maintenance; absolute absence of current from all discs not covered by the car; freedom from leakage of current, and reliability under all possible conditions of weather, service and location. It is the attempt to meet simultaneously all these requirements that has rendered the problem one of considerable difficulty, demanding long study and costly experiment to overcome.

In the G. E. surface contact system, it is claimed that the requirements are adequately complied with, and from the description which follows this will probably be admitted.

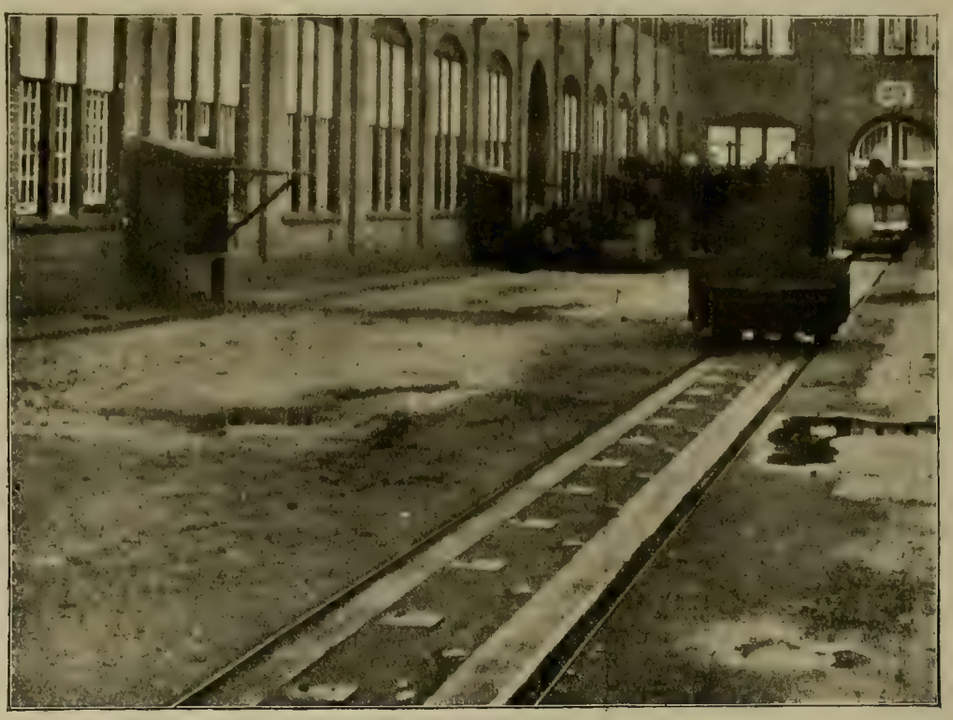


FIG. 1.—G. E. SURFACE CONTACT SYSTEM, SHOWING STRETCH OF TRACK IN YARDS OF GENERAL ELECTRIC COMPANY'S WORKS AT SCHENECTADY, N. Y.

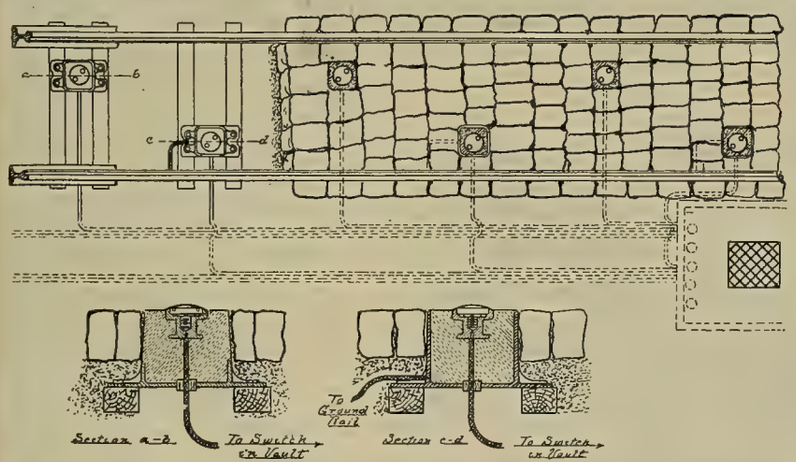


FIG. 2.—G. E. SURFACE CONTACT SYSTEM, SHOWING METHOD OF OPERATION.

The only live portion of the G. E. surface contact system, on the street surface, are the contact plates immediately beneath the car. This is true, whatever the position of the car and whatever the speed—each plate in turn communicating current to the motors and becoming inert as the contact shoe on the car leaves its surface. These contact plates are placed in parallel rows between the two rails of the track and are set alternately. In the illustration the positive, or communicating, discs are on the right, the negative or discharging discs are on the left—one of each between two of the others. Each positive contact plate is made alive by the operation of an automatic magnetic switch, which, instead of being placed in immediate juxtaposition with its plate or opposite it outside the track, is placed in a manhole with a large number of others, each connected to its own respective plate. Through each negative plate is performed the double duty of closing the contact in the switch which "cuts in" the positive plate and of receiving the return current from the motors. Fig. 2 shows the arrangement of the plates.

The operation of this system will be understood from the diagram, Fig. 3, A′ A″ and the negative plates, B, B′ and B″, the positive contact plates, placed equal distances apart, a little less than one-half the over-all length of the shoe. C, C′, C″ represent the automatic magnetic switches, and D, D′ and D″ their armature or contact makers. F is the positive or collecting shoe, E the negative or return shoe, and C the track return. H and K are switches which form part of the controller, the latter connecting in, or cutting out, the cells of a small storage battery, which is used only to energize the coil of the first switch through the plate over which the car passes in starting. After the armature of the first switch has been raised into contact, and the line current has completed its circuit, the battery is cut out by the forward movement of the controller handle. In the diagram the car is to move to the right and all the magnetic switches are open. The handle of the controller is turned to the first notch and switches H and K are closed. Current from the battery flows through a small portion of the motor resistance to the shoe, thence to contact plate A, and the coil C′ completing the circuit to the ground. The coil C′ thus energized raises the armature D′, closes the circuit through the automatic switch, and the line circuit completes its path through the motors and through the greater part of the

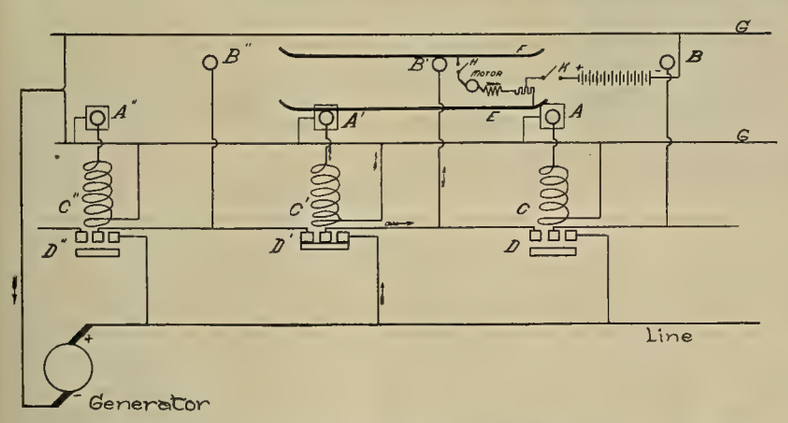


FIG. 3.—G. E. SURFACE CONTACT SYSTEM, SHOWING SURFACE OF STREET AND SECTIONS THROUGH POSITIVE AND NEGATIVE PLATES.

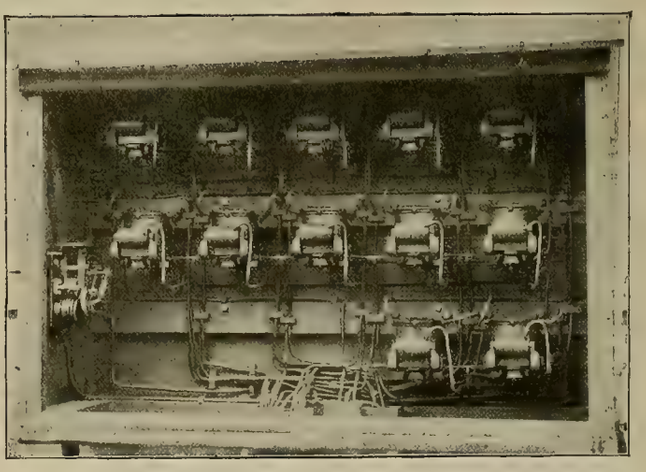


FIG. 4.—G. E. SURFACE CONTACT SYSTEM, SHOWING AUTOMATIC MAGNETIC SWITCHES IN TEMPORARY MANHOLE.

motor starting resistance shown by the arrows through the positive plate B and shoe F. Part of the return circuit goes to the storage cells, which are kept constantly charged, and part through shoe E, negative contact plate A′ and coil C′ to ground, keeping the latter energized and the automatic switch closed so long as the shoe remains on contact plate A′. Moving the controller handle forward from the first notch to the second notch opens the switch K, cuts out the battery and sends all the return current through the coil C′. The shoes E and F in the diagram are a little longer than the distance between contact plates. Thus, when the car moves forward slightly, the shoe will be in contact with the two contact plates A and A′, and the return circuit will divide, half going through coil C′ and half through coil C, energizing both, and closing the armatures in the switches D′ and D. The car moves forward and the shoe passes beyond the contact plate A′. The circuit in the coil C′ is broken, the armature D′ drops, cutting out entirely positive plate B″, leaving it dead, but allowing B′ still to receive current through the closed switch at D. Shoe F moving forward then makes contact with plate B before it leaves plate B′, and the current is interrupted in its flow.

The automatic magnetic switch is the heart of this system. It has been designed to endure under the severest strains and to act with such uninterrupted precision that the working of the system may not be impaired. The development of this automatic magnetic switch marks a decided step forward. Mechanically the switch is simple, strong and durable, with all chances of derangement reduced to a minimum. In the course of the experiments this switch has been subjected to the rougest possible usage and has withstood it unharmed.

If the leakage is great an arc is likely to form when the armature of the switch drops and so long as this is held the contact plate in the street would remain alive, while the arc would burn the switch. It is not practicable to allow the armature to drop far enough to break the arc, and, to extinguish it, the magnetic blowout principle is brought into play. By the use of this retention of this arc is impossible. But there is also the possibility of another arc forming in case of accidental ground on one of the leads to the positive contact plate or if the forward switch fails to close when the handle of the controller is on the first notch, giving a path to ground through the battery. This is also taken care of by the magnetic blowout. All surface contact systems have similar conditions to meet but none have incorporated the magnetic blowout principle.

The form of the contact plates is shown in Fig. 2. They are first set in iron boxes and then surrounded by insulation. The contact plates consist of two parts, a wearing piece screwed into a support and held by a spring washer. This wearing piece can be removed readily without disturbing the support. The standard shoe is 13 feet long. The shoes are supported from the axles and have a slight upward and downward movement to allow for any irregularities in the height of the contact plates. The amount of drop in the shoe is regulated by a set screw.

The automatic magnetic switches are grouped in manholes, where inspection can readily be effected. Fig. 4 shows a group of these temporarily arranged for exhibition. Each manhole will contain about twenty switches, and the wires from the contact plates to them will be protected in similar manner to underground wires for any other purpose. The battery on a car consists of ten coils with normal capacity of fifty ampere hours at five amperes. It is equal to all emergencies, being called into requisition only momentarily while being charged, the balance of the time the controller handle is on the first notch. A close examination of the design and operation of this system will show that it possesses many striking advantages. The operation of the automatic switches is perfect under all conditions, as the full line voltage can be secured to close them and they open by gravity. There is no possible chance of the contact remaining electrified after the car has passed, as by the use of the blow-out on the switch and the switch itself, which opens as soon as the current is shut off, all danger and trouble to live contacts are eliminated. Grouping the switches in manholes renders the working part of the system easily accessible for inspection. In the city of Monte Carlo, in the principality of Monaco, this system is being laid down by the Cie. Francaise Thomson-Houston over a distance of about three miles. It is expected that this will be in operation very shortly.

Electro-Plating Aluminum.

Aluminum which has been well cleaned with nitra-hydrofluoric acid can be readily plated with copper in the way that such platings are usually applied. Upon the copper plating which can be put on in a very retentive coating of any desired thickness, either gold, silver, nickel or other plating solutions can be used. In some cases aluminum can be advantageously plated with other metals directly without first plating with copper. Aluminum is now sold at a price per pound about equal to that of nickel, and not largely in excess of that of German silver. Volume for volume it is much cheaper than German silver, and for replacing German silver or Britannia metal as a base in silver-plated vessels, its power of retaining heat and its lightness, together with its much cheaper price, will certainly cause its extensive use.

One method of plating is as follows: The aluminum is first immersed in a bath of acetate of copper dissolved in vinegar, to which oxide of iron, some sulphur and aluminum chloride have been added. This gives a deposit of copper over the surface. After this the article is brushed with a soft brass wire brush and well rinsed in clear water, and is then placed in the electrolytic bath to be plated in the usual manner. If the work is well done, this plating is so strong that no reasonable amount of bending will cause it to chip off or crack. After being plated with silver or copper, the article may be treated by the sulphide process for "oxidizing," giving the same results as "oxidized silver."

Another method consists of first cleaning the aluminum with an alkaline carbonate, after which it is thoroughly washed in water. This is followed by an immersion in a five per cent solution of hydrochloric acid and another washing in pure water. A preliminary deposit of copper is then placed on the article by immersing it in a weak but slightly acid solution of sulphate of copper. It is then thoroughly washed and placed in the electrolytic bath.

The Velocity of Electricity.

The term "velocity of electricity," says F. F. Grays in "Home Study Magazine," is often heard, but is seldom understood, for the apparent meaning of the words is not the real meaning. As a rule, a man understands by the velocity of electricity much the same thing as he would understand by the velocity of a railroad train. For instance, a train goes from New York to Buffalo, a distance of 500 miles, in ten hours, and the velocity of the railroad train is 500 divided by 10, or 50 miles per hour. This is all right for the railroad train, but it will not hold for electricity, although a man well known in scientific circles once attempted to determine the velocity of electricity in a similar manner. An ordinary telegraph sounder in St. Louis was connected, by means of a special wire, to a key in Cambridge, Mass. The distance between the two cities was exactly determined and the man in Cambridge closed the circuit, by means of the key, at a certain instant, while the man in St. Louis noted the time that he heard the click of the sounder. Of course, the time was determined very accurately by means of chronometers which had been carefully compared. In this way, by knowing the distance and the time it took for the signal to be sent from Cambridge to St. Louis, the so-called "velocity of electricity" was found.

Before we can understand why this determination was utterly valueless, it will be necessary for us to know what is the exact meaning of velocity of electricity. But, again, before we are able to understand even this, we must have in our minds a very definite and clear conception of what is meant by a "current of electricity." We do not mean to say that we must know definitely what a current of electricity is, for that no one knows. We merely say that we must understand exactly what the expression "current of electricity" is intended to convey to the mind.

When the poles of a battery are connected to the opposite ends of a wire, we say that a current of electricity is flowing through the wire. We do not really know that there is anything passing through the wire, but we do know that certain effects are produced; and when these effects are produced, we say that a current of electricity is flowing. In the first place, the wire grows hot, and one way of determining the strength of the current of electricity is by measuring how hot the wire becomes. We are, however, not interested in this effect of the current so much as we are in what is called the "magnetic effect." Had a compass needle been near the wire when it was connected to the battery, the needle would have been deflected from its ordinary north and south position. In other words, when a current of electricity is flowing through a wire, there is a magnetic field around the wire, "magnetic field" meaning that in the neighborhood of the wire there is a force which will act on a compass needle just as would a magnet. The direction of this magnetic force is always in circles around the wire, as illustrated in the figure, where a is the cross-section of a wire supposed to be placed at right angles to the paper. The circles around the wire indicate the direction in which the magnetic force acts when the current is flowing upward through the wire.

Near the wire the magnetic force is stronger than it is farther away from the wire. When the wire is first connected to the battery, this magnetic force appears first at the surface of the wire and then a little farther out, and then still farther, and so on. In other words, it grows from the wire outward. This growth, however, is not as slow as might be imagined from the description. It is the velocity of this growth that is often called the velocity of electricity, and from many extensive experiments it has been found to be the same as the velocity of light, viz., about 186,000 miles per second. It is evident that the experiment between St. Louis and Cambridge did not measure this velocity.

It may now, however, be worth while for us to try to see just what this experiment did measure. In the first place, it is an established fact that, when a current of electricity is flowing through a circuit, the strength of the current at any instant is exactly the same in any one part of the circuit as it is in any other part of the circuit. That is to say, when the circuit was made between Cambridge and St. Louis, the current at any instant in Cambridge was exactly the same at that same instant in the other end of the wire at St. Louis. Now, the sounder will not click unless a current of a certain strength be put through it. There might be a current flowing through it for days and yet the sounder might never come near clicking, if the strength of the current were below a certain value. When a wire is connected to a battery, it takes time for the current to attain its full strength. That is to say, a tenth of a second after the circuit is closed the current will have a certain strength; when another tenth of a second is passed the current will be a little stronger; at the end of another tenth of a second it will be still stronger, and so on until it has finally reached its maximum strength. But remember that at any instant, say at the end of the first tenth of a second, the current has the same strength in every part of the circuit. When the circuit was closed in Cambridge, the current did not at once reach a strength sufficient to make the sounder click, the length of time that it took to reach this value depending upon the kind of wire used in the circuit and the shape and size of the sounder, etc. What was really measured in this experiment then was not how long it took electricity to pass from Cambridge to St. Louis, but how long it took the current throughout the whole circuit from Cambridge to St. Louis to grow to a certain strength. Moreover, this velocity of growth depends more upon the size and shape of the sounder used than upon the distance between the key and the sounder.

The writer has seen a circuit which was not ten feet long in which it took more than a minute for the current to reach its full strength, while another circuit 100 miles long allowed the current to reach its full strength in less than one-tenth of a second.

It is not the purpose of this article to discuss the reason that the current grows more rapidly in one circuit than it does in another.

Our only purpose has been to show, first, what is meant by the velocity of electricity; and, second, that no such simple experiment as that tried between Cambridge and St. Louis determines this velocity.

Scientific Progress.

The Kaiser Wilhelm der Grosse.

The North German Lloyd steamer Kaiser Wilhelm der Grosse arrived at the port of New York on the 26th of September, her maiden voyage. This ship is remarkable. She is the largest ship afloat and nearly as large as the now non-existent Great Eastern. The speed on her voyage, for a single day's run, exceeded that of any ship ever set afloat. The record for the run between Southampton and New York was broken, and the speed of the ship was such that had the voyage been between Liverpool and New York the run would have been considerably shorter than that of any steamer on that route.

The ship has the following dimensions, beside which are here given those of the Great Eastern, the marine wonder of forty years ago:

	Kaiser Withelm.	*Great Eastern.*
Length over all	649	697
Beam	66	83
Draught	26	30
Depth	43	58
Gross tonnage	14,000	19,500
Displacement	20,000	27,000
Horse power	30,000	12,000
Speed, knots	23	12

The driving engines of the Kaiser are triple expansion, one engine on each side of her twin-screw shafts, with steam cylinders 52, 89¾ and 96¼ inches (two of the latter to each engine) diameter, and drive two three-bladed screws, 22 feet 3¾ inches diameter, 32 feet 10 inches pitch, with a maximum of 30,000 H. P., at the rate of twenty-three knots through the water (twenty-six miles) an hour. The propeller shafts weigh 166 tons, the bronze screws 26 tons each. The condensers contain 35,522 square feet of cooling surface, their 11,000 tubes measuring a total length of about thirty-five miles. There are, altogether, 68 engines on the ship, with 124 steam cylinders. The centrifugal pumps and the engine bilge pumps can, together, expel 3600 tons an hour. Four dynamos are employed for lighting purposes, supplying current to 1600 25-candle-power lamps. The cost was $3,500,000.

The hull is enormously strong, is divided by sixteen transverse bulkheads and one running longitudinally. The fourteen boilers are in four groups, each in a separate compartment, and the two main engines are similarly isolated. A double bottom gives addi-

tional safety. Accommodations are provided for 350 first cabin and as many second cabin and 800 steerage passengers, and for a crew of 450 men, including 17 engineers, 18 boilers, 90 stokers and 75 coal passers.

With steam at 180 pounds pressure this ship developed 28,430 H. P. and made a run of 564 knots in a single day—the highest record yet known. The run from Southampton to New York was made in 5 days, 22 hours, 35 minutes (3050 nautical miles), averaging 22¾ knots for the fastest twenty-four hours, 21.39 for the voyage. About 500 tons of coal a day were burned on the trip. The record from Liverpool to New York, now held by the Lucania, is 5 days, 7 hours and 23 minutes, but the Kaiser could make the run in about 5 days.

ABOUT the middle of November the earth crosses the orbit of a remarkable stream of cometary fragments, whose fall into our atmosphere gives rise to the Leonids, or November meteors. These particles move in an orbit whose period equals about thirty-three of our own years, and some of the most brilliant celestial phenomena ever witnessed by man have been due to the fact that this stream of world dust is mostly condensed into a small portion of the great orbit. Hence it is that on five or six years out of the thirty-three the November meteors are likely to be especially notable. The maximum display is expected in November, 1899, but as a magnificent downfall was witnessed in Europe and in America on the morning of November 13, 1864, two years before the last maximum, it is expected that the earth will again enter the denser portion of the meteoric stream this year. Our planet will be central in the stream on November 14, just before daylight in America. This will be midday for Europeans, while American observers will have the disadvantage of a moon only five days past the full, so that the expected meteoric shower will probably not be seen at its best.

TO THE pure scientist, absolute accuracy and relative completeness of knowledge are all-sufficing inducements to the most painstaking and elaborate research, although (from a practical point of view) the results obtained may not justify the expenditure of time and money when viewed in an economic light. Thus, exact measurements of the atomic weight of nitrogen undertaken by Rayleigh and Ramsay revealed the non-commercial fact that nitrogen derived from chemical compounds is one-half per cent lighter than atmospheric nitrogen, which discovery led to the detection of the now well-known element argon. Interesting, however, as this substance may be from the standpoint of pure chemistry, its very distinguishing characteristic (namely, inertness) renders it a drone in the active field of chemistry, though it certainly may still prove useful as a non-combinable diluent in the investigation of the thermic and chemical properties of gases. Still, all this affects the individual who asks, "What is truth?" rather than him who questions "What is the use?"

T. SAVAGE in British patent 21,953, October 3rd, 1896, proposes to use nitrate of soda in conjunction with sulphuric acid in manufacturing copper sulphate. The customary dissolving and crystallizing plant is used. The process may be conveniently carried out as follows: Fifty-six pounds of copper, 84 pounds of sodium nitrate, and 168 pounds of 1.2 specific gravity acid are placed in a steam-heated tank. When the solution is saturated it is syphoned off into the crystallizers. It is claimed that the solution of the copper is effected in one-sixth the time and at less cost than by the old process.

THE sunshine of southern California is being put to practical use by means of a solar water heater, which is being largely used in that section. It heats water by the sun's rays, and by its use hot water may by had for a bath and other domestic purposes at all hours of the day and night, the invention working automatically. It is claimed that after the apparatus is once in there is not a cent of expense, nor need a minute of time be devoted to it.

THE source of the Roentgen rays from a focus tube is determined by Molloy, a Scotch physicist. A small pine board, into which several rows of slender nails have been driven, is attached to the back of a fluorescent screen and the whole mounted on a stand which can be slowly revolved in a circle about the focus tube. The shadows of the nails indicate the exact position of the source of radiation. On adjusting the tube so that the central nail gave only a black spot for a shadow in all positions of the screen, it was found that the radiation must come from near the center of the platinum plate. By means of a pin-hole image, the area of radiation was shown to be an irregular circular patch about a quarter of an inch in diameter.

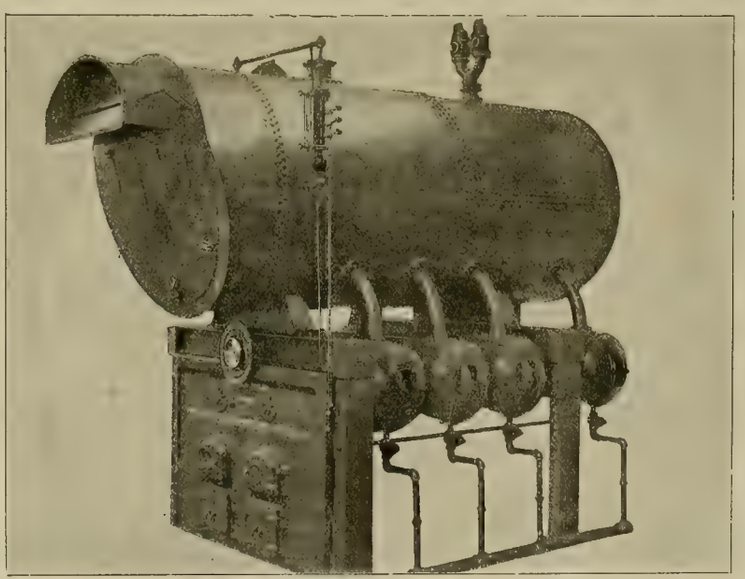
RENEWED ATTENTION has recently been drawn to the Cassel-Hinman process for extracting gold from its ores. A report upon this process has been prepared by William Brookes and William Ramsay. They say: "Our experiments show that an extraction from 90 to 95 per cent of the gold present may be reckoned on, and that there is no important loss of bromine. We may add that the simplicity and ease of working, and the cheapness of the chemicals, render this a valuable process."

Mechanical Progress.

The Sederholm Boiler.

The cut on this page is of a 240 H. P. Sederholm boiler, built by Fraser & Chalmers, of Chicago, showing boiler set up ready for brick work.

These boilers are intended to work under 125 pounds pressure, and others for as high pressures as 180 pounds and of capacities up to 350 H. P. Some of the advantages claimed for this boiler by the manufacturers are: The main shell is protected by the furnace drums from the direct action of the fire; the blow-offs are arranged to each end of drum; the circulation minimizes the danger from burning, and increases the economy of the boiler by the effectiveness of the heating surface; the boiler takes up unusually small floor space, and can be built in very large units; requires a very small amount of brick work; can be thoroughly cleaned at every part, and has an exceptionally free sweep for the flame.



THE SEDERHOLM BOILER.

A NEW revolver is the 1897 invention of Bergmann, of Bavaria—an "automatic pocket-pistol." All it requires is to pull the trigger once, whereupon it empties itself of six loads in two seconds, sending a 32-caliber steel bullet with such velocity that a 6-inch hardwood plank is pierced at a distance of 300 yards. There is an automatic lock by which the weapon is made safe. There is a spring which may be so worked that the firing may be arrested at any point under the sixth shell. The marksman can decide before he pulls the trigger just how many shots he wants to fire. All of the recoil is utilized by the mechanism, and it is the force of the recoil which discharges all the shots after the first one.

Sand Blast on Steel Structures.

The preservation of iron and steel structures from corrosion is among the grave concerns of the modern builder and architect. The extensive use made of this material in the huge buildings and bridges characterizing modern practice has made the necessity of their preservation more palpable and important than ever. In the case of viaducts and bridges, where exposure to the elements and every changing phase of atmospheric conditions is unavoidable, the policy of adequate protection from the standpoint of economy and security becomes definite and positive. Corrosion is a deadly enemy to the stoutest of metallic frameworks, and it can bite its way in silence into the heart of the most massive structures. In the case of bridges the free use of paint has postponed the inevitable, but skin of pigment is seldom more than a temporary precaution. An example of this is shown on the big viaduct of the elevated railway in the city of New York. About five years ago this structure was thoroughly cleaned and painted, and it was thought that this precaution, along with careful maintenance, would make it last at least a lifetime. At the point over the elevated railroad, however, the corrosion, due to the escaping gas and steam from the hundreds of locomotives passing and standing beneath, has completely destroyed the paint, and is now rapidly eating away the steel, thus slowly and surely destroying the life of the viaduct.

The Commissioner of Public Works, in casting about for a remedy, or some better method of protection, acting under the advice of the consulting engineer, decided to adopt the sand blast process, to break away the scale and oxide, and to thoroughly clean the metal. There are 51,000 square feet in the structure that is rust bitten, and it will take about seven weeks to remove the corrosion. The application of the process has, so far, given satisfaction, and its ability to remove the rust and preserve the structure is in a clear way of practical demonstration. The result of the New York experiment will be watched with interest. It is proposed to sand blast all the iron and steel work of the new East River bridge before putting in place. Should this be successful and a precedent established, this plan may eventually come into general practice.

AT Lake Merced, Cal., near San Francisco, has recently been completed a tunnel 3100 feet long to the ocean, approached by a canal 3800 feet long, which conducts the surface waters from the entire watershed to the tunnel proper. The effect of the entire piece of engineering, together with a sluiceway seven miles long, running from Colma, is to convey all impure water from the Spring Valley Water Co.'s reservoir there into the ocean. In building the tunnel, after the workmen had blasted several hundred feet they came upon a bed of dangerous quicksands. Engineer Schussler bored a hole into the tunnel from the surface, the water was pumped out and the tunnel then pushed through the quicksands. The springs under the hills were forced into a minor tunnel which runs up the hill to the lake. Thus, says the *Call*, through one great conduit the odd sight is beheld of impure waters running to the ocean, while a stream of pure water passes the sewage far under the hill.

A LITTLE confusion exists, even in the minds of persons having some degree of practical knowledge on the subject of metal working, as to the proper usage of the terms hardening and tempering. It is very common, for instance, to hear one speak of the temper of a pivot, die, or what not, when in reality the whole process of hardening *and* tempering is what is referred to. The hardening of a steel piece is effected by heating it to a dull redness and quenching suddenly. The tempering of the piece is effected by heating it to a temperature considerably below redness and then allowing it to cool slowly.

RUBBER tubing is used as a core for casting pipes for underground service in the novel method of a French engineer. The trench is dug and given a bottom of cement mortar, then the tubing, inflated and covered with canvas is placed on this bottom and the trench is filled up with cement mortar. When this has set the rubber core is deflated and removed for use elsewhere. This plan of molding conduits is simple and economical, and 6-inch pipes from hydraulic lime and sand are said to have been made at seven or eight cents a foot.

THE recent announcement that contracts had been signed for the delivery in England of 1000 tons of crude aluminum of American manufacture recalled attention to the fact that this metal is now produced in the United States in large and increasing quantities. A few years ago the manufacture of aluminum on a commercial scale was regarded as almost beyond the range of possibility.

THE Blue Lakes Water Company at Mokelumne Hill, Cal., now has machinery in operation capable of developing 2000 horse power. Electric lights are run by this power in several towns in Amador county, and arrangements are being made with companies owning mines in both Amador and Calaveras counties for operation by electricity. Up to this time the Blue Lakes Water Company has furnished water power for running some of these mines, and now expects to be able to furnish them with a kind of power which will be cheaper and more effective. The company considers it is feasible to develop 10,000 horse power at Mokelumne Hill by putting in the necessary machinery and that, should it be desired to do so, the power could be conveyed to Stockton, a distance of thirty-nine miles. At Fresno an electric power transmission plant is already operating over a distance of thirty-six miles, and in southern California one is now building which will transmit power from the neighborhood of Redlands to Los Angeles, a distance of seventy-five miles.

Mining Summary.

CALIFORNIA.

Amador.

Ledger: Mrs. Jennie Ritter, owner of the Michigan Bar Mining property and ditches, which were sold to the Interior Development Company about three years ago, has foreclosed the mortgage on the property on account of deferred payments. The company has put in about $35,000 in substantial improvements and is now engaged in reorganizing the company with the expectation of redeeming the property within the statutory period.

Record: The Zeila mill is crushing ore from the 6-foot level at present. At the 1000-level drifting continues.

It is expected that the Argonaut mill will begin running next week.

C. B. Dillon has been appointed superintendent of the old Centennial mine now being reopened by a San Francisco company.

C. B. Zeek, superintendent of the Red Hill mine, near Butte basin, proposes to use electricity for motive power at the mill.

Butte.

(Special Correspondence).—At the Magalia gravel mine, formerly the Pershbecker, a 10-stamp mill was completed and started crushing on the 15th inst. The mill and hoist are run by water; the drilling and underground pumping by compressed air reheated by steam. The shaft (vertical) to the channel is 510 feet. The face is down about 2000 feet from the shaft. The crushing is about ninety tons in twenty-four hours. The flow of water is 40 inches.

The Bader gravel mine, two miles from Dogtown, has a bedrock tunnel 2000 feet. At 1400 feet the tunnel struck into rapids, from which "big pay" was taken, but the bedrock pitching, a new direction was taken. The workmen expect to break into the channel this week. Geo. B. Mowry of San Francisco is the owner.

Wikle & Lockwood have discovered and located a ledge three and one-half miles southeast of Dogtown. The ledge is 18 feet wide. The owners claim that mortar tests of the croppings yield $30 per ton. The formation is slate and porphyry.

The Butte Creek Power & Gold Mining Co., a Chicago corporation, are sinking and running tunnel and upraise on the former Carter mine, one mile below Nimshew. They are also constructing a ditch and 8-foot flume.

The Ethel, bonded by N. A. Harris to a New York company, Thos. Price manager, has run a bedrock tunnel 800 feet, aiming for the channel. The property is four miles west of Dogtown, on Middle Butte creek.

The tunnel on the Golden Gate, near Coutelene, has reached 1700 feet in bedrock. The property belongs to the syndicate operating the Banner mine.

Dan Meredith is working a side hill for stringers in a decomposed quartz and porphyry, which he runs through sluice boxes. Others are picking the tailings and they are said to be making good wages.

The Banner mine, six miles from Oroville, has taken down the old 10-stamp mill and is erecting forty stamps. Mr. Evans is making an experiment which if successful will prove quite an innovation of its kind. He is building the foundation and mortar blocks of concrete. The ledge on this mine is about 10 feet wide. There is ore in sight to keep forty stamps in operation for two and a half years. The pumps are run by electricity, as will be the mill. The gravity system on the tramways is a success in every detail. The company has its machine shop on the ground and builds cars and other articles used in the mine. The entire plant is a model from top to bottom, and the business system that prevails in every department is admirable. The syndicate has expended over $4,000,000 in Butte county mines. Mr. Geo. H. Evans has charge of all the properties owned by the London syndicate and many improvements have been made under his administration.

Oroville, Oct. 22nd, '97.

Mercury: For the first time in fifteen years, or since the big main drain tunnel of the mine was run, eight-hour shifts are being employed at Cherokee. In that part of the mine leased from the bondholders by H. D. Gage an inclined tunnel 7x6 is being run, and by the three shifts is being run ahead at the rate of 250 feet a month. An upraise in the channel is expected to be made by the first of the year. The gravel is raised by a friction hoist run by a 4-foot Pelton wheel under 300-foot pressure. The operations are in the center of the channel of the big mine and will develop the width and richness of the lead clear across the face and the more important fact as to whether this once-famed hydraulic mine can be successfully drifted or not.

Calaveras.

From Milton, the Plymouth Rock mine is sending 200 tons of sulphurets to San Francisco for reduction.

The Innes mine at Mokelumne Hill, owned J. Guiffra, has been bonded by Robinson and Mathews of Oakland for $4800, to be paid on or before Jan. 13, 1899. The 10-stamp mill is ready to run. The shaft has a depth of 65 feet. A tunnel has been driven 150 feet. Power will be obtained from the Mokelumne and Campo Seco canal under 175-foot pressure.

The California Exploration Company has resumed sinking at the Bund mine. They will go down to 425 and crosscut the vein.

It is expected that the Royal mine, near Copperopolis, will shortly change hands. The prospective purchasers intend to greatly increase the capacity of the plant and work the mine on a much larger scale.

At the Trilby gravel mine, San Andreas, Supt. Pennell has begun pumping.

The J. R. mine at Old Gulch, owned by John Ballard, has been shut down.

El Dorado.

Nugget: The pay shoot has at last been struck at the Larkin mine. C. H. Dunton is the superintendent.

The Grand Victory mine at Fall creek has suspended work for the season.

Kern.

The Pine Tree mine is being run day and night, giving employment to forty men.

The Randsburg Placer and Quartz Mining Company owns 320 acres of land near Randsburg, under which placer gold is believed to lie in great quantities on bedrock. The company's shaft is down 175 feet and is near to the bedrock.

Nevada.

The *Union* says the Allison Ranch mine is to be developed by Mackay & Flood. A good sized ledge of ore which will go $100 to the ton has been discovered in the 400 level. It dips to the south and it is an entirely new ledge.

The *Union* hears that a 10-stamp mill will be erected at the English Mountain quartz mine above Graniteville, to take the place of the one destroyed by fire this year.

Transcript: The Mayflower mine is being worked steadily now and at a profit. About twenty men are kept busy—some on day's pay and some on tribute. Last week a big bar of gold came in from there, and it only took a part of it to pay the expenses of production. After Messrs. Hayward & Lane gave up their option on the property nearly two years ago, it stood idle a very short time. The original owners, who felt satisfied that it was all right if properly opened, went to work with a vim and discovered new and valuable ore bodies that the bonders had missed.

Plumas.

(Special Correspondence).—Carter & Owens are developing a property on Rush creek, eleven miles west of Crescent. They have a tunnel 200 feet long which taps the ledge at 100 feet. The ledge is 7 feet, and fifty-seven tons of the ore yielded $17.50 per ton. The formation is slate and porphyry. They have five claims. The works are on a mountain side; the bottom of the canyon is 5000 feet below them.

G. P. Cornell & Co. have bonded fifteen claims, together with the Green Mt. mine, to a syndicate. There is a 60-stamp mill on the property. The company has begun extensive development work and is also reopening and retimbering the old tunnels.

The Crescent has a 32-stamp mill which is idle. The greatest depth attained on this property is 400 feet. This mine for a number of years produced from $7,000 to $11,000 per week. It is owned by San Francisco people.

Crescent, Oct. 17th, '97.

(Special Correspondence).—The McGill & Standard mine, two and a half miles from Greenville, is running fifteen stamps, but no concentrators. A party works three arrastras on the tailings, over a mile from the mill. The ledge runs from 2½ to 20 feet. The property in seven years netted $150,000.

The New York, owned by Mrs. Trelevan & Sons, has just completed a 5-stamp mill. The property has been in litigation for some years, which was settled recently. There are five claims. The ore will average $5.

Greenville, Oct. 18th, '97.

(Special Correspondence.)—The Excelsior Gravel Mining Co. is prospecting extensively six miles from Longville, at the junction of Yellow and Grizzly creeks. A tunnel 150 feet tapped a 500-inch flow of water. Another tunnel, 27 feet lower, is 275 feet, from which a 40-foot incline again encounters water. Pumping and hoisting machinery is being placed and will be ready for operation in another week. The gravel on the rim was quite rich. The owners live in Plumas and Modoc counties.

Patrick McGovern, working on Chips' creek, twelve miles south of Longville, found among other pieces running from $7 to $30, a nugget weighing $140.

The miners on many of the interior creeks are leaving their "diggings" on account of the snowfall, to resume work about May.

Longville, Oct. 19th, '97.

Riverside.

Recent assays of O. J. Ellsworth's mine in Hemet valley show $26 gold per ton. The ore is said to be 26 per cent zinc.

Virginia Dale placers are said to be producing about $1000 per week, with fifteen men at work. Some are not doing well, says the Redlands *Citrograph*.

A paint mine is being developed, the *Press* says. The mine is two and a half miles from Alvord. The supply of the paint rock is practically limitless. The colors being taken out are yellow ochre, chrome green and red. At Jackson's mill forty tons of the pure material are ground per day.

San Bernardino.

The Rose Cyanide Company has incorporated in San Bernardino to work over the tailings of the Rose mine in Holcomb valley, of which there are from 10,000 to 12,000 tons that it is said will go from $5 to $6 per ton; the mill is turning out twenty tons per day. The company will put in a plant capable of handling fifty tons per day. W. W. Burton, J. H. Playter, F. M. Gallaher of Santa Barbara, and G. P. Brown of Mercur, Utah, constitute the company.

San Diego.

Receiver Pauly has filed his report as receiver of the Golden Cross Mining and Milling Company at Hedges. On July 7 last he took charge as receiver; there were 160 men in the employ of the company and fifty stamps were in operation in the 100-stamp mill. On August 10 the number of stamps was increased to seventy, on August 20 to eighty, and on September 13 to ninety-five stamps, and the number of men to 177. The 40 stamp mill has also been placed in good condition. When Receiver Pauly took charge a cleanup of the batteries realized $10,417.47. There was at that time $9169.69 due the employes, which was paid, leaving a balance of $1277.78. A cleanup on August 1 realized $17,498.46, the cleanup on September 1 showed $37,581.94, and another cleanup on September 30 realized $31,233.84. He has paid out altogether for the benefit and operation of the property $48,-117.07, which does not include the September pay-roll, not yet due. There is on hand and in bank the sum of $50,239.65. All receipts since Receiver Pauly took hold on July 7 amount to $98,356.72, showing a profit for the three months of about $50,000. The report shows that the net earnings are increasing and that large bodies of free gold ore are in sight.

The report comes from Gold Rock that that camp is in a most flourishing condition, more so than ever before, according to the Yuma *Sun*. A large quantity of ore is being gotten out, and the forty stamps which were shut down some time since will be started up on the first of the coming month, and the entire 140 stamps will be kept pounding day and night.

Shasta.

Some weeks ago considerable attention was attracted by the discovery of gold in paying quantities existing in large boulders lying near the Cinnabar, Castella trail, in Shasta county, and search has been going on ever since for the ledge or source of the gold-bearing rocks. It is now claimed that the ledge has been found. The Redding *Free Press* says it is 3 feet in width and is composed of white and rose quartz, carrying gold, silver and copper. The ore assays from $12 to $32 in gold. No assay has been made of silver, but the ore carries 20 per cent copper. The ledge has been uncovered for a distance of 22 feet.

The Diestlehorst dredger in the Sacramento river, near Redding, has been closed down temporarily. Work will be resumed Nov. 1st.

Free Press: On Wednesday morning all of the smelting furnaces of the Mountain Copper Company at Keswick were shut down temporarily, and men laid off to await the completion of a flume in course of construction which will materially increase the water supply. The company is rushing the work of rebuilding the buildings at Iron Mountain which were recently destroyed by fire.

The Mt. Shasta mine, two and a half miles west of Shasta, owned and operated by Behrens & Levisay for some months past, has been sold for $10,000 to Hirschly, Vair and Farfst of San Francisco. Behrens & Levisay have been shipping ore from this mine to the Keswick smelter, the value ranging from $80 to $90 per ton on an average and none of it going under $50. Very little development has been done. An open cut for 40 feet has been made and a shaft 80 feet deep sunk. The ledge averages from 18 inches to 2 feet.

Sierra.

The Pioneer Reduction Company is making a practical test of 400 pounds of concentrates from the Sierra mine, above Downieville.

Enterprise: Last Sunday the Sierra Gold Company cleaned up in free gold from their mine on the East Fork $232, the result from fifty tons of ore run through the mill. The ore besides runs high in sulphurets, which will yield not less than $4 per ton.

Siskiyou.

Journal: All of the hydraulic mines on the lower Klamath are awaiting the fall rains before they can start up again. Many of them, which are usually worked nearly all summer, have been closed down for over two months past, as nearly all the gulches and streams which carry a supply of water are almost dry now. Much of the land on the lower Klamath adjacent to the river will be mined during the next year, as the new companies which are putting in plants in that section have secured quite a large acreage. The Klamath river, below the mouth of Scott river, has cut its way through the northern end of the Coast Range and nearly at right angles to its trend. It runs through a rather narrow canyon from a few hundred to several thousand feet deep, and slopes as steep as the material, whether rock or earth, will stand, and which are clothed with a dense growth of timber and brush. At Hamburg Bar, Happy Camp, Orleans Bar and a few others places on the river, the mountains recede far enough from the stream to admit of a few acres of level land being farmed. Gold is found wherever the river has deposited gravel, whether it be in an old channel 1000 feet above the present river or in the bottom of the stream. The formation throughout this region is blue black slate of great thickness. The Klamath is one of the richest streams in the State, and has been yielding large quantities of gold for over forty years.

Trinity.

The water is all pumped out of the Altoona quicksilver mine at Cinnabar, in anticipation of starting up the mine on a large scale.

Graves Bros. have $800 in gold nuggets, recently taken from their Blue Jay mine.

The Brown Bear mine at Deadwood comprises thirty quartz claims, two placer locations and 600 acres of timber land. The amount of underground work is equivalent to twelve miles. The mill contains fifteen stamps and three vanners. The walls are granite, slate, porphyry and quartzite. The mill has been in continuous operation for fifteen years. They are now working on the 600-foot level. This is the deepest mine in Trinity county. A peculiarity of the ore is that if ore pays at all it pays well, but if poor there is practically no gold in it. Over $6,-000,000 has been taken out of this property. The mine is owned by Chas. Mott of San Francisco, Jno. Milton of Placerville, Mrs. M. E. Phillips of Oakland and Chas. Dobler. The clorination works are owned by McDonald and others and are not in operation. The sulphurets are sent to Selby.

The *Searchlight* hears that the owners of the Altoona quicksilver mine will drive a two-mile tunnel to drain their mine. The cost of pumping the works clear of water is a heavy item of expense, and one that will continue to increase as greater depth is reached. Recently, when the mine was flooded, this long tunnel was fully considered, but the company did not like the idea of the mine lying idle while the tunnel was under way, and a pumping plant was installed, with a battery of three boilers.

The Nash placer mine on Coffee creek, sold three years ago for $25,000 and now in the hands of an English syndicate, has made recent improvements. A tunnel has been completed which puts the mine in readiness for the winter rains. Another tunnel 10 feet square has been driven 550 feet. Through this tunnel a 6-foot flume, with ample fall, carries the debris into Coffee creek. The pay dirt is hydraulicked into the tunnel and over the gold-saving apparatus in the flume. The company has constructed seven miles of ditches and is in shape for a season's run.

Tuolumne.

The Sonora *Democrat* says the miners employed have attached the Green mine for wages. The miners say they know that every ton of rock run through the mill paid handsomely, and that in a very few shifts they can crush enough to pay off all the hands, consequently they think something is wrong that they are not paid promptly.

David Neagle and associates have purchased the Carlotta mine near Cherokee for $10,000.

Sonora *Democrat*: Several years ago the mineral industry of this county was practically dead, but the inevitable favorable reaction came and Tuolumne is now one of the greatest ore producing districts in the country. More mines are weekly being added to her already long list, and thousands of dollars worth of mining machinery is coming in right along. Any prospector with a reasonably fair price of quartz vein within a radius of twenty miles of Sonora can cash it for a few thousand dollars, while rich is the man who can show a legitimate milling proposition that gives reasonable returns on rock run through a mill. With the advent of winter and water mining will receive an impetus in this county.

A Sonora dispatch says last Saturday afternoon the Birney Wainwright Monroe mine at Bald mountain turned out a pocket of $6000, with more in sight. One piece of gold contained $600.

Yuba.

At the Good Title Company, Indiana Ranch, the machinery for the new mill and hoisting plant has all been delivered and the mill is in operation. Of the assessment of $30,000 levied to construct a mill and new hoisting works, every dollar has been paid.

NEVADA.

Carson *News*: The big concentrator at Gloconda is nearing completion. The building has been finished and the machinery is being rapidly placed in position. It is the biggest plant of this kind in the State.

In Esmeralda county, along the line of the Carson & Colorado Railway in the White mountains, is a deposit of diatomaceous earth, the excavation of which is likely to become an important industry. The substance is white, appearing from the cars like a huge bank of snow. It is composed of 92 per cent pure silicon and is so light that thirty-three sacks are required to make a ton. There are many acres of the material and excavations to the depth of 30 feet have failed to find bottom, indicating that the supply is almost inexhaustible. This substance is fireproof and is being used as a substitute for magnesia in the manufacture of plaster and asbestos covering for boilers and steam pipes. A company has been organized in Pennsylvania to manufacture the latter product from the Nevada mineral. There have been similar deposits found in other States, but never in such pure condition, and as its field of usefulness is widened the owners of the deposit, Messrs. Yerington, Laws and Knapp, will find that they have a "gold mine" on their hands. It has been found that the Nevada silicon will answer every purpose of the magnesia and can be laid down in the East at less than half the cost.

OREGON.

The price paid for the Forest Queen group of mines at Cornucopia was $75,000.

J. W. Cook, superintendent Music mine, Bohemia district, Lane Co., reports that the 5-stamp mill which has been running steadily since the middle of May up to October 1 cleaned up $30,000 in bullion and concentrates.

The bonding of 3000 tons of tailings owned by Hicks & Co. of the Ashland quartz mill to Caldwell & Ingalls entails the erection of a cyanide plant to work the tailings.

WASHINGTON.

A German syndicate has purchased thirty-three mines on the west side of Troublesome creek, within seventeen miles of Index. The deal is said to have involved $100,000 as the purchase price, and the Great Northern spur may be constructed from Index to the properties.

BRITISH COLUMBIA.

(Special Correspondence).—The Morning Glory Mining Company is the only one that has put in any machinery. A 5-stamp mill will soon commence work. The assays show from $7 to $13 gold and $3 silver on one ledge; on another the result given was $4.20 in gold. The formation is dyrite.

The Densy Mining Company's property partly overlaps the Sarah, the same ledge having been traced some distance into the Densy, from which equally good results are expected.

The Bon Diablo Mining Company's property lies 3½ miles northeast of Vernon. It consists of a group called respectively the Bon Diablo, the Smiling Tom and the Red Rover. The assays show $244 gold and $2.80 silver. Several ledges traverse these claims. Shaft No. 1 faulted at 35 feet, when a tunnel was drifted in 75 feet, running through highly mineralized rock. Ledge No. 2, about 8 feet in width with well-defined walls, has given $155 gold.

The Camp Hewitt Mining and Development

Company's property is fifty miles south of here, on Okanagon lake, and consists of a group of claims of which the Gladstone appears to be the favorite. Very good ore is brought from the claims and several ton shipments have been made to the smelter. Considerable work has been done on the Gladstone and arrangements have just been completed for a gang of men to be put to work for the winter.

The Ruby Gold Mining Company is on the lake near the Morning Glory's property and consists of a group of twelve or fourteen claims. No work is being done now.

The Silver Star Mining Company's property is fifteen miles northeast and is rich in galena. Sinking is discontinued, awaiting pumping apparatus.

Vernon, B. C., Oct. 22d, '97

A Kaslo dispatch says the largest dividend in the history of the Whitewater mine was declared last week, $24,000, a total to date of $64,000. The Whitewater is shipping at the rate of fifty carloads per month.

The Slocan Star declared a dividend in September of $50,000, a total of $400,000. The mine is shipping concentrates again over both the Nakusp & Slocan and the Kaslo & Slocan roads. The Slocan Star has shipped 1455 tons of concentrates in the last ninety days.

The annual report of the British Columbia Board of Trade, just issued, gives the following:

VALUE OF MINERALS PRODUCED, 1895 AND 1896.

	Value.	*Value*
Gold, placer	$ 481,683	$ 544,026
Gold, quartz	785,271	1,244,180
Silver	977,229	2,100,689
Copper	47,612	160,926
Lead	532,255	721,384
Coal	2,818,962	2,327,145
Coke	2,380	3,075
Other materials	10,000	15,000
Totals	$5,655,302	$7,146,425

"The output of gold and silver during 1897 will show a great increase over 1896, Kootenay alone yielding more by one million than all the rest of the province last year. It is a conservative estimate to say that, excluding Klondike, British Columbia will yield over $10,000,000 during the current year, and that during the next four or five years the increase will average from three to five millions yearly."

ALASKA.

(Special Correspondence)—The following, dated St. Michaels, Oct. 9, is from "Alex. Quartz," an old correspondent, who traversed the entire Klondike region in '88:

After a stormy trip of thirty days we arrived here on the steamer Navarro with the river steamer Thomas Dwyre in tow, October 2d, and found five vessels anchored in Norton bay, off St. Michaels.

Nearly all of the expeditions that have reached here so far this season have been a failure, owing to the projectors being unable to carry out their contracts with the passengers. All of the boats they have brought here to ply upon the Yukon river draw too much water and are lacking in speed to stem the current in the rapids of the river. Parties coming by this route next season should be sure and know that the company who furnishes transportation to them has light draught and high speed boats to take them up the river; otherwise they will be stranded in the river or here at St. Michaels, with no way to proceed further except at their own expense, and that means a small fortune if they have an opportunity to proceed at all. It is almost impossible for any number of men who are stranded here by those expeditions that are failures to get passage up the river, for the reason that all the boats that are capable of navigating the river are overloaded with passengers and freight brought by their own ocean vessels. I would advise all those who intend coming by this route next season not to be deceived by cheap rates of promoters of expeditions which have not the necessary facilities to take them up the Yukon without delay. Better by far for them to pay $200 or $300 more and get to their destination than to come on cheap rates and be stranded here or at the mouth of the Yukon.

There has been no boat nor passenger got any further up the river this season than Fort Yukon, this side of the American line, since July 26th; and there are now over 200 people, stranded in the river in boats and here at St. Michaels, that are unable to get up the river. A large number of them would gladly go back to San Francisco if they could. The Mare Island, towed up here by the North Fork, with about 100 passengers on board, left here nearly three weeks ago, but stuck in the mud and ice in the mouth of the river, came back a few days ago and is lying here in the bay as useless as she would be if she was out on the desert. She draws about 7 feet of water, and the water at the mouth of the river is only 4 feet deep in the latter part of the season. They are a most discouraged lot of passengers, with all their golden dreams blighted. Thirty-seven of them are going back on the Navarro in a few days. They tell me they are fed twice a day on the poorest kind of fare and are huddled together like a band of sheep. At the Devil's Finger Rapids, up near Fort Yukon, there are only 18 inches of water, and no boat nor provisions has passed there since July 26th, and, as a consequence, provisions are getting very short at Dawson and along the upper Yukon. All whom I have seen so far who have come down the river since then say that the most of the people will have to come down the river 400 miles to Fort Yukon, to where the provisions are, or starve this winter; or, in other words, Dawson will have to move to Fort Yukon till next summer. Any person who comes here without at least one year's provisions and proper clothing and a couple hundred dollars in cash is inviting slow suicide.

The following is a list of prices for an inferior quality of provisions, etc., here at St. Michaels, and this is the cheapest point in Alaska to buy goods: Flour, $16 per barrel; bacon, 20 cents per pound; ground coffee, 50 cents per pound; tea, $1 per pound; chocolate, 50 cents per pound; beans, 10 cents per pound; oysters, 50 cents per small can, picks and shovels, $2.50 each; baking powder, $1 per one-pound can; potatoes, 10 cents per pound; onions, 15 cents per pound; 44-cal. Winchester cartridges, $2.50 per box of 50; 45-cal. cartridges, $5 per box of 50; and so on down the list. So those who intend coming this way next season should provide themselves well with an outfit before starting. The cheapest board here is $3 per day, and no employment for strangers. The town consists of two stores, owned by the Alaska Commercial Company and the North American Transportation & Trading Company, their buildings for their men including two hotels; the Mission Catholic church and the houses of the Mission Indians. There are also a large number of native huts scattered all over the point between the stations of the two companies.

The latest news from men who arrived here from Dawson yesterday, and who are on their way to San Francisco, is that the people in Dawson have been ordered to leave for Fort Yukon, where the supplies are. I have just interviewed one of them and he tells a woeful tale of hardships in the Klondike region, and although he said he was not one of the fortunate ones he asserted that half the richness of that region has not been told. So say they all who have come from there this season. From the most authentic information at hand, and it is considered reliable here, it is estimated that there is at least $5,000,000 stacked up at Dawson awaiting transportation down the river, and $30,000,000 more in sight in the dumps and in the process of washing. This seems like a feverish statement, but when the lowest estimate is placed at those figures by the most conservative men who come from there, as well as the people here who are posted, we have to accept it as truth. There is no excitement here and things go along in as placid a way as they do in a California town. Still, I have seen enough since I've been here, gold included, to convince me that the Klondike region is not a golden dream of the fevered mind, but a reality, and I will say that it is beyond a doubt the richest country in gold on earth, and also the most vast in extent. There have been some rich discoveries made all along the Yukon and its tributaries within the past two months, but development work in those new districts has not yet progressed far enough to prove whether they will become rivals of Klondike or not. Minook creek, Sucker creek and Hoosier creek, on the west side of Fort Yukon, are all promising districts, and a report reached here to-day that one man took out 115 ounces in one day from a claim on Minook creek on reaching bedrock. Some new discoveries are lately reported within 200 miles of St. Michaels here, but I have not yet learned the exact locality of the new district. Gold is reported to exist in every stream tributary to the Tawana river, and it is considered by all to be the coming country. But little is known of this river, as its headwaters have never been explored and but little is known of any part of the river above fifty miles from the Yukon. I am told here that it is navigable for 275 miles from the Yukon and is a better river, without shoals or rapids for 250 miles, and is well timbered. It flows into the Yukon from the southeast 700 miles from its mouth and is estimated to be between 800 and 900 miles in length. It is the largest tributary of the Yukon river.

Our boat, the Thomas Dwyre, is the only boat that has been brought here this season that is fitted and suitable to ply upon the river. She is 65 tons register, 80 feet in length, with a speed of 12 miles per hour, and only draws 30 inches of water when loaded.

We leave here to-morrow for the mouth of the river in the hope of getting in. A priest from here is going as pilot. He knows the river and thinks our chances good to get in. Although the slush ice has blocked the mouth of the river for twenty miles for the past ten days, we have had a thaw with southeast wind for the past two days, which they claim has cleaned the river at the mouth of ice, and once in the river, it is open for some 400 miles. If we succeed in getting in the river we will go up 150 miles to winter quarters at timber and safety, and remain on the boat all winter, and will get up the river on the boat at least a month earlier than it is possible for a boat to get in from the outside, for the mouth of the river doesn't open for navigation until the middle of June at the earliest. If we fail to get in to winter quarters in the river, then the boat will come back here and winter, and in that event I will take Indians and dog teams and make the portage of 200 miles over to the Greek Mission, near the mouth of the Tawana, in November, when the deep snowfall occurs.

Twenty one out of the twenty-three passengers on board are bound for Dawson City. Several of the passengers want to make the portage with me in the event of our not getting in the river, but I have refused to allow them to accompany us, for they are inexperienced in traveling in this ice-bound region, and if they went would be walking into the jaws of death; and if we would tarry to assist them it would mean death to us also. The Indians we have engaged to go refuse to start should we allow them to follow my partner and myself. The thermometer has been below the freezing point ever since we came here, until yesterday morning, when the thaw began, and since then it has been like early spring weather in California at an altitude of 3000 feet.

This goes out on the last mail from here this season, so we will have no opportunity to forward any mail or receive any until next February or March. Those who are stranded here on those steamers that are caught in the river away from suitable winter quarters are to be pitied, especially where they are remote from timber to build cabins with, for they will find it a hard task to keep from freezing even though they save their boats from destruction by the ice. I would not care to change places with the passengers who are going to remain on the steamer Mare Island this winter. There is no fuel here except driftwood, which is brought from along the coast of Bering sea, and it is waterlogged cottonwood, and next to no fuel at all, as not even a shrub or bush grows within miles of St. Michaels. I hope to have some important news for the readers of the MINING AND SCIENTIFIC PRESS when you receive the next letter from me and be able to give reliable information regarding the geology, geography and resources of the country, with a description of the best routes for the pilgrims to come by who intend braving the dangers of ice and frost for the treasures they hold.

BERNERS BAY DISTRICT.

(Special Correspondence).—The Nowell Co.'s 40-stamp mill at Seward is running full time on good ore from the new strike in the Kensington mine. Development work in this mine is opening up good ground and so far this is the largest high-grade ore deposit found in Alaska. Over 30 feet wide will mill $50 per ton.

The Portland Alaska Mine Co.'s 10-stamp mill is running steadily on medium ore from the drifts.

The Jualin Co.'s 10-stamp mill has been busy all the season on good rock. This is one of the best little mines in Alaska, a regular profit every month. This company will ship this winter all the concentrates that they have accumulated during the past year.

The mines of Bok & Co. have been bonded (rumor says $150,000). Development work that has been done this year showed that the ore bodies are large and very high grade. The parties bonding have men at work opening up the property.

Seward, Alaska, Oct. 1st, '97.

Alaska *Record*, Oct. 13th: About 120 miners came down from the Cook inlet section on the Dora, most of them passing through Juneau on the Topeka en route to ports below. Considerable gold was taken from the placers in that district this year, or in the neighborhood of $250,000. The Polly Mining Company cleaned up about $160,000. Next year this company will put in a hydraulic plant and work their ground on an extensive scale. They are located on Mills creek.

THE KLONDIKE.

The method of locating a placer claim is simple. There are numerous small streams or creeks running through narrow valleys. The prospector must not exceed 100 feet up and down the creek, the general course of the valley. The width of the claim can run from base to base of the hills or mountains. If there are no claims located on this particular stream, the claim is known as the "discovery claim," and the stakes used are marked O. The next claim staked up the creek is marked No. 1, as is the next claim going down the stream. There can be but two claims marked No. 1 on any one stream. The four stakes being driven and each marked with the initials of the locator, and the letters "M. L," which means "mining location," the miner must bound his claim with cross or end lines, and then proceed within sixty days to file the claim with the government's recorder at Dawson City. In recording affidavits must be made that the claim is properly staked, the date given and the gold that has been found. The number of the claim must also be given, and if it is not the discovery claim it must be mentioned as for instance, No. 1 or No. 10 above or below "discovery claim," as the case may be. If a claim should be staked before gold is discovered thereon, the prospector has sixty days in which to prosecute the search for gold. If when this time has expired, he is yet unsuccessful, he can no longer hold the claim, as the finding of the metal is absolutely necessary for the holding of the claim.

When a Klondike prospector has staked out his claim, which must be as near water as possible, and generally about 100 feet in length, he makes an experimental panning as a test of the claim. This may show very little at first, but when it is considered that five cent dirt—that is, ground that washes or pans five cents' worth of gold to the pan—is paying property, it may be seen that the miner's standard is not so very high. Many cases have lately been reported from the Klondike where the dirt has washed out $50 to the pan. With a claim of five-cent dirt the miner, if he is industrious, may be reasonably sure of $50 a day. With $50 dirt he is a millionaire, if his claim is of any considerable extent.

The testing of a claim is, however, only the beginning. After it is proved to be worth working, it is necessary to prepare for more extensive operations. The first thing is to make the sluice boxes. In the Klondike lumber is a scarce and very expensive article, provided it is purchased all ready for sluice purposes. If the miner is industrious, he will fell enough trees from the thousands that cover the rugged lands about to make him all the sluice box lumber that he will need. It is much more economical for him to put in the time and labor necessary to do this than to buy the lumber ready made.

When the lumber is ready it is converted into sluice boxes of whatever length the miner may deem advisable. The boxes are then placed in position, and all is in readiness for the washing process. Now comes the necessity of getting the dirt into the boxes. It is always the case that pay dirt—dirt containing gold—lies next to rock. This being the case it is necessary to clear away the gravel that lies between the surface and the pay dirt. It is a laborious task in any event, but when one has to face Klondike seasons, it is still more difficult.

Sometimes it happens that as much as 25 feet of gravel must be removed before pay dirt is reached, and when most of this has to be done within sixty days, besides washing out the pay dirt, the necessity for hard work is apparent. As a rule, the depth of the surface gravel is about 8 feet, and at this depth it is possible for the miner to get his pay dirt and wash a good bit of it in one season. Many of these who are on their way to the Klondike cherish the belief that all the miners do when they pan out gold is to dig out a surface lode and make all the money they want to. On the contrary it is often necessary for a miner to spend the entire season in clearing away the surface gravel from the pay dirt on his claim.

The statements often made that it is impossible to do any work during the winter season are erroneous. Nearly all the tunneling is accomplished at that time of year. Fire is the agent by means of which the tunneling is done. There is plenty of wood to be obtained, and so the miner builds a roaring fire next to the gravel which he wishes to tunnel. Naturally, this melts the frost out of the gravel, which is then shoveled out. This method does not prove successful with surface gravel.

Occasionally it happens that a claim is too far from water, and in such cases several fortunes have been rocked out — that is, rockers have been used. The rocker is just what its name indicates. The dirt is placed within it and it is rocked until the dirt and gold have been thoroughly shaken apart. The system is used only on rare occasions, for, as a rule, water is sufficiently plentiful to make the ordinary methods of placer mining available.

IDAHO.

At Burke, the Tiger has resumed sinking again. It is not necessary to keep sinking all the time, for the ore chute is 1300 feet long, and the shaft can be sunk much faster than the ore can be mined for such a distance. The shaft is now 1325 feet deep and will continue to 1400 feet.

The Surveyor General's office at Boise has been crowded with applications for surveys and mining patents this quarter more than for any quarter for the past ten or twelve years. Applications have been received for nearly eighty different claims. Of this number twenty-five come from the Bunker Hill and Sullivan mines in the Cœur d'Alene country, and sixteen from the Hailey district. De Lamar and Warrens supply most of the remainder.

At Florence the Banner mill is daily reducing eighteen tons of ore, the Ozark twelve, the Waverly six. These three companies employ forty-five men at an average of $3.25 per day. Capt. N. D. Moore of the Florence Mining Company has bought the 5-stamp mill formerly used by ex-Governor Willey on the old Knott mine, at Warren, for removal to the Blossom mine. The Waverly Company has a new mill on the way, which will be erected on the Waverly mine. The new mill for the Hi-Yu will be in operation in a month. The Poorman Company has ordered a mill for its property; it will not be operated till spring. The Gold Bug, Toledo and Cumberland will be worked all winter.

The Bedrock flume property of Idaho City has been sold to Col. Souther of Boston for $36,000. It takes in seven miles of the bed of More creek, beginning at Idaho City, the claims embracing about 1000 acres.

The growth of Florence camp is illustrated thus by the Florence *Miner*: "The winter of 1893-94 only five men wintered in the camp; in 1894-95 fifty men wintered here; in 1895-96 about 150 men wintered here, and this winter there will be about 1000 men employed and wintering here."

MONTANA.

The Montana Ore Purchasing Co. proposes to increase its capital from 40,000 to 100,000 shares, or from $1,000,000 to $2,500,000, par $25. The object of the increase is to enlarge the capacity of the smelting plant and acquire new properties and develop claims now owned. The meeting is called for Nov. 6th at Butte.

The Anaconda Mining Co. at Clark's Forks will erect large works and mine coal extensively. There will be 4000 men employed, and the expected output will reach 3000 tons of coke daily.

Sheridan reports that F. J. Lyons has interested Michigan men in his Toledo smelter and that within a short time the present plant will be torn down and a new 60 or 100-ton plant will be constructed.

The report of the directors of the Montana Mining Company regarding the Drum Lummon mine for the half year ending June 30, 1897, shows that during the six months the total yield in bullion bars and concentrates (on assay coinage valne) was $175,975. Of this $76,556 was contributed by the cleanup of plates, etc., and $99,419 by 6,820 tons of ore reduced by the 50-stamp mill during May and June. The actual realized and realizable value of the produce amounted to $151,382, the difference on the coinage value being $24,593, or 1.09 per cent on the gold, and 60.23 per cent on the silver produced. The 60-stamp mill was shut down for the whole of the half year and the 50-stamp mill was in operation only during May and June. The developmnet of the mine during the half year consisted of drifts, winzes, crosscuts and upraises, representing a total progress of 4,233 lineal feet, at a cost of $64,889. During the month of May, the connection between the 1200 and 1600 feet levels, south of shaft No. 2, was completed, thus ensuring safety and better ventilation in the mine.

Inter-Mountain: The Chicago capitalists who invested money in plants for the extraction of gold from the bed of Grasshopper creek near Bannack are now reaping the reward of their enterprise. Three boats or dredges have been in operation this summer and the returns have been so satisfactory that a London company is now placing machinery on the ground for another boat next summer.

It is not more than four years ago since some Montana men succeeded in enlisting the attention of a few capitalists of Chicago to the fact that the old river bed, which has been worked in the primitive way by the early gold seekers, was rich in gold. Everybody knew the gold was there, but it was

difficult to get at. Finally some one hit on the scheme of a dredger. The old mossbacks laughed at the idea. It was from 30 to 50 feet to bedrock, the river bed was filled with boulders, and it was considered an impossibility to devise machinery to handle the gravel. A boat or dredger was built, but it was not successful. The machinery was defective. The next year another effort was made with new and improved machinery and the success of the enterprise was assured.

"The Gold Dredge Company has a Klondike of its own at Bannack," said Deputy Mine Inspector Frank Hunter, who returned from an inspection of the mines of Beaverhead county Saturday. "This company has two boats or dredges in operation and employs about thirty-five men. One of the boats is operated by steam and the other by electricity. Each boat cost about $40,000. The electric dredge is the least expensive to operate, the expenses being some $75 or $100 a day less than the boat operated by steam. The power is derived from a ditch several miles in length, the electricity being generated at Bannack and transmitted to the dredge.

"The boats of the company are able to handle from 1500 to 2000 cubic yards of dirt each day and the gravel will average about 40 cents to the yard in coarse gold. No section of the now famous Yukon ever produced such handsome nuggets as I have seen taken from the bed of Grasshopper creek. Near the town of Bannack bedrock is reached at a distance of 30 to 40 feet, but down the creek bedrock is generally found at a depth of about 45 feet.

"The Chicago Mining and Development Company has one boat in operation having a capacity of handling from 1200 to 1500 cubic yards a day. The boats begin operations early in April and continue in operation until early in November. There is lots of working ground below the town and it is likely that next year there will be several more dredges at work. The London company will operate four or five miles down the creek from Bannack. I have been told that as high as $2,000 in gold has been cleaned up in two days by one of the dredges now in operation."

SOUTH DAKOTA.

Deadwood reports that the bottom of the body of ore in the Hardin shaft at a depth of over 200 feet has been reached and shows a thickness of 22 feet that will average $50 a ton.

COLORADO.

(Special Correspondence).—Gilpin county is one of the busiest districts in Colorado and there are good grounds for the prediction that the year's production will be approximately $5,000,000. Every mill in the district is running and all have as much work as they can do. The mills and concentrators are treating 20,000 tons per month and not less than 5000 tons per month are shipped direct to the smelters. The ores of the district, which are a sulphide of iron and copper, partially oxidized, carry gold values principally, there being low values in silver. The mills all use stamps for crushing and have amalgam plates on which a saving is made which varies greatly, according to the kind of ore. They all use concentrating tables, by means of which a large per cent of the saving is made. About 730 stamps are now dropping in the district, besides the large concentrating mill, which will handle 1500 tons per month.

The Gettysburg shaft has reached a depth of 675 feet and has been working several months. Some material has been shipped from it which ran 12 ounces in gold to the ton. It is said to be producing $5000 per month.

The Robert Emmett is putting down a double compartment shaft, 4x8 feet, with Cornish sets. New machinery has been put in. Shipments from this property are said to have run as follows: Nine to 25 per cent lead, 7 per cent copper, 1½ ounces to 18 ounces gold and 8 ounces silver. W. H. Nicholls is superintendent.

A. J. Trimble, an iron operator from Duluth, is associated with W. H. Knowles in a bond and lease on the Holland and Homestake in Russell Gulch. These are partially developed and produce high-grade ore. Contracts are out for new machinery on the Holland.

The Vendome Company, operating a large mill and a group of mines, is putting up a tramway 700 feet long from their mines to the mill. The Vendome is handling 1000 tons of ore per month. This property has been worked for the past fourteen years.

The Gold Coin property comprises a consolidation of a number of big properties on Quartz and Gunnell hills, and includes a bond and lease on the Bobtail-Gregory mine and tunnel near Blackhawk. WASCOTT.

Central City, Colo., Sept. 11, '97.

The opposition to the proposed assessment plan of the Boston & Cripple Creek Mining Company is active. It requires a two-thirds vote to carry the plan, which would be 133,333 out of the 200,000 shares. The minority claim that, under the laws of Colorado, the change cannot legally be made. The present charter does not allow of an assessment and the opposition do not relish the method adopted. They will ask for an accounting of the 50,000 shares of treasury stock sold. The shaft is down 220 feet, but not yet in pay ore. The company votes to-day on a proposition to double the capital stock of $200,000 in dollar shares by doubling the par value; also to make the shares assessable. If the plan is carried out, it is purposed that an assessment of 10 cents per share shall be levied, and with the proceeds—$20,000—that the shaft shall be sunk to a point where it is believed that pay ore will be reached. The opposition excepts to this manner of raising money, and has suggested as a possible alternative plan that shareholders contribute stock to the treasury to be disposed of for the advantage of the company. That is another way to levy an assessment. It is not a matter of vital concern to others than shareholders what course is pursued in this matter. It would have been vastly better for the shareholders had a dollar in money been put into the property for each share issued. It is impossible to develop a mine with liquid capital, but a mine may sometimes be "floated" that way. The sort of capital that develops a mine is the sort required at this juncture.

The Elkton Consolidated mine has set up two boilers, each 1000 H. P., to operate the two pumps. Their combined capacity is 1500 gallons per minute. The water must be raised 400 feet. As soon as drained sinking will be continued 200 feet.

The Ophir *Mail* says about $10,000 in retorts was shipped from Ophir last month.

NEW MEXICO.

The *New Mexican*, concerning mining operations around Red River, says the principal mine is the Memphis, on which the new proprietors will spend considerable money in developing. New hoisting machinery has been placed and a mill will be added to the equipment. The mine has a 56-inch lead.

On the Midnight new hoisting machinery is in place at the shaft and a new mill with a daily capacity of from ten to fifteen tons will be ready to treat ores by December 1. The ores in this mine are partly free milling, and the greater part of the values can be saved without concentration. The concentrates will be shipped to the smelters for treatment. Harvey Finch is superintendent.

The Edison has over 400 feet of development work done. A six-ton shipment was recently made to Denver which gave returns of about $100 to the ton.

At Franklin, six miles distant from Red River, the Montezuma Company has large placer claims and several lode mines, and at present are working twenty-five men. The Franklin Company also have placer claims and a townsite.

ARIZONA.

At Rosemont the company has shipped 150 tons of copper bullion carrying a good percentage of gold. About forty men are employed.

The Napoleon Con. M. Co. has incorporated at Prescott, capital stock $600,000; F. V. Layton, G. Pridham, F. S. Munson, to operate in Yavapai county and Randsburg, Cal.

S. H. Gould, superintendent Oro mine, Oro Blanco, says the owners contemplate the erection of a 60-stamp mill within a short time. Thus far 200 feet of tunneling has been put in, and the work has been confined to development. They have opened a body of ore from $3 to $15 a ton.

Messrs. Lewisohn Bros. say the road to Globe City and the Old Dominion mine will be constructed and in operation before July 1.

The Detroit Copper Company will increase the output of its Morenci mines, which have been closed while new and improved machinery is being put in.

The Commonwealth Company at Pearce has canceled its mortgage of $300,000.

Forty men are working in the Golden Wave mine, one and a half miles north of the Congress, and at a depth of 240 feet shows 3 feet of ore similar in character to that of Congress.

Republican: The Copper Queen at Bisbee has reached a depth of 500 feet. The company's payroll at Bisbee is the largest of any in the territory, containing over 1100 names, all of $100,000 being paid out monthly in wages.

The three patent cylindrical roasters are the invention of President Douglas. The distinguishing feature is the fixed central flue which revolves with the fumes and carries the gases, when fuel is used, from the fireplace to the stack, heating by radiating the annular space in which the ore is roasted. This structural peculiarity insures a constant oxidizing heat to ore not otherwise secured in automatic cylinders, the absence of which has here application to the roasting as distinguished from the chloridization of ore. These cylinders are 60 inches in diameter. An average of 32,710 pounds, gross, of ore is treated in a month's time. Average per cent of sulphur going in is 45.1; yield in ore roasted represents but 5.1 per cent sulphur.

Prescott *Courier*: Superintendent M. H. Dodge, of the Gold Basis M. & M. Co., is now prepared for development work on the properties on Groom creek, and immediately have work commenced on a 200-foot shaft and will put up a mill as soon as development justifies it.

Supt. Wm. Johnson of the Gold Cliff at Pearce says all tests made with the cyanide process before the erection of the plant gave the most satisfactory results of any ore that has come under his observation. The ore gave a result of 95 per cent. The capacity of the plant is ten tons daily which will be increased.

MEXICO.

The Copper Queen Company has been granted a concession to erect a smelter at Hermosillo, State of Sonora, the company having deposited a guarantee of $10,000 gold coin to comply with the concession, which carries with it exemption from taxation and special low rates on custom ores hauled over the Sonora Railroad. The plant will treat copper, silver and lead ores.

L. E. G. Carden, H. B M.'s Consul General to the City of Mexico, in the annual report to his government for 1896, has the following report on silver:

"The value of the silver exported in 1896 was, $58,861,692, equivalent to English money at the rate of exchange for that year to £6,315,369, by far the largest amount ever exported from Mexico in any one year; 21 per cent of this amount ($18,253,397) represented Mexican silver coin; the total of the silver coined in Mexico in 1896, being $21,092,397—20 per cent was exported in the form of ores and sulphurets for treatment in the United States, Germany and England, 48 per cent was exported in the form of bars, whether of pure silver or what is known in the United States as base bullion, that is to say, argentiferous lead as it comes out of the smelting furnace, and before it is refined.

"The smelting business in Mexico has made great strides of late years, especially as regards economy of treatment of the ores, and it is probable that each year the amount sent abroad will become less. The remarkable development of silver mining, in spite of the low price of the metal abroad, is in great measure due to the fact that large quantities of ores which were not rich enough to stand the high cost of reduction by the imperfect methods in use in most of the smaller mining camps, can now be profitably shipped for treatment in one or the other of the large smelting works in the central and northern part of the republic. It is scarcely necessary to say that the movement of freight thus brought about, amounting to several hundred thousand tons per annum, has been of the greatest benefit to the railways."

LOWER CALIFORNIA.

The *Lower Californian's* correspondent at Calmalli says: The system adopted by Supt. Swain, of the Ibarra Gold Mining Company of Calmalli, for reducing refuse ores by a new process, is giving very satisfactory results. The new machine is a device invented by Mr. Swain.

The Buenaventura mine, belonging to the same company, is now being worked with twenty men.

Lower Californian: Nothwithstanding the fact that silver is selling at 55 cents per ounce the Taiunfo mines, near La Paz, in the southern district of this peninsula, are still working at a small margin of profit.

While the Triunfo mines are not operated on so large a scale as formerly, about 1000 men are employed at their works and forty stamps are kept continually pounding. The Triunfo group consists of seven or eight mines which have been in process of development for the past thirty years. The shafts have all been sunk on an incline to a distance averaging about 2000 feet, though the vertical depth of the deepest shaft is not 600 feet from the surface. The ore is all raised in cars operated by cables, and there are nine miles of railway in connection with the property.

SOUTH AFRICA.

South African *Mining Journal*, Sept. 18: There have been no very grave fluctuations among the steadier producers. From many points of view, the recent frequency of record outputs is highly satisfactory, as showing that the Rand is really an industrial proposition, and that the industry is doing its best, despite all obstacles, to put out as much gold as possible. But one question has lately troubled a great many thoughtful men. Are these record outputs, under present conditions, quite fair to the shareholders? It does not matter whether a mine be rich or poor—the cost of milling a ton of rock is something in the neighborhood of 30s. The ore cannot run away. Is it altogether fair to its proprietors that so much of it should be milled and cyanided before the reforms suggested by the Industrial Commission have been carried into effect? Even if the reduction were only a shilling a ton, the saving would be immense. The problem is full of difficulties, but the managers of compan es just now are put in a very awkward position. They can only do justice to the mines and to the country at the direct expense of the shareholders. If the Government's share of the profits were applied to any useful purpose, there ought to be some reason for handing them over cheerfully; but since they only go to piratical monopolists—there's the rut.

The Robinson mine's report for August contains the following: Mine—Quartz mined, 14,631 tons. Development—Drives, 780 feet; rises, 405 feet; crosscuts, 226 feet; total, 1411 feet. Mill—Stamps at work, 120; net running time, 29¾ days; tons crushed, 14,631; tons per stamp per diem, 4.1; gold won from above, 10,145 ozs. 13 dwts. Chlorination and Cyanide Works—Gold won from own concentrates (by chlorination), 929 ozs. 0 dwts; bullion from tailings (cyanide process), 3062 ozs. 9 dwts; bullion from slimes (recovered by Rand Central Ore Reduction Company, Limited), 720 ozs.; total from own ore, 14,857 ozs. 2 dwts.; gold from concentrates purchased (by chlorination), 3984 ozs. 16 dwt.; total, 18,841 ozs. 18 dwt.

EXPENDITURE AND REVENUE—Crushed, 14,631 tons.

WORKING EXPENDITURE.

		Per ton milled.
Mining acc't (including mine maintenance)	£ 8,246 8 4	11s 3.27d
Milling acc't (including mill maintenance)	2,495 4 0	3s 4.93d
Gen'l mainte'nce acc't	237 11 8	0s 3.90d
General charges	1,570 9 10	2s 1.76d
	£12,549 13 10	17s 1.86d
Expen're on mine dev't, incl'g main shafts	3,740 8 2	5s 1.35d
Expen're on machinery, plant and buildings	1,965 8 5	2s 8.24d
	£18,255 10 5	24s 11.45d
Retreatment Acc't—Working expenses at cyanide & chlor'n wks	3,422 8 11	
Cost of concentr'es purchased, incl'g rec'v'g.	11,486 16 8	
	33,164 16 0	
Profit for month	35,380 12 3	
	£68,545 8 3	

REVENUE.

Gold account (mill), 10,145 ozs. 13 dwts	£36,725 0 8	
Sundry revenue	792 10 11	
		£37,517 11 7
Slimes plant acc't: 6477 tons delivered		739 4 1
Retreatment Acc't—Gold acc't (tailings), 3062 ozs. 9 dwts.	9,378 2 0	
Gold acc't (own and purchased concentrates), 4913 ozs. 16 dwts	20,509 1 9	
		29,887 3 9
Plus am't rec'v'd in excess of book entry for June gold		401 8 10
		£68,545 8 3

AUSTRALIA.

The smelting furnace at the Illawarra, New South Wales, works is in operation and has large supplies of ore on hand, including considerable consignments of gold ore of various descriptions. The blast furnace for copper smelting, made by the Atlas Company, is to be put in position at Illawarra without delay, and Manager Howell believes that copper ore will be forthcoming in sufficient quantity to keep it in continuous blast.

NEW ZEALAND.

New Zealand *Mines Record*: Dredging is becoming a very important factor in the product of gold from this colony, and in Otago especially it has lately attracted a great deal of attention and led to the pegging out of a large number of claims in the vicinity of the Clutha, Kawarau and other rivers. The Roxburgh correspondent of the Otago *Witness* publishes a series of articles, extending over a period of nearly three months, on "The Rise and Development of Dredging in Otago." In concluding (on August 19th) the writer stated that there are fifty-seven dredges working in Otago, thirteen dredges building, and seventy-five dredging claims taken up with the view of placing dredges upon them.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING OCTOBER 19, 1897.

592,042.—MIRROR SUPPORT—Bader & Cartwright, S. F.
591,801.—DESK RULER—J. D. Barrie, Los Angeles, Cal.
591,945.—SMELTING FURNACE—F. N. Bergen, Tacoma, Wash.
592,187.—VALVE—A. W. R. Berr, San Jose, Cal.
592,217.—SKINNING KNIFE—O. Bolderi, S. F.
592,131.—RAISIN SEEDER—C. S. Cox, Fresno, Cal.
592,218.—RAILWAY—W. G. urtis, S. F.
592,219.—WOOD CONSTRUCTION—Curtis & Isaacs, S. F.
592,051.—WAVE MOTOR—F. M. Graham, San Jose, Cal.
591,966.—HAIR DRIER—H. V. Halliwell, Tacoma, Wash.
592,091.—VEHICLE—M. P. Holmes, S. F.
592,114.—FIRE DRAUGHT BLOWER AND SCREEN—P. W. Hurndall, S. F.
591,842.—BOTTLE—F. Johnson, S. F.
591,852.—RAILWAY SWITCH—H. C. Lausen, Newman, Cal.
592,203.—WAGON—W. H. Martin, Los Angeles, Cal.
592,050.—TRUNK AND TABLE—C. H. Miller, Los Angeles, Cal.
592,120.—RAILWAY SIGNAL SYSTEM—J. G. Pearce, Oakland, Cal.
592,125.—TIRE—Rogers & Hall, S. F.
592,031.—PIPE WRENCH—G. W. Waitt, S. F.
592,182.—LADDER—C. H. Waterman, Dayton, Wash.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

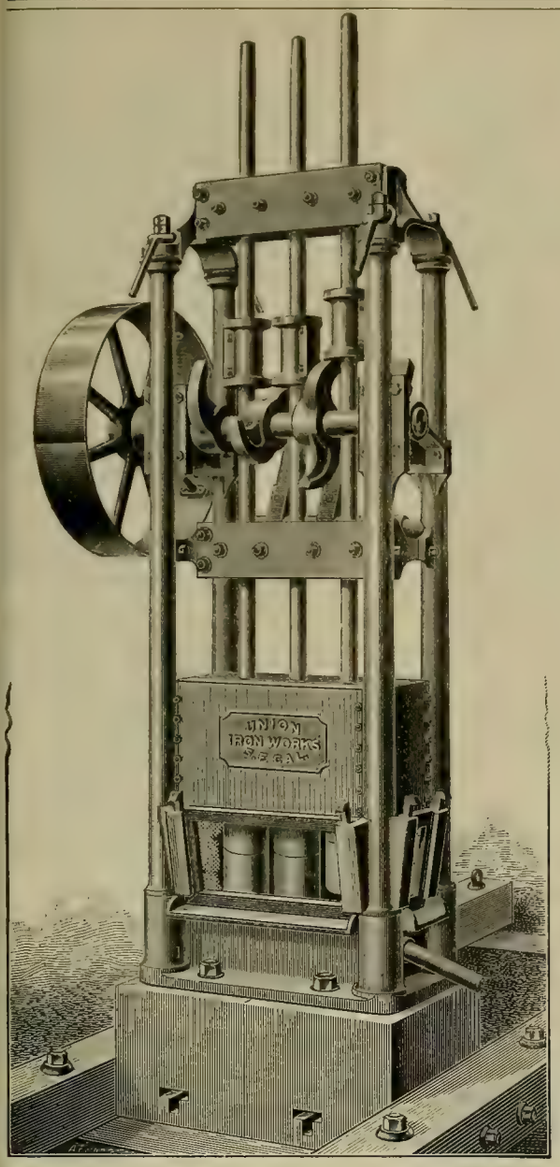
Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

VALVE.—August W. R. Berr, San Jose, Cal. No. 592,187. Dated Oct. 19, 1897. This invention relates to a valve which is especially adapted to close and control the passage for any medium under pressure. It consists essentially of a cylinder valve case having transverse inlet and outlet openings and an intermediate valve seat, a valve recessed inside of its periphery, a separate and renewable face secured in said recess being of smaller diameter than the exterior disk, to form a circumscribing space, whereby the transmitted medium exercises a pressure on both sides of and partially balances the valve, and means whereby the valve may be turned, said valve and seat having ports through them adapted to be moved into and out of alignment.

COMBINED AUTOMATIC BLOCK AND SIGNAL SYSTEM AND BRAKE APPLIANCES.—James G. Pearce, Oakland, Cal. No. 592,120. Dated Oct. 19, 1897. This invention relates to a device, the object of which is to guard railway trains from collision by the employment of a series of block signals distributed along the line of railway, these signals serving, first, to show when a train leaves the station at one end and enters the block, and when it arrives at the other end of the block and leaves it, thus continuing to signal its approach and departure at each point of the line over which it travels. This invention has also for its object the application of brakes to any train entering the block from the opposite direction so as to prevent its further progress while the first-named train is within the block, and to similarly apply the brakes to any train following too closely. These operations are effected by means of a series of depressible levers situated at intervals between the rails of the track, and in such positions that they will be successfully acted upon by a drum or roller fixed upon the engine shaft, so as to form contact with these levers as the train passes over them. Each lever is connected so as to operate a mechanism which either sets a signal at "danger" or returns it to the position of "clear." Other sets of levers actuate mechanisms by which the electrical current is successively cut off from these levers which act upon the brake mechanism of the train, so that the train may pass over said levers without being affected. After the train has thus passed these levers, another set of mechanisms are successively actuated to again return the current to said levers and to set the mechanisms already passed over into condition to act on the brakes on any following train which may approach the first train within the danger limit.

ADJUSTABLE FIRE-DRAFT BLOWER AND SCREEN.—P. W. Hurndall, San Francisco, Cal. No. 592,114. Dated Oct. 19, 1897. This invention relates to a device for controlling the draft of fires, grates, and to act as a screen therefor. It consists of the combination with a spring-actuated roller, of a heat-resisting curtain adapted to roll thereon, means for holding the curtain and controlling the coiling of the same, and means for operating the mechanism so as to raise or lower the curtain. When raised, the grate and its contents are fully exposed; the curtain may be drawn down so as to wholly or partially cut off the grate, and, if desired, entirely cut off the draft therethrough.



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Coast Industrial Notes.

—The sale of the Union Pacific road will take place next Monday.

—The Santa Fe Railway Company paid out $42,000 at San Bernardino, Cal., for wages and salaries for the month of September. Last April the amount was less than $20,000.

—San Francisco hide and wool buyers are in Eureka and Lander counties, Nevada, contracting for 2000 horse hides at $1.50 each; tails and manes at 3 cents a pound; the bones at $18 a ton. The horses being killed are wild range animals.

—The annual report of Commissioner Hermann of the General Land Office shows that during the year railroad land patents were issued as follows in California: Central Pacific, 42,074 acres; Central Pacific (as successor to the California and Oregon), 13,504 acres; Southern Pacific, 122,348; Indian lands patented in California, 2861 acres. There now remain in California 35,217,527 acres of surveyed vacant lands, and 8,623,517 acres of unsurveyed vacant lands. During the year 1,298,355 acres of land were surveyed in California. The allotment for surveys was $20,000. For the ensuing year $15,000 is asked for surveys and $5000 for resurveys.

—The Corral Hollow Coal mine, Alameda county, Cal., is to have another $100,000 expended in improvements. Among other improvements is a plant for utilizing all the screenings. By hydraulic process, the screenings are united in a solid briquette and will burn readily. A tunnel 10x10 feet pierces the mountain a distance of nearly 3,000 feet. It crosses about fifteen coal veins that vary in width from inches to yards. At the terminus of the tunnel is encountered a solid wall of coal over 20 feet in width. This vein is 1500 feet under the surface of the ground; at this point the heat is stifling. The same wall of coal is found again 1000 feet below the 1500-level. Another improvement contemplated at the mine is the erection of an electric light and power plant.

—The California Supreme Court decides that the connecting lines of a railroad are agents of the company over which a shipment started. The Colfax Mountain Fruit Company entered into an agreement to ship a carload of fresh fruit from Colfax to New York City with the Southern Pacific Company. An agreement was entered into whereby the Southern Pacific agreed to forward the car by passenger train service to its destination, and did carry out that agreement so far as its own lines were concerned, taking it as far as Ogden, where it was turned over to the Union Pacific Company. The connecting line did not forward the car as agreed upon; it arrived in New York four days late, the contents greatly damaged. The fruit company brought suit and recovered damages. Upon appeal the Southern Pacific Company contended that it had carried out the terms of its agreement, but that it could not compel performance of passenger train service from its connecting lines; that it could only covenant to deliver on its own system. The Supreme Court affirms the judgment of the lower court, and holds that the connecting companies are agents of the Southern Pacific, and that the failure of any connecting line to carry out the provisions of the agreement makes the first line responsible for any damage.

—Consul Jarnigan writes from Utilla under date of August 3, 1897, in regard to a concession by the Honduras Government to citizens of the United States. A copy of the contract, transmitted by Vice-Consul Bernhard, of Tegucigalpa, under date of August 30, 1897, gives the names of the syndicate as follows: Chauncey M. Depew, W. Steward Webb, John Jacob Astor, Benjamin F. Tracy, J. G. McCullough, Frederic B. Jennings, George S. Scott, Nathaniel A. Prentiss, Charles McVeigh, and Melville E. Ingalls, jr. The agents for the syndicate were Henry L. Sprague and W. S. Valentine, of New York. The concessionaries are to construct and operate a railroad from Puerto Cortez, on the Atlantic, to the Bay of Fonseca, on the Pacific coast. The Government grants the syndicate the railroad, with all its appurtenances, now being operated from Puerto Cortez to La Pimienta, a distance of about 30 miles. The company is granted exclusive right of transit over land and water throughout the length of its route —the water rights being limited, however, to the construction of bridges, wharves, etc., necessary in the operation of the railroad. A subsidy of 100 English feet of land is granted on each side of the road, whether it passes through public or private lands. In the latter case, the Government is to pay the proper indemnity to the owners, and the company is to pay for the improvements of the land, in accordance with law. When the road passes inhabited sections, only half this width of land is granted. The Government concedes five square miles of land for every mile of railroad constructed. The land is to be located contiguous to the road, in alternate sections, when the road traverses public lands. When it traverses private property, the company has a right to select sections of land (under the above-named conditions) from he public property. This choice is to be made within five years from the date of contract. The grant is not to extend within one mile from the coast line, but the company is allowed the privilege of constructing stations, etc. Branch roads can be constructed under conditions similar to those given for the main road, and one shall extend to Tegucigalpa. The company can use all materials necessary for the road which are found in the Government lands, and no charge shall be made for the same. It also has the right to all minerals, etc., found in the lands conceded, provided that this does not interfere with previously acquired rights of third parties. The development of these minerals is to be subject to the mining laws of the country. The width of the line is not to be less than 1 yard 6 inches. Five miles shall be constructed within the first year. At the end of the second year, twenty-five miles are to be finished; at the end of the third year, fifty miles; at the end of the fourth, the road must have arrived at Comayagua; at the end of the sixth year, the line is to be completed and opened to the public. If the company fails to comply with these conditions, it shall pay to the Government 15 per cent of the gross receipts of the line until the conditions are fulfilled, an extention of time having been granted. At the expiration of this extension of time, if the said number of miles has not been completed, the road will pass into the hands of a trustee. The Government mail is to be carried free, and officials (not traveling in a private capacity) are to be subjected to no charge. The transportation tariff shall not exceed that on the portion of the line now in operation (except in the case of interoceanic traffic.) The cost of transportation of products of Central America is to be made low as possible. Passengers and freight engaged in interoceanic travel or transportation are not to be subjected to customs duties. Foreign colonists and workmen can be introduced (with the exception of negroes and Chinese), and the same will be exempt from personal taxes for ten years. The syndicate can issue bonds (not to exceed $20,000 in gold for each mile of road) and can transfer rights in the property to any one except foreign governments. After seventy-five years, the Government will have the right to purchase the road; the same option will be given at the end of each five years following; and at the end of ninety-nine years, the road and all its appurtenances will become the property of the State. The syndicate undertakes to liquidate the public debt of Honduras, and offices for this purpose will be opened in New York, London and Paris. Bonds are to be issued for one-fourth the amount of the original debt, to run for twenty-five years and bear interest at the rate of 1½ per cent (gold). These bonds are to be established, under the name of the Commercial Bank of Honduras, with a minimum capital of $500,000 (gold), divided into shares of $100 each. The bank has authority to act as the fiscal and financial agent of the Government and to be a depository of national funds. It can coin money, the net profits to be equally divided between the Government and the syndicate. The bank can grant mortgages (one-third of its capital to be devoted to this use) at a maximum annual interest of 15 per cent. It can make loans, guarantee Government bonds, and issue notes. There are to be five directors, with an additional one appoined yearly by the Government of Honduras. The bank was to take control of the customs of the country on October 1, 1897, and the Government promises not to change the tariff so as to reduce the revenue for fifteen years. (According to this agreement, says Consul Jarnigan, the increase in customs duties authorized by act of Congress last April will not take effect.) The bank is to pay 1,000,000 pesos (about $500,000) to the Government each year, and a certain per cent over this amount is to be applied annually to the payment of the new bonds. There is to be no tax on the railroad or on the bank capital. The syndicate is to equip one or more vessels to guard the coast and prevent smuggling. Consul Jarnigan speaks of the mineral and agricultural wealth of the lands conceded and of the advantages to Honduras which will result from their development. The United States, he says, will have practical control of the trade of the country.

Personal.

A. L. PEARSE, a London mining engineer, is examining a property near Gold Run, Cal.

H. BRATNOBER is in New York City en route to London to report regarding the Klondike.

JNO. W. MACKAY and party were in Grass Valley, Cal., this week, examining the Allison Ranch mine.

E. C. ENGLEHARDT is the new superintendent of the Kilton Reduction Co.'s works, Florence, Colo.

R. H. POSTLETHWAITE is in Oroville, Cal., arranging to construct a dredger to operate in the Feather river, similar to the one now operating in the Yuba below Smartsville.

GENERAL DUFFIELD, Chief of the Coast and Geodetic Survey, will be succeeded next Monday by Prof. Pritchett of Washington University, St. Louis, Mo., upon the recommendation of Secretary Gage.

PROF. J. M. SCHAEBERLE has been appointed acting director of Lick Observatory, in place of E. S. Holden. It is thought that either Prof. Schaeberle or Prof. Davidson will succeed Prof. Holden in the directorship.

MR. A. S. HALLIDIE has been deputized to visit various technical schools in the East preparatory to the selection of plans for the erection and practical working of the Wilmerding school in San Francisco.

HORACE F. BROWN is at Mercur, Utah, to superintend the erection of the Brown furnaces and the Loomis gas producers, which comprise the roasting plant of the new De Lamar Golden Gate mill. Mr. Brown can be addressed at Mercur until January 1st, '98.

MR. SAM'L J. HENDY, proprietor and general manager of the Joshua Hendy Machine Works of San Francisco, was unanimously selected by the California State Miners' Association at its convention last week as the treasurer of the Association for the ensuing year, succeeding Postmaster W. W. Montague.

R. U. GOODE, J. J. Gilbert and C. H. Fitch of the United States Geological Survey are in San Francisco. Mr. Goode is at the head of the Geological Survey on the Pacific coast, and has fifteen parties out doing geographical and geological work in various parts of the coast. During the past year Mr. Goode has traveled through Montana and Idaho and through the principal mining districts of this State. One of his parties is now making a claim map of the mother lode, to be completed January 1. Another party under Mr. Goode is running the boundary line between Montana and Idaho.

CHAS. G. YALE, special newspaper correspondent, has returned to San Francisco. He left July 28 on the steamer Excelsior en route to St. Michaels, Alaska, and thence went up the Yukon 1600 miles, getting within 400 miles of Dawson, when, the steamer being unable to go farther up by reason of low water, he returned home. He does not consider the reports of the value of the mines exaggerated, and thinks that there will be no starvation in that region this winter. He says: "In my opinion, the most extensive gold fields yet to be opened in the Yukon region will be on the American side of the boundary line. Whether any of them will prove quite as rich as the phenomenal Klondike district remains to be seen, but there is no reason why some of them should not."

Publications Received.

"*Geology and Veins of the Hauraki Goldfields, New Zealand.*" Jas. Park, F. G. S.; with colored maps and plates; an exhaustive and apparently authentic treatise on a subject of local importance; finely printed and illustrated. As in other countries "the source of the gold" is a subject of inquiry. The author concludes: "That the main lodes were primary channels or fissures, at one time filled with slowly circulating waters containing gold and silver, and probably base metals in solution. That the cross veins were secondary fissures filled with waters containing the metallic salts necessary for the electro-chemical deposition of the noble metals"; which seems sufficiently general to avoid other than abstract dissent. Accompanying the treatise in separate form are handsome colored maps and sectional views of the locality discussed.

"*Notes on Lead and Copper Smelting and Copper Converting.*" By H. W. Nixon, 8vo., 110 pp.; published by the Scientific Publishing Company, New York and London; price $3. Mr. Nixon was formerly superintendent of the blast furnace and converter department, Anaconda, Montana, and contributes valuable practical addition to the stock of knowledge in lead and copper smelting, and converting of copper matte. The author makes no attempt at elaborate discussion of the processes from the time the shaft is begun till the refined and manufactured product is in actual use, but from his own experience gives interesting details of how he smelted lead and copper and what he did it with. Illustration of how things should not be done is incidentally brought in, and up-to-date methods are technically described. Detailed shop drawings and cuts add to the value of the work.

Obituary.

ANDRE CHAVANNE, a pioneer capitalist, mining engineer and inventor, died in Grass Valley, Cal., last Wednesday, at the age of 79 years. He came here in the early fifties and followed mining until his death. He patented a nozzle regulator recently, which is illustrated and described on page 410 of this issue.

Commercial Paragraphs.

FRASER & CHALMERS have for the present discontinued their branch office at Salt Lake City, Utah, and request that all correspondence should in future be addressed to Messrs. Fraser & Chalmers, Chicago. Mr. J. W. Young will continue as heretofore General Western Manager.

Recent California Mining Incorporations.

Republic Mining Company, Los Angeles; Mrs. Downs, Mrs. Clark, Mrs. Eversole, Mrs. Brandis, A. M. Stephens; 40,000 shares.

Hard Cash M. & M. Co., Los Angeles; capital stock, $1,000,000; subscribed, $200,000; A. T. Stewart, Dr. B. O. Webb, I. N. Inskeep, J. E. Hunter, N. Wiltshire.

Assurance Placer Mining Company, Grass Valley; J. Mulroy, R. Connolly, J. J. Greany, R. P. Stevenson, E. E. Eitel; capital stock, $100,000; subscribed $50.

Oakland Con. G. M. Co.; W. S. Harlow, C. E. Snook, C. W. Greene, J. B. Barber, F. V. Wood, M. C. Chapman; capital stock, $125,000; subscribed, $875.

Recently Declared Mining Dividends.

Lillie G. M. Co., Cripple Creek, Colo., 1 cent per share, $8,100; payable Nov. 1.

Moon Anchor Co., Colo., 2½ cents per share, $15,000; payable Nov. 1.

Whitewater mine, Kaslo, B. C., $24,000; payable Nov. 1.

Directors of the Rio Tinto Company, Limited, have declared out of the estimated year's profit a half-year's dividend of 28s 6d per share on the 5 per cent preference shares, and an interim dividend of 20s per share on the ordinary shares, payable Nov. 1.

Geyser-Marion, Utah, $9000; payable Nov. 1.

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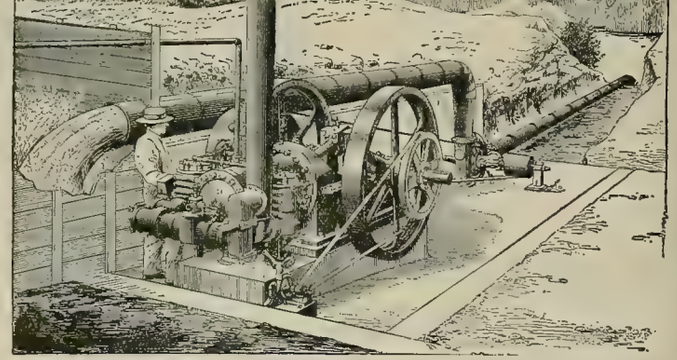

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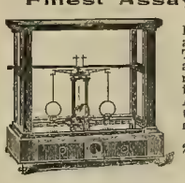

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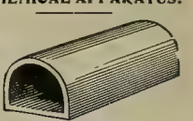

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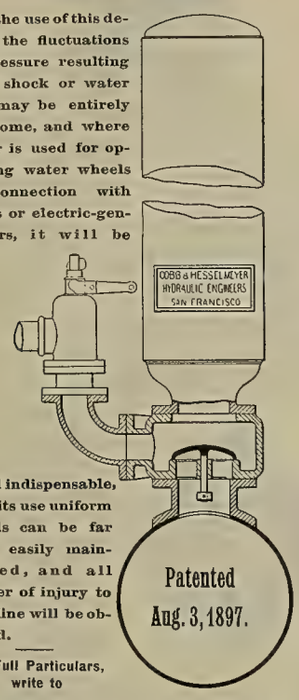

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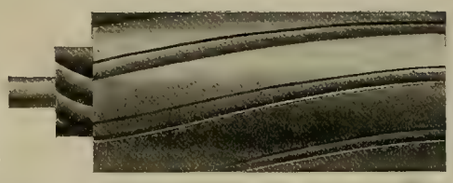
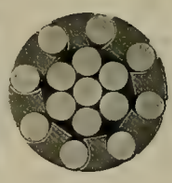
Locked-Coil   Track Cable

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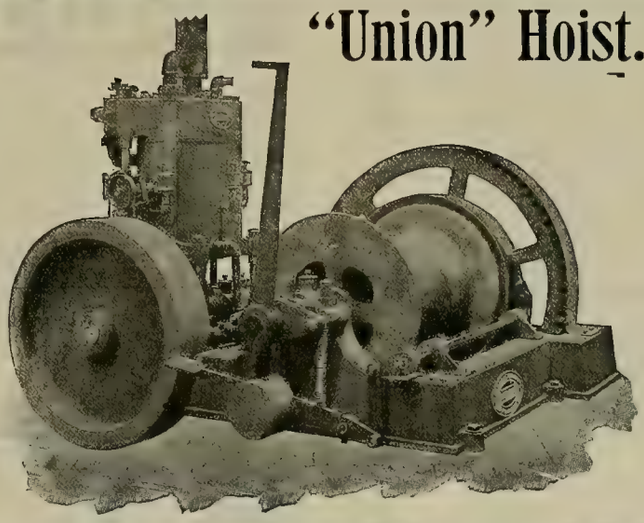

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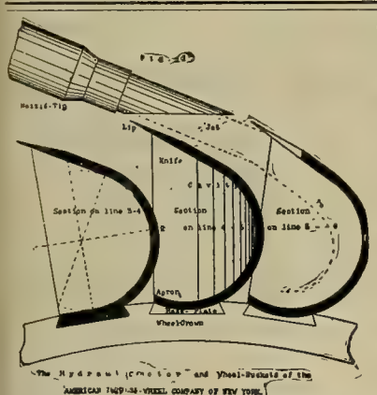

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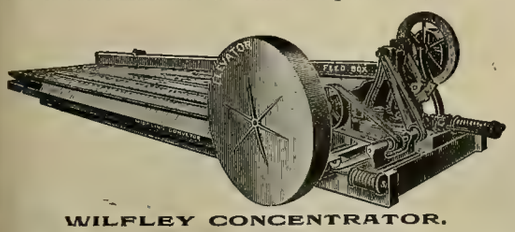

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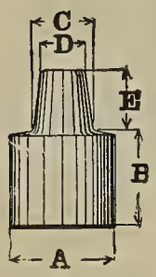

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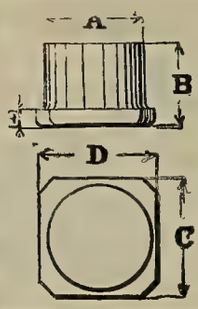

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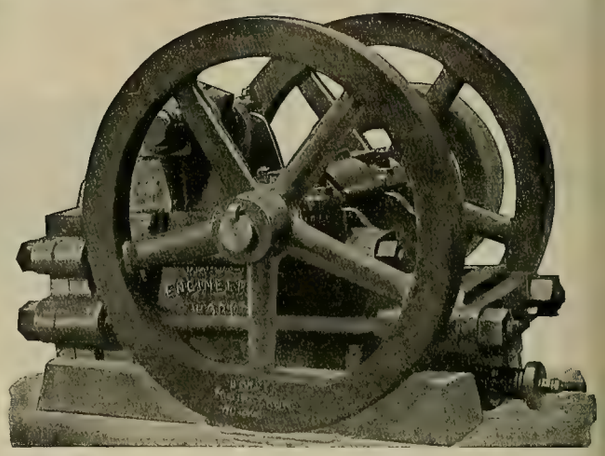

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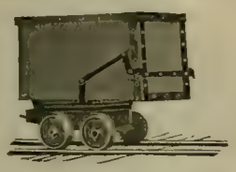

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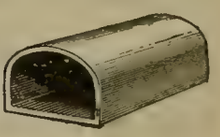

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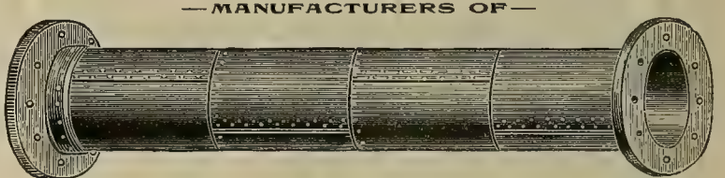

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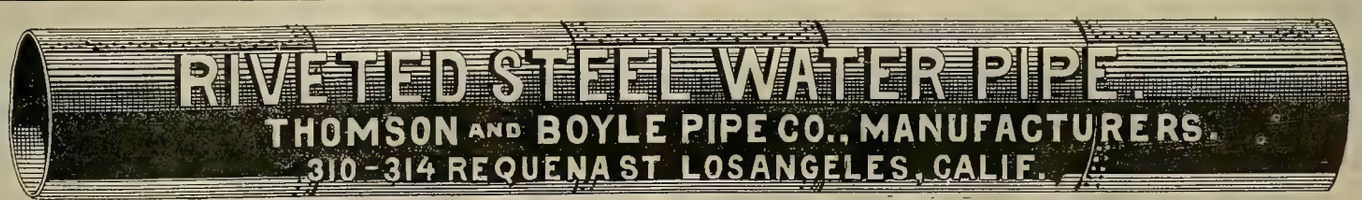

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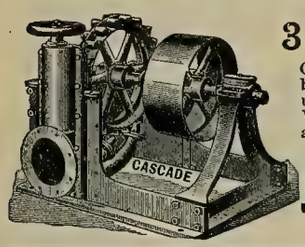

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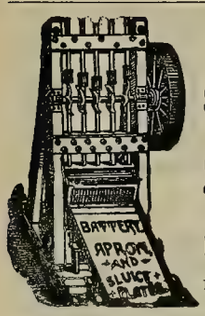

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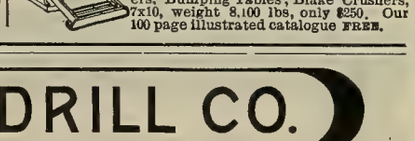

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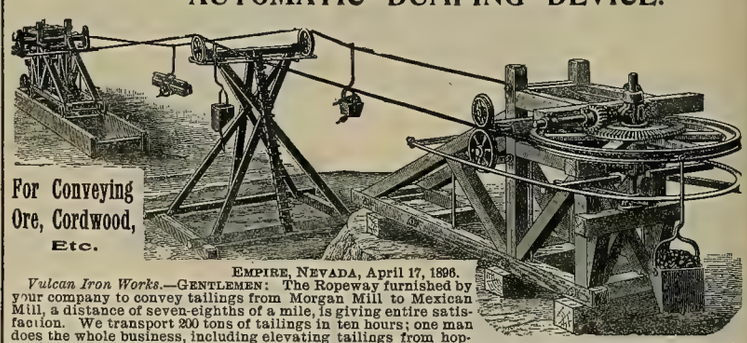

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EMPIRE, NEVADA, April 17, 1896.

Vulcan Iron Works.—GENTLEMEN: The Ropeway furnished by your company to convey tailings from Morgan Mill to Mexican Mill, a distance of seven-eighths of a mile, is giving entire satisfaction. We transport 200 tons of tailings in ten hours; one man does the whole business, including elevating tailings from hopper in the ground, operating Vulcan self-loader, and attending to the Ropeway generally. The self dumper requires no attention whatever. The Vulcan loader I consider the best feature in the whole Ropeway, making it possible for one man to load 200 tons in ten hours.

Yours very truly, J. P. WOODBURY, Supt.

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MANUFACTURERS OF MINING MACHINERY,
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IF YOU ARE INTERESTED IN A MINE OR MILL--YOU CAN'T DO WITHOUT IT.

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IT IS ABSOLUTELY ACID PROOF---TRIED AND PROVEN.

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You Can Order It From Your Dealer.

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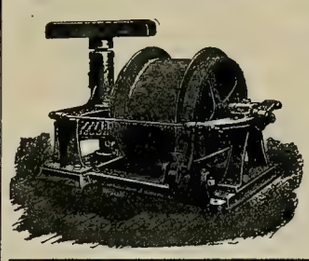

Specialty of PROSPECTING, MINING and MILLING PLANTS.

ORE and WATER BUCKETS.

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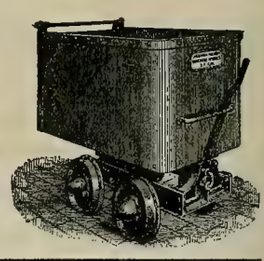

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—AND—

CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

STAMP SHOES.

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These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

Manufactured by CHROME STEEL WORKS, Brooklyn, N. Y.

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Special attention given to the purchase of Mine and Mill Supplies.

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FINLAYSON PATENT WIRE ROPE TRAMWAY.

It is of the double rope pattern and the newest and best thing in its line ever placed on the market. The automatic features, simplicity of construction, ease of running and economy in operation places the

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far ahead of all other systems of aerial ropeways. It is unsurpassed in tonnage capacity. It is on the principle of "You push the button and the machine does the rest." If interested send for special catalogue.

Our Line of Manufactures includes all kinds of Modern Equipments for the Successful Milling and Smelting of Metalliferous Ores. Special Catalogues on Application.

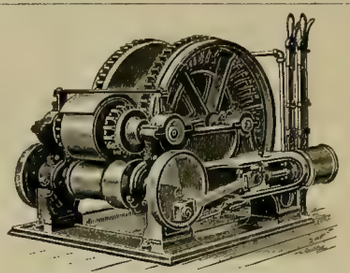
Built to Meet the Demand.

A HIGH GRADE

Winze Hoist

FOR STEAM OR COMPRESSED AIR.

Noiseless!
Compact!
Powerful!
Economical!



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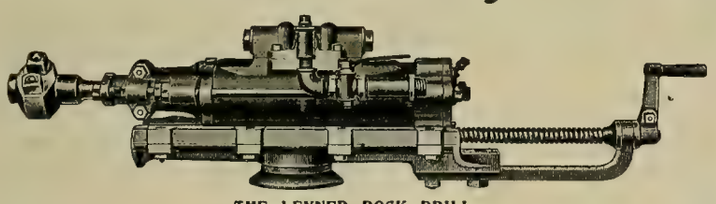

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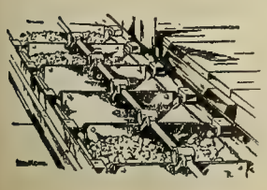

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MALLEABLE IRON BUCKETS, Approved Pattern and Weight; ROPE POWER TRANSMISSIONS, SHAFTING, PULLEYS, GEARING, CLUTCHES, ETC.; ELECTRIC COAL MINING MACHINERY.

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TUTTHILL WATER WHEEL.

The Best Jet Wheel in the Market, BARRING NONE.

Wheels, Buckets and Nozzles Designed to Suit Special Requirements, When Head and Conditions Are Given.
Theoretically as Well as Practically Perfect. Highest Efficiency Guaranteed.

We have a Sensitive, Simple Governor that will positively regulate speed of wheel. Specially adapted for electric railway and lighting plants.

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Oakland Iron Works, Builders,
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Mining Pipe!

STEEL OR IRON.—We make pipe of either, but recommend STEEL, it being superior to iron in many particulars and inferior in none.

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SCHAW, INGRAM, BATCHER & CO., Hardware Merchants,
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FOWLER'S
Fossil and Asbestos Sectional Covering.
As a Non-Conductor, Unequaled.
Special Rates for Steam Boilers and Drums.
G. C. Fowler, 656-58 Howard St., S. F.

HEADQUARTERS.
Genuine English Pump Leather

For Heavy Mining Pump Buckets. Will outwear any other material and give best satisfaction. Samples furnished on application. A. C. NICHOLS & CO., Leather Manufacturers and Dealers, 404 Battery St., S. F.

Market Reports.

The Markets.

SAN FRANCISCO, Oct. 28, 1897.

There is a good demand for goods suitable for midwinter holiday purposes but for other lines business is rather quiet but not more so than rules at this season of the year. From all we can learn the retail trade in agricultural districts is more interested in collecting old accounts than in pushing goods. So far as we can learn the higher prices ruling for about everything raised make it possible for farmers to meet all store accounts. If this is done then the retail merchant will be able to commence 1898 on a better financial footing than ever before. With the wholesale trade the opinion prevails that after the turn of the year business will open out better than for several years and continue large throughout 1898. Manufacturers are also looking forward to more demand next year than has ruled even this year.

The banks continue to report heavy deposits, which shows general activity in all lines of trade. Remittances to the East continue free, which keeps exchanges on New York quite stiff. It is not at all unlikely that the premium on exchange will make further advances, for the shipments of California products will be soon falling off. The wholesale trade report collections easy, with more accounts squared than before known. Outside capital is still coming here for investment in gold mines, late as the season is, which encourages the belief that 1898 will be a banner year in this direction. New York advices state that loans are being made against sterling exchange. This indicates that shipments of gold to this country for the time being will not assume much proportion. It also indicates lower rates of interest in this country than abroad.

New York Silver Prices.

NEW YORK, Oct. 28.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	27⅛	58¼
Saturday	27	58⅛
Monday	27	58
Tuesday	27⅛	58⅛
Wednesday	27¼	58⅜
Thursday	27½	68⅜

	Copper.	Lead.	Iron.	Tin.
Fri.	11 00 @11 15	3 95	10 00@12 25	13 85
Sat.	10 90 @11 10	3 95	10 00@12 25	13 85
Mon.	10 90 @11 00	3 92½	10 00@12 25	13 80
Tue.	10 85 @11 00	3 92½	10 00@12 25	13 80
Wed.	10 85 @11 00	3 92½	10 00@12 25	13 80
Thur.	10 85 @11 00	3 92½	10 00@12 25	13 80

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	15c Prem
New York Telegraphic Transfer	17½c Prem
London Bankers' 60 days	$4.83½
London Merchants	$4.82
London Sight Bankers	$4.86
Refined Silver, per oz. 1000 fine	58¼
Mexican Dollars nominal	46¼

SILVER.—The market has held remarkably steady at full figures in the face of reports that the outlook for international action to ennoble the white metal is very unfavorable. It looks very much as if there is a scarcity and that to meet current wants buyers have to pay full. Evidently the quotations of the New York market as seen here are made too low, for our New York exchanges quote slightly higher than the price telegraphed.

MEXICAN DOLLARS.—The market is steady, with a good demand about the sailing of each steamer for China. The shipments have been quite heavy so far this fall.

COPPER.—Our market is weak, but not quotable lower, although it is stated that a shading can be had by prompt buyers. The markets at the East and abroad have set off owing to a lessened call from abroad and an indifferent demand in this country. The output of America is quite heavy.

Our market is quoted as follows:

Ingot casting, jobbing	13 @—
Ingot " wholesale	12½@—
Sheet copper	— @16½
Bolt ¼ and 5-16, 20c; ⅜ and larger, 16½	

QUICKSILVER.—The market is quiet but steady.

Our market is quoted at $38 for domestic consumption and $34@34.50 for export to the west coast of Mexico.

LEAD.—The market is barely steady. The continued strength of silver is evidently against the market, for it makes consumers less anxious to anticipate wants for fear of an increased production of silver, which also means more lead.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	4 75	@	5 00
Sheet	6 25	@	6 50
Pipe	5 50	@	6 00

TIN.—The market is dull, but not quoted lower. There is more inquiry for future delivery, but no sales, so far as we know, have been made. A New York exchange says: "The mills seem well booked for some months to come and are quite indifferent for orders, which is probably fortunate for the market, as at the present moment there is very small demand from can makers and packers. Prices remain unchanged. The feature of the situation is the small demand for charcoal ternes. The present month presents quite a contrast with October a year ago. At that time the buyers were booking tin plates heavily for next year's delivery. At the present moment there is hardly anything in the way of future contracts."

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing		@	15
Plate, I C coke, heavy, per box	$4 10	@	4 25
" " " light, "	4 00	@	—

SHOT.—The market is weak.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 40		
Drop, B and larger sizes, " "	1 65		
Buck, Balls and Chilled, do, " "	1 65		

POWDER.—There is a fairly active demand, but chiefly for mining purposes.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9 to 11c, according to strength and quantity.

COAL.—The demand continues fairly free, notwithstanding warm weather. Receipts the past week aggregate about 29,000 tons of foreign and domestic.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$8 00	@	—
Greta	6 00	@	6 50
Nanaimo	6 50	@	—
Gilman	5 50	@	—
Seattle	5 50	@	—
Coos Bay	—	@	4 75
Cannel	9 50	@	—
Egg, hard	12 00	@	—
Wallsend	6 75	@	—

TO ARRIVE—CARGO LOTS.

Australian	5 75		
Liverpool Steam	6 75		
Scotch Splint	7 50		
Cardiff	7 50		
Lehigh Lump	12 00		
Cumberland, bulk	10 50		
Egg, hard	9 50		
West Hartley	6 75		

COKE.—Considerable foreign has come to hand the past week.

The market is quoted as follows:

Gas Companies'	—		—
English, to load	—	@	—
" spot, in bulk	10 00	@	—
" in sacks	11 00	@	12 00
Cumberland	—	@	—

IRON.—The local consumption is quite heavy for the season. The outlook is favorable for a larger consumption this year than in any former year.

AMERICAN.

	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

NAILS.—The market is steady at full prices.

BORAX.—The market is steady.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4½

PLATINUM.—The market is steady.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is firm.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

NAILS.—The market is steady.

Wire, carloads, basis per keg			
" jobbing, " "	$2 45		
Cut, carloads, " "			
" jobbing, " "	2 35		

ANTIMONY.—The market is steady.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 8c for Cookson's, 7½c for Hallett's and 7c for Japanese.

Chemicals.

There can be no doubt that so far the market has been disappointing both here and at the East, for values have not responded to the increase in duties. This confirms previous statements that the trade had stocked up in anticipation of the increased duties, and until they get out values will not improve much, if any.

SULPHURIC ACID.—The demand is fair.

We quote in a jobbing way at 1½c per lb for 66%.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported easy from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is steady.

We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is steady.

Our market is quoted in a jobbing way at $1.40 a pound.

BONEASH.—The demand is good for export.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is firm.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is firm at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is steady at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—The market is quiet at 2½c a pound from stores.

NITRATE OF SODA—The market is unsettled, with large buyers getting concessions owing to strong selling competition in primary markets.

Our market is quoted from store at 4c for 95%.

Mining Share Market.

SAN FRANCISCO, Oct. 28, 1897.

The market ruled weak and heavy, but with no material shading off up to Monday, when there was a steadier tone, with slightly firmer prices for the middle and Gold Hill shares. The heavy and unpromising appearance of the market up to Monday afternoon caused many cash holders to sell and bring in large lines of margin shares. Where they went is not known, even to brokers, but it is safe to affirm they drifted into strong hands, who are informed on the work of a favorable character in the mines that will be made public at at an opportune time for a bulge in the market, so as to unload at a profit. On Tuesday the shares of Chollar and Potosi, which had been steadily absorbed for several days, as stated in this department, began to show more activity, resulting in quite an advance. Wednesday morning Potosi sold up to 83 cents and Chollar at 75 cents, but they soon went off under freer offerings, closing the day at from 20 to 25 per cent less. Hale & Norcross was more active, selling up to $1.45. In the Gold Hill shares there was more trading at a slight advance. The up in Chollar and Potosi is due to reports that in the Potosi workings there was an improvement with a decided increase in the output of ore. All of this, we stated some time ago, would result as it has, so it is nothing new. The bulls put out a report that they are liable to make a big development, so as to get the public to buy and take their holdings at higher prices. Outside of this the work in Chollar toward Potosi on the 500-foot level of the Brunswick lode is assuming importance. The character of the ground seems to improve, but the drift can be changed to run out of it. It is stated that when the south drift is run a fair distance into Potosi ground a joint crossdrift will be run to tap the ore found farther north. Kentuck levied an assessment this week. This ought to indicate that the company has decided to prospect their own ground to the west, and not wait for development work by Yellow Jacket and Crown Point. It looks to be a safe buy.

The interest of the trading public suddenly shifted from the Gold Hill mines to the middle mines owing to reports of an improvement in Potosi. Like a band of sheep being led to slaughter the trading public rushed to get in, whether they will get out at a profit remains to be seen, but unless strong moneyed men come to their rescue and bid the market up, it is a safe proposition the majority will not get out even. While there is active and important work being done in several mines, still, we think, there will not be anything developed for some time that is calculated to draw in big moneyed men, and without them a big upmove is an impossibility. From Utah our advices do not report any change. In Sierra Nevada they advanced the new tunnel 50 feet last week. On the Layton tunnel level they are extracting some ore on the 900-foot level. West crossdrift No. 4 was, at last advices, in vein matter, with water coming in. No change is reported in the Union workings. They are still drifting east in the 1000-foot level in Mexican. In Ophir they are still crossdrifting to the west on the 1000-foot level. On the old Central tunnel they are drifting south. Crossdrifting to the west has been stopped. In Con. Virginia they are doing active exploiting and other work on the 1550-foot, 1650-foot and 1750-foot levels. The work in this mine seems to be pushed with energy. No change is reported in the joint work of Best & Belcher and Gould & Curry. In the latter mine they are extracting low grade ore. In Savage the work is the same as reported last week.

In Hale & Norcross no work is being done. In Chollar they will be soon ready for exploiting. They are extracting fair-grade ore in Potosi and at the same time doing important exploiting work. From Con. Imperial, Alpha and Confidence the official letters are practically the same as last week's. In both Crown Point and Belcher active exploiting work is being done on the 800-foot level in the former and on the 750-foot and 850-foot levels in the latter. The work is for the purpose of developing the recent finds. In Yellow Jacket they are working on the 1000-foot, where it is said some ore has been found. From Seg. Belcher, Overman, Justice and Alta nothing new has come to hand.

The news from the Brunswick lode continues to confirm previous published advices of active work in Chollar and Occidental. In the latter mine they are exploiting the 500-foot and the 750-foot levels. The management seem to feel quite encouraged from reports received. In Chollar they are extracting ore from the 300-foot level. They are milling ore. On the 500-foot level they are drifting south, with the material changing for the better as it approaches the Potosi line. On the 600 foot level they are running several crossdrifts and also drifting south. In Savage they are opening up the 600-foot level. The Con. Virginia, Best & Belcher and Gould & Curry joint work is confined to the 300-foot and 600-foot levels.

The market opened inactive but fairly steady this morning after call. Chollar, Potosi and Savage sold down, but just before the noon closing Potosi, under a fair demand, began to move up, which brought in the short sellers as buyers, who rushed it up to 75 cents. This advance caused Chollar and Savage to do a little better. This afternoon the market was weak and slightly lower. After call it was still weak. Air connection has been made between the 750-foot level of Crown Point and the 850-foot level of Belcher. This will admit of active exploiting work being started within a day or two.

The following illustrates the changes of the week:

Mines.	Oct. 21.	Oct. 28.
Alpha	$ 11	
Alta Consolidated	15	$ 10
Andes	30	27
Belcher	68	50
Best & Belcher	52	48
Bodie		
Bullion	09	17
Challenge	39	37
Chollar	62	65
Confidence	1 15	
Consolidated California and Virginia	1 35	1 25
Consolidated New York		
Crown Point	65	36
Exchequer		
Gould & Curry	63	38
Hale & Norcross	1 20	
Justice	32	28
Mexican	45	45
Ophir	91	88
Overman	17	12
Potosi	54	73
Savage	44	48
Sierra Nevada	82	77
Union	44	
Utah	17	
Yellow Jacket	55	50

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied, Delinq't and Sale.	Secretary.
Belcher S M Co, Nev	56	20c	Sept 18..Oct 21..Nov 11	C L Perkins, Mills Building
Caledonia S M Co, Nev	47	10c	Oct 6..Nov 10..Dec 2	A S Groth, 414 California
Confidence S M Co, Nev	29	30c	Sept 10..Oct 15..Nov 5	A S Groth, 414 California
Con Imp M Co, Nev	39	1c	Sept 27..Nov 2..Nov 23	C L McCoy, Mills Building
Eureka Con D M Co, Cal	10	3c	Sept 14..Oct 16..Nov 6	D M Kent, 330 Pine
Gold Ridge Con M & M Co, Cal	5	4c	Aug 3..Sept 18..Nov 4	H Sylvester, 43 Sixth
Potosi M Co, Nev	48	25c	Sept 8..Oct 12..Nov 4	C E Elliott, 309 Montgomery
Red Cap M Co, Cal	1	$0	Aug 25..Oct 1..Nov 6	H H Martin, 125 Beale
Silver Hill M Co, Nev	35	5c	Sept 7..Oct 12..Nov 5	D C Bates, 309 Montgomery
Thorpe M Co, Cal	8	2½c	Sept 28..Nov 6..Nov 29	A F Frey, Phelan Building

San Francisco Stock Board Sales.

SAN FRANCISCO, Oct. 28, 1897.

9:30 A. M. SESSION.

300 Alta	10	700 Gould & Curry	36
300 Andes	26	950 Justice	28
100 Belcher	49	400 Kentuck	05
400 Best & Belcher	46	20 Occidental	1 10
400 Bullion	11	100 Ophir	86
500 Caledonia	21	100 Overman	12
600 Challenge	37	200 Potosi	66
300 Chollar	61	400 Savage	44
400 Con Cal & Va	1 25	100 Scorpion	05
500 Con Imperial	02	300 Sierra Nevada	75
500 Crown Point	34	500 Yellow Jacket	48

SECOND SESSION—2:30 P. M.

200 Ophir	88	100 Yellow Jacket	50
100 Mexican	45	500 Con Imperial	02
100 Gould & Curry	38	200 Kentuck	04
100 Best & Belcher	48	300 Belcher	50
250 Con Cal & Va	1 25	500 Sierra Nevada	77
300 Savage	48	900 Bullion	17
300 Chollar	65	400 Alta	10
1000 Potosi	73	200 Andes	27
200 Crown Point	36		

Rainfall and Temperature.

The following data for the week ending 5 A. M., October 27, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

California Stations.	Total Rainfall for the Week	Total Seasonal Rainfall to Date	Total Seasonal Rainfall Last Year to Same Date	Average Seasonal Rainfall to Date	Minimum Temperature for the Week	Maximum Temperature for the Week
Eureka	2.32	3.83	3.51	3.59	40	70
Red Bluff	1.98	1.71	1.78	1.87	44	76
Sacramento	1.74	2.13	.42	1.06	40	72
San Francisco	1.69	1.80	2.14	1.34	50	80
Fresno	.48	1.20	1.56	.81	42	78
San Luis Obispo	.67	.85	1.68	...	40	76
Los Angeles	.52	2.52	1.31	.82	46	72
San Diego	34	1.05	1.01	.50	52	70
Yuma	T	.81	1.07	.90	46	88

Working Capital for Mines.

PACIFIC EXPLORATION COMPANY

Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. F. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

WILL NEGOTIATE with owners or their duly authorized agents only.

WILL INVESTIGATE only thoroughly bona-fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

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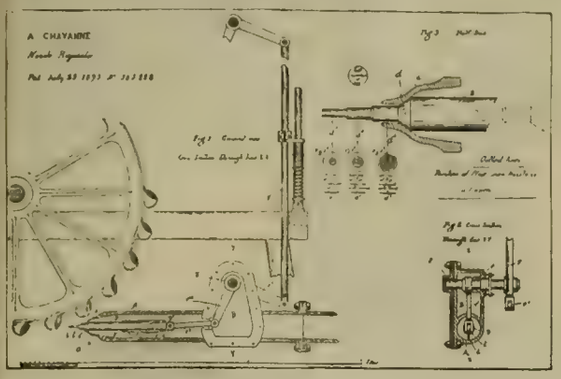
FOR TANGENTIAL IMPACT WATER-WHEELS.



"CHAVANNE" NOZZLE-REGULATOR.

The peculiar construction of these NOZZLE-REGULATORS effects a saving of thirty (30) or more per cent in the consumption of water without loss of power, and effectually precludes any shock or jar to the connecting pipe-line, as is attested by the following copy of a testimonial letter, selected from among many others of similar import:

MR. A. CHAVANNE, Grass Valley, Cal.

ORIGINAL EMPIRE MILL AND MINING COMPANY, Grass Valley, Nevada Co., Cal., February 29, 1896.

DEAR SIR:—We have used your nozzle and regulator for the past two months, and it gives us good satisfaction. We find that it has as much power as the old style Pelton nozzle, and we find the jar on our pipe in shutting off the water reduced from twenty-five to thirty pounds, and we save 30 per cent in amount of water used.

Yours respectfully,
[SIGNED] ROBERT WALKER, Superintendent.
EDWARD MOYLE, Engineer.

They can be applied to all forms of TANGENTIAL IMPACT WATER-WHEELS. Descriptive Circulars furnished and prices quoted upon application.

Assessment Notices.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 28th day of September, 1897, an assessment (No. 8) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, Room 44 Phelan Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of November, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 29th day of November, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—Room 44 Phelan Building, San Francisco, California.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from J. F. Cowdery, in the Sackets Gulch Mine near St. Louis, Sierra Co., to deposit tailings in old pits; from the Santa Clara Mining Co., in the Richardson Ranche Mine near Shasta, Shasta Co., to deposit tailings in Clear Creek; from W. T. Sherman and O. F. Caya, in the Canada Mine near Fort Wine, Sierra Co., to deposit tailings in French Ravine; from R. Cordez, in the Mosquito Mine near Comptonville, Yuba Co., to deposit tailings in a ravine; and from C. N. Foote, in the Montalgo Mine near Uno, El Dorado Co., to deposit tailings in Cedar Creek, gives notice that a meeting will be held at room 59, Flood building, San Francisco, Cal., on November 8, 1897, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from T. Larimore, in the Conrad & Wheeler mine, near Forbestown, Butte Co., to deposit tailings in a ravine, and from Edward C. Rigney, in the Round Butte mine, near San Andreas, Calaveras Co., to deposit tailings in Batista creek, gives notice that a meeting will be held at room 59, Flood building, San Francisco, Cal., on November 15, 1897, at 1:30 P. M.

Assaying Gold
.....AND.....
Silver Ores.

By C. H. AARON.

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A Standard Work.

This work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist nor the pratical miner can mistake his meaning.

The work, like Mr. Aaron's former publications ("Testing and Working Silver Ores," "Leaching Gold and Silver Ores,") that have been "successfully popular," is written in a condensed form, which renders his information more readily available than that of more wordy writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:—Perface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of cupellation; Weighing of Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests of Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 126 12-mo pages, with illustrations, well bound in cloth; 1896. Price **$1.00** postpaid. Sold by the **Mining and Scientific Press,** 330 Market St., San Francisco.

DELINQUENT SALE NOTICE.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.— Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 5) levied on the 3rd day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
John A. Heninger	16	250	10 00
Nils Johnson	120	100	4 00
Nils Johnson	121	100	4 00
Hattie E. Gray	124	100	4 00
Wm. Westhoff	144	250	10 00
A. O. Lindstrom	148	250	10 00
Wm. Westhoff	177	500	20 00
Richard Phelan	188	5	20
Wm. Westhoff	200	100	4 00
Wm. H. Lillie	202	10,500	420 00
Mark Strouse	208	5	20
P. E. Robertson	215	250	10 00
Sarah Spalding	218	100	4 00
Abe MacCreadie	220	500	20 00
Alfred H. Hogg	221	300	12 00
Abe MacCreadie	222	250	10 00
J. W. Brown	231	4,099	163 96
C. D. MacNeill	236	200	8 00
Paul Muller	239	50	2 00
Paul Muller	240	100	4 00
Paul Muller	242	1,000	40 00
Chr. W. Heyer	243	755	30 20
Chr. W. Heyer	246	606	24 24
Abe MacCreadie	247	200	8 00
Wm. Westhoff	250	200	8 00
Mary Ann Robertson	251	250	10 00
Mary Ann Robertson	252	250	10 00
R. H. Daley	268	1,000	40 00
C. M. Howe	272	1,000	40 00
C. M. Howe	274	500	20 00
R. H. Daley	275	1,500	60 00
Francis Brady	277	700	28 00
R. H. Daley	278	100	4 00
Dr. H. Sylvester	280	51,278	1,971 12
(2,000 shares of this cert. have been paid by H. Sylvester, being part of his stock.)			
L. V. Merle	286	10	40
J. T. M. Kelly	289	500	20 00
R. H. Daley	290	100	4 00
R. H. Daley	294	750	30 00
R. H. Daley	295	185	7 40
E. Swenson	296	1,750	70 00
Mark Strouse	297	5,000	200 00
Mark Weil	299	750	30 00
C. W. Heyer	300	400	16 00
Mark Strouse	301	100	4 00
Geo. Day	302	1,000	40 00
Dr. H. Sylvester, Trustee	305	1,105	44 20
Dr. H. Sylvester, Trustee	306	5,000	200 00
R. H. Daley	307	250	10 00
R. H. Daley	308	240	9 60
F. Heard	309	125	5 00
Mark Weil	310	125	5 00

And in accordance with law, and an order from the Board of Directors, made on the 3rd day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Rooms 12 and 13, No. 43 Sixth St., San Francisco, California, on SATURDAY, the 9th day of October, 1897, at the hour of 12 o'clock M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

The day of sale of the above delinquent stock has been postponed by order of the Board of Directors to THURSDAY, October 28th, 1897, at the same hour and place.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, the 4th day of November, 1897, at the same hour and place.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

DELINQUENT SALE NOTICE.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 25th day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
Harvey M. Binckley	2	1	9 00
Alice E. Binckley	20	4	36 00
Alice E. Binckley	23	20	180 00
Alice E. Binckley	24	20	180 00
Alice E. Binckley	25	20	180 00
Alice E. Binckley	26	20	180 00
E. de Kay Townsend	14	1	9 00
E. de Kay Townsend	29	2	18 00
Caroline S. Townsend	18	20	180 00

And in accordance with law, and an order from the Board of Directors, made on the 25th day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, 125 Beale Street, San Francisco, California, on SATURDAY, the 23rd day of October, 1897, at the hour of 3 o'clock P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

H. H. MARTIN, Secretary.

Office—125 Beale Street, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to SATURDAY, November 6th, 1897, at the hour of 1 o'clock P. M., at the office of the company, 125 Beale St., San Francisco, Cal.

H. H. MARTIN, Secretary.

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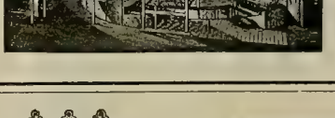

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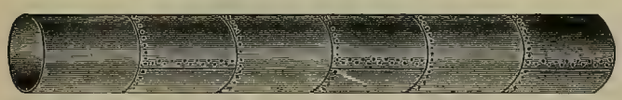

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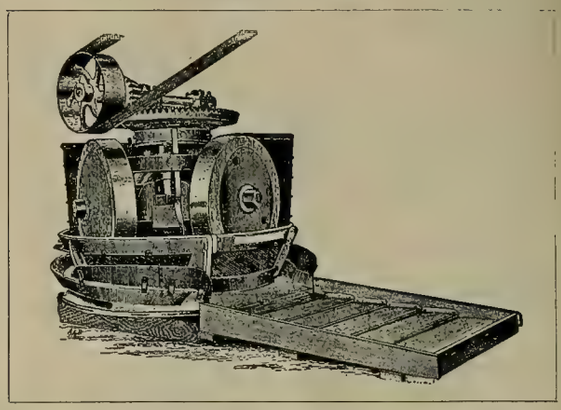

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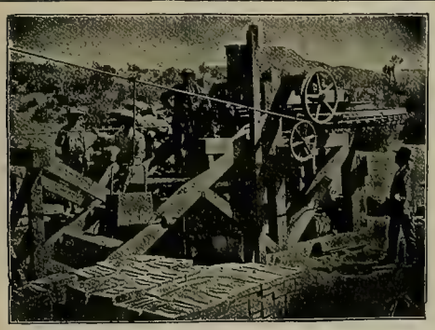

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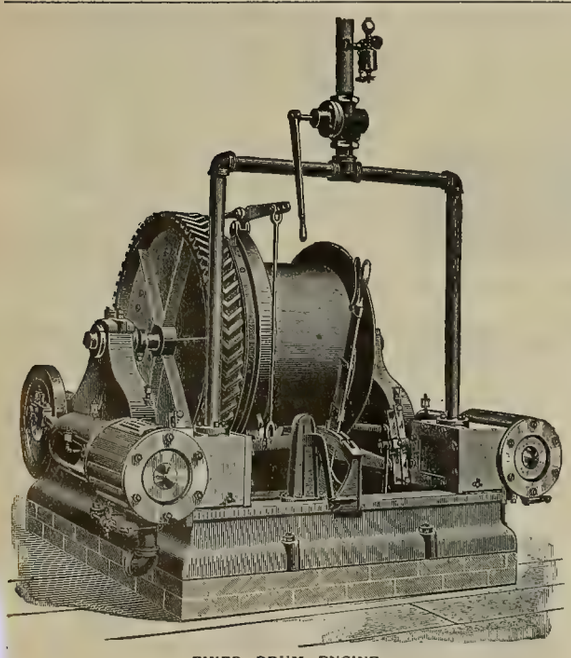

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MINING AND SCIENTIFIC PRESS.
AND PACIFIC ELECTRICAL REVIEW.

No. 1948.—VOLUME LXXV. Number 19. SAN FRANCISCO, SATURDAY, NOVEMBER 6, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Vein Structure in Nevada Co., Cal.

As elsewhere, in Nevada Co., Cal., the character of the fissure determines to a great extent the structure of the vein. The simplest form of a fissure is a joint plane, such as is seen in regions of intense sheeting about the Lecompton and Canada Hill mines or in the seam belt of the Red Hill, west of the Nevada City mine. On some of these joints there is a narrow line of quartz, accompanied by a slight bleaching of the rock on each side. Certain of these breaks along the joint planes may be more pronounced and extensive, or one larger break may be produced instead of a series of smaller ones. In such case there is usually a more noticeable movement along the fault plane, and the sliding of two irregular surfaces on each other produced more or less continuous open spaces, which were subsequently filled with quartz. This is the character of the Idaho-Maryland, the Mountaineer, and the Omaha veins, for instance; and on the 1400-foot level of the Maryland mine, well illustrated by Fig. 1 on this page, showing a 2½-foot vein of rich ore. The vein here consists simply of a filling of white quartz two to three feet wide between two parallel surfaces. The regularity is usually not maintained over a large extent of the vein. It is extremely common to find local pinches, and sometimes the vein is found to close down to a mere seam in whole levels, above and below which good ore is found. Again, in places the vein loses its regular character by reason of local fracturing and brecciating of the hanging wall. A typical occurrence of this kind is shown in Fig. 2, in a stope above the 1500-foot level of the same mine. To this first relatively simple type belong many veins in the district referred to.

FIG. 1.—VEIN ON THE 1400-FOOT LEVEL, MARYLAND MINE, NEVADA CO., CAL.

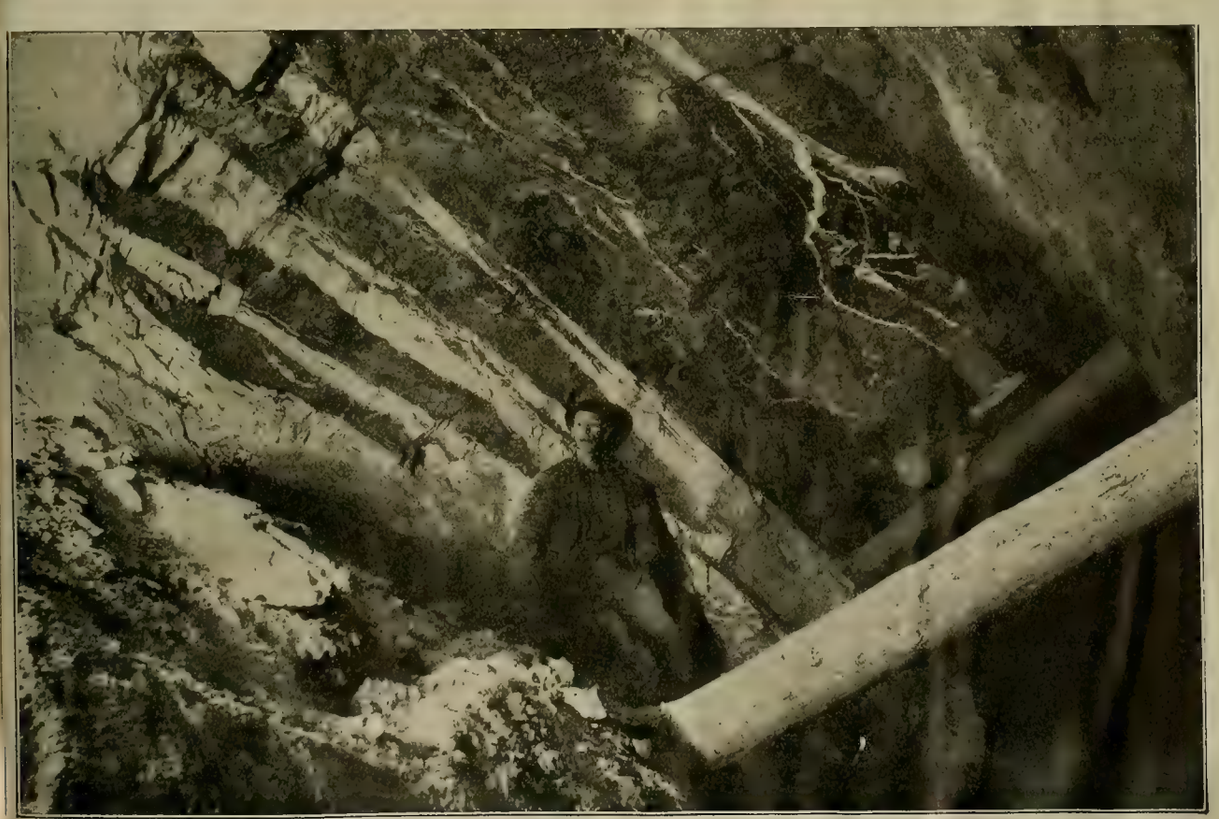

FIG. 2.—MARYLAND VEIN, STOPE ABOVE 1500-FOOT LEVEL.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

Office, No. 330 Market Street, San Francisco, Cal.

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J. F. HALLORAN.....General Manager

San Francisco, November 6, 1897.

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Two Recent Opinions.

The Commissioner of the General Land Office has just promulgated two opinions regarding assessment work on mining claims, and amount of work necessary to secure patent, that are of considerable importance to mining men in this country.

Referring to assessment work on claims that are contiguous and held in common, Commissioner Hermann holds:

"While the annual assessment work required for the maintenance of possession under Section 2324 United States Revised Statutes may be placed on one of a number of contiguous mining locations held in common and constituting one entire claim, yet the amount expended must equal $100 annually for each of the locations so held and worked in common."

The General Land Office has ruled that $500 in work or improvements was all that was necessary on a group of contiguous claims in common ownership to secure patent thereon, though the opinion has very generally been expressed that, before securing a patent, it must be shown to the satisfaction of the local office that work had been done amounting in the aggregate to $500 on each claim in the group.

On this point the Commissioner affirms a former ruling, where he says:

"The conclusion is apparent that an expenditure of $500 on one or more of several contiguous mining locations embraced in one application for patent is sufficient if made for the convenience of working or developing all of the claims included. This must conclusively appear, however."

This is a very liberal construction, and again authoritatively determines an important point, as the rulings of that official have all the force of law—at least, during the administration that appointed him.

It will be observed that cases exist where it is cheaper to get a U. S. patent than to do one year's assessment work on a group of mining claims, adjoining and owned in common. A man or company owning ten claims would have to spend $1000 annually under the above rulings, but can get a patent and forever dispense with the necessity of any further similar work upon payment of $500. Any one, however, proposing to take advantage of this should carefully note that it must be conclusively shown and made satisfactorily appear to the local official and the Commissioner that such expenditure of $500 upon one of such contiguous claims was for the purpose of developing and conveniently working all of the claims included in the application for patent.

It may be said in general that it is the constant policy and purpose of the Federal Government to make it as easy as possible for the miner to secure Government patent.

A Commendable Idea.

The fiftieth anniversary of the discovery of gold by Marshall at Coloma, El Dorado county, in this State, on January 24, 1848, is deemed by the San Francisco County Miners' Association worthy of celebration, with the general view of awakening a greater interest in the mining resources of this State, and consequently in the general prosperity of the commonwealth. The idea is worthy the active approval and support of everyone in the State.

The San Francisco County Miners' Association, under whose auspices the celebration is proposed, has contributed largely to the support of the California State Miners' Association, is composed of active participants in the mining industry, and is justly entitled to leading in the celebration of the fiftieth anniversary of the discovery of gold in this State on the 24th of January, 1898.

This is not intended to be merely a commemoration of the name and fame of the man who accidentally discovered the historic gold nugget in El Dorado county. Whatever credit is due any one man, or set of men, should justly be given those who developed the mining industry, who followed up this accidental discovery with intelligent study and brave effort, and who showed that California from one end to the other was a great mining region. The credit is due to the intelligent workers in all branches of hydraulic mining, and to the quartz miners, who made it possible, by improvement, to profitably treat ore that was once deemed worthless.

The world's output of gold for the year when it was discovered in California was but $30,000,000. In 1852 it had risen to $185,000,000. Through the years improvements innumerable have been instituted, largely of California origin. In hydraulic mining nearly all the appliances originated here. In quartz mining the revolving of the stamp head, the increasing weight of the stamp, the introduction of mechanical rock breakers, the invention of mechanical feeders, dynamite, mechanical rock drills, steam pumping, the wire rope, the chlorination process, the concentrator and, in later years, electricity and the cyanide process have revolutionized gold mining, have rendered workable large quantities of ores hitherto worthless, and have changed gold mining from a hazard to a legitimate industry.

What California has done for the mining industry of the world is a matter of record and needs no detail. All over the globe the mining industry is in a present state of activity, and now is a good time to direct attention to the fact that where the first flood of gold started fifty years ago there is still sufficient to keep California in the lead.

THE MINING AND SCIENTIFIC PRESS bespeaks the active support and cordial co-operation of the business men of this city and the entire State in the scheme of making the semi-centennial celebration on the 24th of next January a notable event. It is in order to have the Governor declare that day a legal holiday, to have a parade, the support and co-operation of the Society of California Pioneers, of the several California mining associations, of all the labor organizations, of the Native Sons, and that the event be celebrated in such a manner as to make it manifest that the same spirit that actuated men in the old days, when none but the daring came and none but the strong survived, still lives, and will hold this State in the front rank.

THE Mercur, Utah, mine is a good illustration of what has been achieved in the way of scientific progress in mining. Up to four years ago no way was found to satisfactorily treat the low grade ore. An article in these columns led to investigation, which resulted in the successful operation of a plant that has enabled the directors of the mine to last month pay a $25,000 dividend, No. 32, a total paid to stockholders of $825,000 from a property that three years ago was nothing but a hole in the ground because of lack of proper method to profitably extract the gold.

THE spirit of prophecy has again descended upon the Director of the United States Mint, and he outlines the probable gold yield of California for 1897. He seems to confound the amount of gold deposited at the San Francisco Mint with the gold yield of the State, and appears disposed to discount any authentic statement, his idea of the State's gold output being apparently made up in advance of the facts.

Proposed Change in Federal Mining Law.

At the October meeting of the California State Miners' Association Col. W. S. Keyes spoke as follows:

Mr. President and Gentlemen of the Convention, Fellow Miners of California: As a member of the Committee on Revision of the Federal Mining Statutes ordered by our last State Convention, and by appointment of President Neff, further, as a delegate to the International Gold Mining Congress, held at the city of Denver, July 7th of the present year, and further as a delegate to the Trans-Mississippi Congress, held at Salt Lake, July 14th of the present year, and by appointment of Ex-Governor Prince of New Mexico, President of the International Congress, as a member of the National Committee on Revision of the Federal Mining Statutes, which committee, pursuant to the call of the chairman, Mr. Moore of Cripple Creek, Colorado, met in Denver on the 22nd and 23rd of September last, I have the honor to report progress and submit for your approval, alteration, amendment or rejection, such changes in our mining laws as may to you individually and collectively seem best.

That our present Mining Code is in a sad condition of chaotic confusion will, I think, hardly be denied by any legitimate miner. It is equally true that more than thirty years after its first adoption, the courts have not yet been able definitively to construe it. Take, for example, the tunnel clause, with which you all are, doubtless, familiar. This has recently received a new judicial interpretation, viz: that the locator thereof has the absolute right to all veins, undiscovered at the time of its inception, to the extent of 1,500 feet on either side of the line of the tunnel. By earlier decisions the act was absolutely emasculated, by conceding to the tunnel owner a strip of about 6 feet on the line of the tunnel, defining the width thereof. That the law is a prolific source of acrimonious and costly litigation is a matter of common notoriety. On the authority of a former Surveyor General of Nevada, Mr. S H. Marlette, "there was expended in litigation, on the Comstock lode, during the years 1860-65 inclusive, not less than $9,000,000—one-fifth of the total product of the mines and considerably more than was declared in dividends during the same time." Senator Stewart estimates the cost of litigation carried on by the Chollar and Potosi Mining Companies, prior to 1866, at $1,300,000, and the expenses of the Ophir-Mosco w was at somewhat less than $800,000. The total costs of litigation in the Washoe district up to January 1st, 1866, he computes at $10,000,000. As a part of the litigation there sprang up a horde of greedy, conscienceless "standing witnesses" ready, for pay, to swear to anything.

In this connection I may recall a conversation in my presence between a celebrated mining magnate, since deceased, and a man supposed to be familiar with all the facts in a contemplated mining litigation. Said mining magnate wished to learn something about the original location, amount of work, etc., done upon a claim which he had bought or was about to buy, and to which there were several contending claimants. After diligent cross-examination, the man was proven to be utterly stupid or absolutely ignorant as to the facts. Our mining magnate lost patience and began to reproach the man in rather rough language. After awhile the man himself lost patience and blurted out: "Just tell me what you want to prove, and I'll know it fast enough."

As an example of the evils of litigation due to the looseness of our earlier mining law, I may here interject a statement of Mr. Eliot Lord, as it appears on page 134 of the Fourth Monograph of the U. S. Geological Survey. Speaking of the litigation on the Comstock, he says: "The cloud of uncertainty which rested on these titles grew blacker and heavier from month to month. Witnesses were manufactured by wholesale, and testimony to suit the requirements of the case was bought and sold with scarcely a pretense of secrecy."

On page 136, quoting from an address of Attorney-General R. M. Clarke, he says: "Chicanery won more suits than eloquence and learning. At that day (1863) the practice of the law had, to some extent, degenerated into the practice of villainy."

Such a depth of infamy had been reached that even the ermine on the bench was soiled.

I quote again from Mr. Lord, page 151: "The legitimate costs of this multitude of suits were enormous and the expenses of 'fighting fire with fire' were insupportable. The legal war culminated with the remarkable case of the Chollar vs. the Potosi M. Co. This suit was the immediate cause of the resignation of the whole territorial bench and resulted in a contention without parallel in the history of the litigation of mining claims in its duration, fierceness and cost."

I quote further from the speech of the Hon. Frank Tilford, delivered August 1, 1864: "A most potential cause of the present depression of mining is the deep and universal distrust of our judiciary. It is a fact, flagrant and notorious, that thousands and hundreds of thousands of dollars have been expended in obtaining corrupt decisions from infamous judges"

I quote further from Mr. Lord, on page 177. Speaking of the outcome of the Ophir-Burning Moscow litigation, he says: "To obtain possession of this section of the Comstock, 200 feet in length, nearly $1,000,000 had been spent, but it was finally purchased by the Ophir Company at a cost of about $70,000, while its market value, at the time, was only $50,000. No further commentary is needed to disclose the folly of the laws which allowed a locator to follow the dips, spurs and angles of his ledge anywhere."

On page 77 he says: "The total number of suits instituted and defended by twelve of the principal companies of the Comstock, prior to 1867, was 245." Their cost, as heretofore stated, was over $10,000,000. This vast sum was absolutely filched from the pockets of the owners of the mines, and would have sufficed for very respectable dividends in the interval. All of this waste is justly chargeable to the mischievous "law of the apex."

On page 308 Mr. Lord says: "The most preposterous titles would be trumped up, as fighting 'claims' so-called, and the discoverer of a bonanza might count himself fortunate if he recovered his original investment from the hungry mouths of contestants and lawyers."

"Jumping," perjury and crimes of violence were, in the early days, of constant occurrence. What else could have been expected when locations were often made by many ignorant and illiterate men, and even by men who designedly sought to take advantage of "finds" made by more industrious prospectors who had preceded them? Even if the claim was originally properly located, then came the question of record. The District Recorder was not always honest, and even if well intentioned he was often careless. And further, as I learn from what I have reason to believe to be competent testimony, the local land office in a certain very rich mining district was, some years ago, deliberately set on fire in order to destroy the records.

It is hardly to be expected that Senator Stewart, the stalwart and ever active advocate of our present mining statutes upon the floor of the Senate of the United States, should, years ago, have been the champion of the surface location to be applied to lode claims. But such, nevertheless, is the fact. I quote from the work of Mr. Lord, page 145: "Wm. M. Stewart proposed to end the Chollar-Potosi-Grass Valley litigation by *defining the respective claims by surface boundaries.*"

He was convinced that the principal wealth of the Comstock would be found to the east, and, although he did not disguise his opinions, he found few to agree with him. He formed a dashingly brilliant and sagacious plan to gain possession of most of the claims to the east of the line of workings at that time and then to fix the boundary line between the eastern and the western groups of claims.

To use the words of Mr. Lord: "When the boundary lines were determined, it was to be stipulated that planes should be drawn perpendicular to these lines, extending indefinitely downward, and that the mining operations of all companies should be confined within the limits of the planes bounding their respective claims. All pending suits should be adjusted as soon as possible, and, *the main cause of litigation having been removed*, he foresaw that the mining industry of the district would expand with natural vigor. Now, this was substantially a relinquishment of the *cherished but litigious principle* which allowed a locator to follow the dips of his ledge indefinitely and a substitution of the often decried Spanish or Mexican system of allotment; yet it was clearly the most expedient course to pursue." The scheme, sound as it was, fell through, owing to the obstinate stupidity of a majority of the Chollar trustees.

That Senator Stewart was not the only advocate of surface locations even on the Comstock is proven by the testimony of Judge B. C. Whitman, given on October 11, 1879, before the Government Land Commission, to which I shall later refer at length. Judge Whitman was then the attorney of the Great Bonanza firm. They submitted to him the question of the "apex" or surface location, and he replied as follows: (Page 421 of the Report.) "I think the square location, *i. e.*, common law, would have no injurious effect upon deep mining. On the contrary, it would improve it, have a good effect, always provided that the United States survey and fix the monuments. A man could go in there then feeling that he owned that piece of ground, and I think every prospector would be willing to avail himself of that and go to work on that supposition. The history, so far as I know, of every mine and mining company is continued litigation and expense by adverse locations. *With a square location there could be no litigation.* Mining men would be more

willing to invest in a square location than they would in what we call ledge locations."

The first Act of 1866 was so full of flaws that six year later—namely, 1872—it was amended by requiring a mineral ledge to be in the center of a parallelogram not more than 600 feet and not less than 50 feet in width, with a maximum length of 1500 feet. Within this space of ground no new claim could be located. This was a step in the right direction and shut off a vast number of pestilent jumpers. While it did away with certain evils it gave birth to others, in that it rigidly required the lode to pass through both end lines, in order that the locator might get or enjoy the full number of feet as claimed by him.

That the present law is not the flower of perfection I have the testimony of Dr Raymond, secretary of the American Institute of Mining Engineers and an authority on the "law of the apex." I quote from *The Mineral Industry*, Vol. III, published by the Scientific Publishing Company, New York and London, 1895, page 711, et seq.:

"Enough has been written, perhaps, concerning the curious, haphazard origin of our unique mining law and the innumerable disputes which its eccentric, vague, inconsistent and ill-considered provisions entail upon mine owners—though, perhaps, all these things will need to be reiterated again and again before they will be realized by all the parties whose co-operation is necessary to a radical reform.

"Enough has been written concerning the object lesson presented at this time by the mining districts of the world, *including the greater part of the mining industry of this country*, in which mining litigation is unknown, while in certain of our States and Territories such litigation burdens the courts, oppresses the owners and operators of mines and enriches only lawyers and experts. This lesson also may need to be enforced hereafter by repeated exposition; but only because of the slowness of the pupils who should have learned it long ago." * * *

"My first report as U. S. Mining Commissioner of Mining Statistics, written in 1868, contains an argument in favor of the then existing law.

"In the same volume will be found a paper by Mr. W. S. Keyes, then residing in Helena, Montana, condemning the U. S. law and frankly urging the adoption of the principle of vertical boundaries or mining titles."

On page 712, Dr. Raymond writes: "The prospector is best rewarded by a grant of something definite which he can safely hold or easily sell, rather than of something so vague as to be forever uncertain."

On page 713, he says: "The actual expense of litigations under this law has mounted into the millions. Is anybody silly enough to suppose that mines subject to such an extra risk can be sold as easily or at as high a price as if the purchaser was sure of getting what he thought he was getting, and sure of being protected in the rights thus definitely acquired?" * * *

Again he says: "*The full development of the mineral resources of the West will never come to pass* until the capital it requires is better protected by definiteness in title and boundaries of mining property. And that can not be done, in my judgment, by any amendment of the present law which shall leave in it the present abnormal, irregular, indefinable, precarious and mischievous extra-lateral right.

"How many years longer will our Western fellow-citizens interested in mining continue to look upon the enormous investments of capital and the amazing resultant development of wealth through mining enterprises, which characterize every mining State in the country where mining rights are bounded by surface lines and vertical planes only and 'the law of the apex' is not known?

"Let them take note of the immunity from vexatious and ruinous conflicts over boundaries of mining rights enjoyed by placer mines and coal mines under their own eyes and draw the obvious inference that a similar immunity conferred upon lode mines would be a boon to all concerned."

Without pretending to be "either a prophet or the son of a prophet," I may be permitted to recall a few of the lines written by me twenty-nine years ago, to which Dr. Raymond refers, as follows:

"In my humble opinion, the 'local rules and customs' are too uncertain for security and are entirely inadequate to prevent that litigation which is and has been the curse of our mining system. I totally dissent from that portion of the local law which gives the mine owner the right to follow all the dips, spurs, angles and variations of his lode, even though it may enter the land adjoining. I object to the law as it now is, for the reason that it is the frightful source of litigation and violence.

"No law should be tolerated which does not give a reasonable freedom from assault. The system at present in vogue has fostered and will foster the most vexatious litigation. * * * *

"It is this uncertainty of title, fear of litigation and blackmail, which do more to retard legitimate mining than all other causes combined. Hence I can see no usefulness in any law which does not render unassailable, or, at least, reasonably so, a title once obtained from the highest authority. To this end I can conceive of no enactment unless one which gives a surface beneath which, even to the center of the earth, every precious or useful metal or mineral shall be the property of the patentee."

I am in receipt of a letter of recent date from Dr. Raymond, in which he assures me of his hearty concurrence in the views expressed by me nearly thirty years ago. That is to say, he is radically converted.

In view of Dr. Raymond's reference to the immunity from litigation in States where the "law of the apex" does not obtain, I may refer to the testimony of Mr. W. H. Stevens of Michigan and Colorado. I quote from page 307 of the Report of the Public Lands Commission of 1880. Mr. Stevens said, in relation to the status of the mining laws in the States lying to the west and northwest of the Great Lakes:

"In Michigan *only one case has been carried to the Supreme Court* in the last twenty-five years where the question of title to mining lands was raised. This was a contest between the Minnesota and National Mining Companies. The National Company held their title from a grant made by the State of Michigan under the provisions of the School Act. The Minnesota Company derived their title under the old land law permitting location and pre-emption by authority of the War Department."

Hence, the question at issue turned merely upon the decision of a conflict precipitated by two grants made respectively by the U. S. Government and by the State of Michigan. Such or a similar question might have, and in fact has, arisen as between claimants to agricultural lands. Our present mining statutes are a veritable Pandora's box of evils, a prolific source "of woes unutterable" to the legitimate mine worker. The crying defect is the "law of the apex"—the "extra lateral right." At the present time there are only three countries in the world which still maintain this absurd provision, which has been the cause of greater and more acrimonious litigation than all others combined. These countries are the United States of America, Bolivia and Mashonaland in Africa—civilized, semi-civilized and barbarous.

There is no need to particularize as to the effect of this "right" as far as litigation in the first-named country is concerned, and as to the last I am not sufficiently informed. As to the second, however, I quote the testimony of Arthur F. Wendt, M. E., published in the "Trans. of the Am. Inst. of Min. Eng.," Sept., 1890, page 4. Speaking of certain mines near Potosi, he says: "It is on record that in 1660 one Brigadier Montes, owner of the Guaillahuasi mine, lost a suit brought by Esteves, owner of the Flamencos mine. Montes had crosscut from the Guaillahuasi to the Flamencos vein, below the workings of Esteves, and claimed to be working another vein. The report says that six hundred men were at that time at work extracting 150-ounce ore for Montes. When the suit was decided against Montes he is said to have destroyed the mine. Be that as it may, neither the Flamencos nor the Guaillahuasi mine have been worked for over a century, although both are claimed to be among the richest on the mountain. It appears from this lawsuit that considerable depth had been attained by the mines of that period, and that the ridiculous law of following a vein, which then held good in all Spanish-America—and still obtains in the United States—was even then resulting in interminable legal controversies."

Our own MINING AND SCIENTIFIC PRESS of this city, in a leading editorial under date of August 21st, 1897, comes out distinctly for surface boundaries for lode claims. In another editorial, under date of October 2nd, 1897, the same expression of opinion is repeated.

I had feared that, in view of possible loss of future valuable clients, the members of the legal profession would oppose the views heretofore set forth, but, to their credit be it said, I have found a substantial unanimity of opinion as to the necessity of reforming our mining code, and I have not yet heard a dissenting opinion from a single member of the profession as to the advisability of doing away with the extra-lateral right. Indeed, I may quote from a letter of one of the most distinguished members of the Colorado bar, sent to the Chairman of the National Revision Committee at Denver.

In reply to the question as to how far he would go in revising the present Federal mining law, he writes:

"September 14th, 1897.

"It is impossible for me and, I think, for anyone else, in the short space of an ordinary written communication, to outline what seems to me to be the extent to which that revision should go. Indeed, my own judgment is that the present system of Federal mining law is not worth revising. It ought to be repealed *in toto* and a mining code enacted upon entirely different principles and ideas from those which lie at the foundation of the present system. There is no more absurd, complex, irrational and illogical conglomeration of so-called statutes to be found anywhere than our Federal mining law and the State laws necessarily based upon them.

"The methods provided for location and patent, to say nothing of the interminable confusion consequent upon the recognition and attempted enforcement of extra lateral rights, have involved mines and miners in a mass of litigation the extent and expense of which are almost incredible.

"These things will continue so long as the system continues.

"It should be wholly eradicated, and all attempts at revision, in my judgment, while they may mitigate, cannot remove the evils which are so apparent to men like you and myself.

"Yours very truly."

Under the Act of March 3rd, 1879, there was created a Public Land Commission to rearrange, alter, amend or propose new regulations touching the public lands. The printed conclusions of this Commission, together with the testimony on which they based their action, was issued from the Government Printing Office in 1880.

This Act reads (in part) as follows: "Provided that the Commission shall consist of the Commissioner of the General Land Office, the Director of the Geological Survey and three civilians to be appointed by the President." * * *

They were to report to Congress within one year: "First, a codification of the present laws relating to the survey and disposition of the public domain; second, a system and standard of classification of public lands as, arable, irrigable, timber, pasturage, swamp, coal, mineral lands and such other classes as may be deemed proper;" etc., etc.

The Commission was appointed, consisting, besides the ex-officio members named in the Act, of Mr. Thomas Donaldson of Philadelphia, Pa., Mr. A. T. Britton of Washington and Mr. John W. Powell of Illinois. They took testimony from every mining State and Territory, and finally drew up a Mining Code which, in my judgment, at least, will, with few amendments, give to the people of these United States a set of statutes which will insure to the benefit of labor and capital alike; will ring the death knell to jumpers, "claim hogs," perjurers, speculators and such as wish to get something for nothing; will stop our ruinous litigation and make an United States patent a perfect monument of title and, in the words of Justice Field of the U. S. Supreme Court, "ironclad against all (speculative) objections."

In order not to extend this paper to an undue length, I beg to read from the Report of the Commission a part of their conclusions. I may premise by saying that there are in all 790 pages of printed matter, much of it in small type. The replies came from practical men, miners, mine owners, Surveyors-General, Registers and Receivers of the Land Offices, deputies and a host of others. There were but three or four among the hundreds who gave testimony upon the matters now in question who were content with the present mining laws.

The Report condenses and sums up the testimony so much better than I could do that I venture to ask a few moments' time in order to read a portion of it. I quote from the Report, page 35:

"While in a large class of cases the law conveys definite rights and protects the grantees, in a far larger class it simply bequeaths a piece of paper and a legal contest.

"We find an extraordinary and characteristic difference between the mineral development east of the Missouri and that west. The first is almost absolutely free from litigation growing out of conditions of the Government conveyance. The other is the history of the most frequent, vexatious, costly and damaging litigation.

"There are two general features in the existing statutes which have provoked and directed the main lines of legal contest, and they are: First, the recognition by the law of the local customs and regulations. Second, the attempted conveyance of a lode, ledge or deposit of rock in place bearing mineral, as a thing separate from and independent of the surface tract of ground, with the permission to follow the lode on its dip, even when in the downward course it passes beyond the side lines of the surface claim.

"The law leaves all the conditions as to location, notice, record of location and area of claim within certain wide limits to local regulations. That is to say, the Government proposes to convey a portion of its public land, and bases the very origin and initiation of that conveyance on the acts of an official wholly outside its jurisdiction.

"Title after title hangs on a local record, which may be defective, mutilated, stolen for blackmail, or destroyed to accomplish fraud, and of which the grantor—the Government—has neither knowledge nor control. In the testimony taken by your Commission it was repeatedly shown that two or three prospectors, camped in the wilderness, have organized a mining district, prescribed regulations, involving size of claims, mode of location, and nature of record, elected one of their number recorder, and that officer, on the back of an envelope or on the ace of spades, grudgingly spared from his pack, can make, with the stump of a lead pencil, an entry that the Government recognizes as the inception of a title which may convey millions of dollars.

"From such extreme cases, frequent as they have been, there is a wide range of organization to the duly elected county recorder, but even that official, who represents the most favorable working of the system, is not responsible to the United States. He is neither bonded nor under oath. He may falsify or destroy his record; he may vitiate the title to millions of dollars' worth of claims, and snap his fingers in the face of the Government. All the local officers are made indirectly the agents of the Government at the critical stage of a vast class of transactions without an iota of responsibility or a syllable of instruction from the principal.

"It is true that the statute of 1872 does not make a record obligatory nor does it define its effect. Miners at their meetings might draw the provisions of their code without mention or requirement of record, but practically they exercise the privilege which the statute does not inhibit, and create a record. Having, as is universally the case, made the record a part of their code, the Federal law, having recognized and enforced the code, is thereafter bound as to its conveyances by the record, with all its preposterous seeds of harm.

"The continuance of this early practice, which has survived not only its original necessity and usefulness, but every semblance of value, is perhaps due more than all other causes to the excited, sudden and transient character of the industry. The immediate returns, the movements of the stock board to-day, the swift conversion of bonanza into bullion, are the points which absorb men. Permanent ownership and security of tenure are less considered. Like a great wheel of fortune, the dazzling prizes blind men to the sober legal conditions on which security depends, and, as a result, no branch of American enterprise has ever paid to litigation so great and so unnecessary a share of its gross returns."

"Judge Beatty, our present Chief Justice, writes conclusively that the local records are of no practical value, and hence there is absolutely nothing whatever to weigh against the crying evils which their continuance entails. On page 398 of the book of testimony he says: 'The magnitude of the evil resulting from the uncertainty of mining titles will, perhaps, be appreciated when I say that after a residence of seventeen years in the State of Nevada, with the best opportunities of observing, I cannot at this moment recall a single instance in which the owners of really valuable mining ground have escaped expensive litigation, except by paying a heavy blackmail.'

"Your Commission find that a large majority of the mining men consulted during the examination of the Western States and Territories clearly shared our conviction: First, that the local regulations are of no use; secondly, that they are a great positive harm; thirdly, that by Congressional enactment they should be promptly abolished as to all future locations.

"Accordingly, in the code of legislation submitted herewith, it is directly provided that "all future occupation, location or purchase of public mineral lands shall be governed by laws of Congress, to the exclusion of all local customs and regulations and State and Territorial law" (Section 172); and a mode of location is prescribed which requires all the acts necessary to pass title for public mineral lands from Government to the purchaser, to be performed by the locator, his assignor agent, and the duly bonded and qualified officers of the United States.

"With a defined fissure vein, by spending many thousand dollars, and, providing his cloud of expert witnesses are not tripped up by clever cross-examination and the judge is impartial and the jury are not corruptly influenced against him, after many months, and perhaps years, during which his enterprise has been handcuffed with injunctions and himself reduced to poverty, the owner might derive whatever hollow comfort he could from a victory which left him ruined.

"The law brings honest neighbors to the point where they discover that the Government has seriously sold them both the exclusive right to the same thing and the courts have forced one honest man to rob the other.

"The line of adverse proceedings is this: One man locates an honest claim on the evident apex of a true lode. Fifty or a hundred tramps locate claims all around him and over him, burying his tract deep with thickly stratified possessory titles. Not one of the tramps has discovered a lode; he has simply marked out a piece of ground and paid the recorder's fee, bestowing some name upon his imaginary discovery. The tramp's claim is obviously valueless for working, but he is in a position, for a fee of $5, to mine without the cost of muscle or plant. And where? Not on his alleged lode, but in the already coined earnings of his neighbor, the honest discoverer.

"The blackmailer's method is simple and effective. Located over the dip of the honest discoverer he has only to say to him: 'It will cost you less to pay than fight.'

"The robber's method is somewhat bolder and less certain of success, but his prize is greater. He sinks through his worthless claim and cuts the honest locator's veins where, in the language of the law, they 'so far depart from a perpendicular in their course downward as to extend outside the vertical sidelines of the honest claims.' The honest miners are then in the hands of justice, which means injunctions, trials, expert testimony, juries, and an abominable waste of money.

"Your Commission, after a review of the lines of mining contests and a consideration of the complex nature of ore deposits, are unanimous in the conviction that any attempt on the part of the United States to convey such deposits as individual things beyond the vertical planes bounding the surface claim, must always end in a history of intolerable injustice.

"The result of our test of public opinion shows that, while there are regions whose simple fissure veins have not caused battles, and where, consequently, the people ask no change, the majority of experienced mining men desire a change from the lode location, with its disastrous sequel, back to the security and peace of the solid old common-law doctrine.

"The existing law holds out the conditions for obtaining patents. Having permitted an inception of title dangerously vitiated by acts of local agents outside of the Federal jurisdiction; having permitted a lode location with its indefinite conditions; having permitted the robbers and blackmailers to acquire a cheap and secure fighting title, the Government then causes its unfortunate victim to set himself up as a target for attack by advertisement for patent, and when attacked calmly turns its back and permits him to be dragged into the local courts.

"In short, the present law might be fitly entitled 'An Act to cause the Government to join, upon unknown terms, with an unknown second party, to convey to a third party an illusory title to an indefinite thing, and encourage the subsequent robbery thereof.'

"The Commission has thought that the time has arrived when Congress should formulate the legislation to govern the changed conditions of an occupation which has passed from a frontier experiment into a national industry.

"If mining is to be continued as an experiment, or for speculative purposes alone, an adherence to the existing customs is desirable. If it is to be continued as a business, upon settled principles and with expectation of legitimate returns, it should be governed by the same rules which the wisdom of centuries has formulated for the definition of all real property titles.

"The insecurity and hazard of the first system could be well followed by a continued relinquishment of Federal control over its own property, both in the inception of title and in the adjustment of controversies.

"The certainty and security of the second system should be maintained by an assertion of the national jurisdiction over its own property in all stages of progress, until the title is vested in private ownership.

"In the new law submitted for the consideration of your honorable body we have attempted to preserve all the valuable and practicable provisions of the present statute, and sought to cure all its flagrant wrongs.

"We have protected the prospector for an ample time to test his discovery, but we have fixed a limit to his possessory title; and thereafter, failure to tender purchase money shall work a forfeiture of the claim.

"We have in terms abolished all the local organizations and regulations, reserving to the United States full jurisdiction over all questions, from location to patent.

"We have repealed the lode location, and substituted the common-law rule in its stead.

"We have, by a system of official survey and mineral inspection, prevented blackmail and robbery, and obviated those contests which necessitate the intervention of the courts before patent."

It would occupy too much time to go over in detail the testimony of all the witnesses who gave their views to the Commission. Suffice it to say that a careful inspection of this rather voluminous document thoroughly substantiates the conclusions heretofore set forth.

The Mining Code should be simple, so that any man of ordinary intelligence can understand it and comply with its provisions. In the words of Mr. Lord, on page 180, Fourth Monograph: "Clear, just and simple laws may be childish in the sense that even children can comprehend them, but it by no means follows that children would be able to frame them; yet it would be nearly as sensible to allow children to legislate for their own government as to permit uneducated miners of limited experience to parcel out the mineral lands of the country and then to compound their district regulations into a code of universal application."

As a member of the Board of Trustees of the State Mining Bureau, I, more than a year ago, directed the secretary to solicit, in behalf of the Bureau, copies of all the mining codes of all the States of our Union and of every mining country in the world. The responses were prompt and much matter of value was sent to him, which I have been studying for the last twelve months or more.

All countries except the three heretofore referred to preserve the "common-law right" as to lode locations.

They vary in size from the claim or "pertenencia" of Mexico, which is 100 meters square, equaling about 329 feet by 329 feet, and containing 2.47 acres, up to the amount allowed under the laws of British Columbia, which is as a maximum 1500 by 1500 feet. In all, the codes take precedence of and in fact forbid any State or local rules and regulations. And, best of all, we hear of no litigation as to boundaries and no acrimonious contests. All questions of underground trespass are easily settled by calling in a competent surveyor.

In conclusion, I have the honor to propose the following as the sense of the members of this convention:

First—*Resolved*, That the existing Statutes of the United States touching mineral lands require radical amendment.

Second—*Resolved*, That the "law of the apex" and its corollary, the so-called "extra-lateral right," should be abolished and a return made to the common law right of surface boundaries, and that the claim or unit of location be of sufficient width, i. e., of sufficient width on the side of the dip, to permit of excavations on the ledge to a depth of 1800 or 2000 feet, when the angle of the dip is not less than 45°.

Third—*Resolved*, That the local "rules and regulations" ought to be abolished.

Fourth—*Resolved*, That the Congress of the United States be petitioned or requested to formulate a complete mining code, touching all matters from the inception of the claim (location) to the final acquisition (patent) thereof.

Fifth—*Resolved*. That the process of applying for and obtaining patent should be simplified and made less costly to the miner.

Sixth—*Resolved*, That Section 2333 of the Revised Statutes, relating to so-called tunnel locations, be restricted in its application to the deep placers of "dead rivers," whose course and direction are not shown upon the surface by reason of accumulation of drift, soil, lava or other rock. A tunnel for the discovery of such deposit or deposits must be prosecuted with due diligence, and proof of such diligence shall be held to mean work upon the tunnel for not less than four months in each year, with at least two shifts of workmen. The channel, "deep placer" or "dead river," when encountered, to be locatable to the extent of not more than 1500 feet up and 1500 feet down stream from the point of intersection by the tunnel.

Seventh—*Resolved*, That all the precious or useful metals, earths, rocks, stones, fossils, mineral oils, bitumens, natural gas, hydrocarbons, natural fertilizers—in a word, any substance found within or beneath the surface of the earth and having a commercial value, should be subject to location under the section or sections of the law applicable to placers.

Eighth—*Resolved*, That any party or parties who may desire to avail him or themselves of the provisions of the present laws must apply for patent before January 1st, 1900. A failure so to apply shall constitute a forfeiture of all such claim or claims, and thereafter the land shall be open to location as other public mineral lands.

Provision should be made so that mineral land so abandoned may be located preferentially by a neighboring claim, whether possessing a secure location or not, if such land may be claimed (located) within a reasonable time, say within six months, and no other location shall be allowed during said period unless such neighboring claim owner shall, in writing, have declined to take up such abandoned ground.

Ninth—*Resolved*, That a committee consisting of members of this convention be appointed by the President to formulate in detail the provisions of a bill in accord with these resolutions, to be placed in the hands of our Senators and Representatives in Congress, with a request to urge its passage in the next Congress.

Geology and Man.

Written for the MINING AND SCIENTIFIC PRESS by WALTER C. CHAMBERLAIN, Geologist.

Into whatever depth of knowledge or science mankind has gone since the beginning of his semi-barbaric state, when he emerged from the darkness of the Pliocene or early Quaternary age, his learning cannot be accepted as definite, theory and investigation must be therefore substituted, while Nature guards her secrets with a sleepless eye.

The world revolved on its axes just the same minus man apparently for many millions of years, and various other classes of animals were antecedent to him, so to speak. He is, according to the views of many learned men, a recent product. Compared with the length of geologic time, his advent, therefore, according to biblical ideas, was detained until the times and conditions of this earth were best fitted for his existence.

Geology in its wide expanse gives us, first, an age or a division of time when there was no life on the globe; or, if any did exist, it must have been of the simplest kind, plainly showing us that man has taken his time in attaining his present position. From archæan time up to the Pliocene age a slight trace and only faint and indefinite evidences of his existence are found; or, if he existed at all previous to the above age, his existence in prehistoric time must have been a very primitive one, as about every other class of animal matter of importance—both terrestrial and marine—that has occurred up to the present has given paleontology some slight record to show it once held a place in the secret workings of nature, while that of man is very vague.

His present distribution is just as perplexing. Consider his isolated position in some of the South Sea islands, thousands of miles from mainland, supposing that in some cases volcanic upheavals were responsible for his islands. Whence comes he? The theory that he may have drifted there in boats is not impossible, but not altogether probable, considering the primitive means of transportation.

The equal distribution of these people on nearly every bit of habitable land in midocean means that at or about the beginning of one of the past geological epochs, subsidences and upheavals were of frequent occurrence in that portion of the globe where the crust was thin and the pressure intense. Take, for instance, the Hawaiian group: The alluvium is thick and plentiful, and sedimentary matter equally so; there is evidence of a basaltic rhyoletic flow in places, but the energy of later ages has been confined to the larger islands. There are extinct craters on several of the smaller islands, but what is left is evidence of a meager kind, only illustrating that, if they had in past ages been the seat of any powerful volcanic activity, dissolution of volcanic matter produced sedimentary depositions sufficient to show that the island, by its deep accumulation, to be of a ripe age.

If there was any history left by the primeval members of these islands as to how they occurred, it has become obsolete in the vast eon of time which has elapsed since they took up their abode on these seagirt isles, although I understand there is a tradition among the remnants of the Hawaiian race that they landed there by the means of boats or rafts, etc. We must, therefore, accept it as authentic, as we cannot proclaim for ourselves any direct definition or try to make manifest something we cannot look into otherwise than through the eye of man, which is limited and not an authority.

The archæan condition of the world after having gone through the igneous process leading up to its formation, and up to the time of the occurrence of the first form of organic life, was such as to show mankind that the decay of the elements which formed the globe, after its fires had ceased, was the hotbed from which, by the aid of an atmosphere and solar heat, organic agencies would arise and life in its various forms would assert itself.

Evolution or divine creation may have been the author of the human being, but, notwithstanding these possibilities, man stands alone in his supreme mystery. Is it possible that this wonderfully endowed being, Man, found his first organism in the primordial Lingula, when there was supposed to have been no evidence of terrestrial life whatever? The awe-inspiring depth of the subject leads us to look at it from another standpoint, and, shifting the hypothesis to another point of our imagination, we must look to the eccentricity of our planet in its orbit and the many different transitions which have occurred previous to its reaching the present habitable state.

This planet has not always been subject to the same control and conditions as it is at present. Tribes of animal life have been ushered in to encounter some unusual condition, whereby they have become extinct in a single geological age, embracing a few million years, showing that the earth suffered from changes in its physical conditions, which were quick destroyers and generators. Animal life in the zenith of its power, compared with the working forces of nature and the universe, is weak indeed. Its equilibrium rests on such a precarious foundation that any slight increase in temperature by either the agencies of heat or cold would be "like taking a stone from an arch—destruction to the whole." Whilst animal life has increased and decreased in its various forms throughout the many long geological ages, planetary life is obeying the forces which are still in operation. It would require only a slight disturbance by the sun or some unknown agent to cause complete annihilation of every class of animal matter, with a reaction that would leave our mother earth an inanimate mass, like the moon, with no witness to vouch for its former state. Many such disturbances have occurred since the earth assumed its spherical form. If we admit the plutonic formation of this globe, the earth, therefore, is much smaller now than when it first concentrated all its matter into a revolving mass. It must have been three times its present diameter, more or less. It stands to-day a sedimentary globe, having lost by volatilization two-thirds of its primitive bulk.

In primordial times it suffered submergences, owing to the presence of a dense atmosphere which occurred at intervals with its other phenomena.

Intellectual animal life no doubt existed in prearchæan times with other matter when conditions were favorable, although many geologists and scientists adhere to the hypothesis that man appeared not earlier than the lower Pliocene or Quaternary age. This is accepted simply because there is not much evidence of him previous to the stone age, and, being a subaerial animal of frail construction physically, and leaving no fossil evidence to speak of, it leaves their opinions one of pure conjecture and open to any supposition. A strong body of scientific evidence, judging from other classes of animal matter, goes to prove that man is an old inhabitant, having been subject to conditions which have exterminated him and regenerated him in accordance with the mysterious laws of Nature, like other animal matter which could be brought into action by comparatively slight changes in the physical conditions of the earth. Of the many different epochs and periods, embracing millions of years since the earth took upon itself its mantle of life, this era is possibly one of the many which have been fortunate enough to have reached such a high state, all owing to its quiet and undisturbed position, coupled with favorable astronomical conditions.

Any igneous disturbance which might affect the temperature of our atmosphere a few hundred degrees, or the entire surface of the earth to a meager depth, would furnish results which would destroy any trace of previous existence of mankind and convert its surface into a dross, leaving our globe a virgin world to reanimate itself and begin life anew, as it is supposed to have done in the lower Silurian age. Such is cosmology.

This poor old whirling mass of matter has not always been a chronometer of regularity, and its contorted strata give great proof of how it suffered to make a home for its present brood of human kind.

Edison's Ore-Working Process.

The success is again announced of T. A. Edison's process for the electrical recovery of the iron contained in low-grade ore. The inventor's experiments have been carried on during the past six years. His process in brief consists in pulverizing the ore. The corder is then allowed to fall in close proximity to electric magnets which deflect the iron to one side and the non-metallic matter falls to the other side by gravity. Edison's magnetic iron works are at the village of Edison, on the summit of Iron mountain, Sussex county, N. J. One statement is to the effect that ore assaying but 15 per cent of iron can be worked at a profit. Six years of work, nearly $4,000,000 in money, more than half of it spent in experimenting, represents the cost. The ore is mined about 400 yards from where it is treated. After passing between the first pair of rollers, which are four feet in diameter, studded over the entire surface with teeth about six inches long and operating with a space of fifteen inches between them, the ore is conveyed in an endless chain of buckets to the top of a building about eighty feet high, where the second pair of rollers, somewhat smaller than the first and without the teeth, are located. The ore emerges from the second pair, that which has started on the journey in the shape of large boulders, some of them weighing a half ton, coming out in the form of powder as fine as the finest flour, in which no grit can be felt. "The time used in accomplishing this wonderful transformation is about five minutes." The separators are a series of revolving electro-magnets about fifty in number. The crushed ore is distributed to the various separating machines through chutes from the top of the building in which they are located. Every particle of iron in the mass clings to the magnets, while the refuse, be it of whatever nature, either sulphur, quartz or flint, drops on another endless belt, which conveys it to the cars, on which it is carried to the refuse dump. When the magnets have taken up all they will hold the current is turned off, they cease to act as magnets, thus releasing the iron which has clung to them. This iron then drops through chutes which emerge at a point beneath the separators, from whence it is carried in an endless chain of buckets to the bricking house, to be formed into bricks by hydraulic pressure and again carried on by conveyors to the waiting cars on the branch railroad.

Notes on Platinum.

The constantly increasing demand for platinum in the arts and manufactures of the world and the present limited sources of supply have in recent years greatly enhanced the price of the metal. Because of the peculiar and valuable qualities of platinum it is believed that the consumption of the metal would be greatly increased if the supply was sufficient to materially lower the cost.

Contrary to popular impression, platinum and associated metals are widely distributed, although they have thus far been found in paying quantities in but few localities. This condition is perhaps largely due to the higher intrinsic value of gold and to the limited acquaintance of prospectors and miners with the means of identifying platinum ore and of its economic separation. Up to the present time the platinum of commerce has been obtained entirely from alluvial deposits, although it has been reported in limited quantities *in situ*. About 80 per cent of the present supply is derived from the alluvial deposits of the Ural mountains, but there are few, if any, of the gold-bearing gravel beds of the world that have failed to yield platinum, and it is more than likely that large quantities of platinum ore have been thrown away with the black sand washings from gold placer deposits. The distribution of the ore may in fact be regarded as practically coexistent with gold placer deposits, as is evidenced by the following list of localities, except Russia, that have yielded the ore in varying quantities: In California in nearly if not all of the gold-bearing gravel and sands; in Oregon, Georgia, North Carolina, Alaska, on the Yukon river, Canada, British Columbia, Mexico, Colombia and Brazil, South America, and Australia.

The genesis of native platinum is not well understood. In two cases it has been reported as found in quartz veins, but these reports have never been verified, and the theory of deposition from solution based upon them is rendered extremely doubtful by the known insolubility of the metal. The undoubted occurrence of platinum *in situ* are in California, Russia, Brazil, New South Wales, Canada and Colombia.

Platinum ore is usually found in the form of rounded or flattened grains or "sand," occasionally in irregular lumps of the size of peas; large nuggets are very rare—the largest as yet found weighing twenty-one pounds.

The ore has a metallic luster and is distinguished by its steel gray color, shining light gray streak when rubbed on a hard white surface, high specific gravity (16 to 19), infusibility in the hottest blast furnaces and insolubility in any single acid. It is not affected by borax or salt of phosphorus before the blowpipe, except in the finely divided state, when reactions for iron and copper may be obtained. It is soluble only in hot nitro-hydrochloric acid.

Platinum ore is a complex body consisting of the metal in combination with varying proportions of the other members of the platinum group, such as iridium, rhodium, palladium, ruthenium and osmium, together with from 4 to 20 per cent of iron. In alluvial deposits the ore is generally associated with iridosmine (a native alloy of iridium and osmium possessing a degree of hardness superior to that of hard-tempered manganese steel), magnetic iron sand, chromite, garnet, epidote, and often with zircon, serpentine, ilmenite, peridot, quartz, diamond and chrysolite. Russia is the only country, excepting possibly New South Wales, that at the present time mines platinum ore for itself alone.

In the former country the platinum-bearing sand is found at depths of between 6 and 40 feet, the pay streak, averaging less than 1 foot in depth, resting directly on serpentine bedrock. In New South Wales the pay streak is from 60 to 150 feet wide and underlies a loam bed 60 to 70 feet deep, the ore occurring in the crevices of the bedrock and in the gravel resting thereon.

The method generally adopted for extracting the ore is to pass the sand and gravel with water through puddling machines or revolving conical screens; the platinum and fine sand pass through into sluice boxes beneath, while the coarser materials are discharged at one side. The contents of the sluice boxes are washed in the usual manner, and when gold is present in paying quantities it is removed by amalgamation with mercury, the platinum remaining behind. Experience shows that it is seldom profitable to work mines yielding less than three grams of platinum ore to the ton of gravel. The average yield of the richest Russian mines is about six grams per ton.

At the present time Russia is the greatest producer of platinum in the world. It is estimated that the output of platinum from Russian sources is nearly fifty times greater than that of the rest of the world. Nearly 6000 kilogrammes of this rare metal is now placed on the market per annum. Russia, however, confines its attention to merely mining the ore, which is found entirely in the southern Ural district. Germany imports the ore and makes it up into metal, so that what metal Russia requires she has to buy back again from Germany.

At the present time raw platinum costs £45 per kilogramme. It used to be thought that platinum ore would be a prolific source of iridium, but the

anticipations have not been justified, this rare metal being only found in small quantities. Last year only 4.1 kilogrammes were obtained.

Future of Minook Creek.

Fifteen years ago an expedition left San Francisco for the purpose of investigating certain rumors of the existence of gold on the Yukon river, Alaska. It was probably the best organized and equipped prospecting party that ever entered Alaska, and consisted of forty-five veteran miners. At its head were two brothers whose names are well known in mining circles, Edward and Eff Schiefflin, the discoverers of Tombstone, Arizona.

Proceeding to the mouth of the Yukon, they built a steamboat called the New Racket, and journeyed up the great river as far as the trading post of Nuklukayet, a short distance below the mouth of the Tanana river, prospecting with greater or less success along the way. At Nuklukayet they spent the winter, and the next year they ascended still farther to a region where the Yukon cuts through the Lower Rampart mountain range after emerging from the vast plains known as the Yukon Flats. Here they prospected, and, in fact, took out some gold in the season of 1883 from the bars of small streams that entered from the south and east; but in the end the Schiefflins returned to the States with the idea that Alaska would never become a great mining district on account of the great difficulty of living in its inhospitable climate.

Since this visit, which was the first time that mining had been attempted in the interior of our northwestern territory, spasmodic efforts have been made to find gold in the same Lower Rampart region, but generally with little success. In fact, the discoveries of Forty Mile and Birch Creek districts farther to the east had attracted new-comers and retained miners and prospectors. However, in the spring of 1896, a Russian half-breed—John Minook by name—in company with O. C. Miller and George Sinclair, all of these men old prospectors, decided that there was "good ground" on one at least of the three creeks upon which the earlier party had worked. The creek had formerly been known as Klanarkakat, which in the Mahlemute dialect means "small stream fit for little boats;" but with the discovery of gold it was named in honor of its discoverer, "Minook creek."

Minook or Munook creek has recently received a little boom, and toward it will drift much of the outflow from the Klondike. The new district is within American territory, 300 miles below Circle City at approximately lat. 65 deg. 15 min. N. and long. 151 deg. W., or a little below the middle portion of the Yukon river. The creek, which, with its branches, is said to be as much as thirty-five miles long, enters the Yukon from the east, out of the Tanana hills.

It will be remembered that it was the reports of the natives that led Cannack to make the discovery of Klondike over a year ago. The first discoveries in the American Birch Creek district were also made by two half-breed miners, and this creek owes its discovery as a gold bearer to another half-breed. Generally, the importance of the native ceases with the mere announcement that he has seen gold in such and such a creek, for neither the Stick Indians of the upper Yukon nor the Mahlemutes of the lower seem to be capable of the steady application to work that Alaska placer mining demands. Yet, Minook creek forms an exception to this rule. On the discoverer's claim only native labor was employed a year ago, and some two or three thoroughbred natives had become so infatuated with mining that they staked claims on their own account.

On Sept. 1, 1896, the United States Geological Survey party arrived at the mouth of Minook creek, and the three following days were spent in an investigation of its valley. At that time there were probably ten white men at work. There had been a very mild stampede from Circle City, but operations had not gone beyond the stages of prospecting or the staking of claims, except in a few cases. One of these was that of the discoverer himself, who had opened up and was ground sluicing new ground, and had before this made a cleanup which netted him $100.

Locations of placer claims were made up the main creek and its branches, Little Minook and Hunter creek, for six miles, but above that point most of the men thought that no "good ground" could be found, although, on the other hand, some thought that the round, worn character of the gold showed that it had been transported considerable distance, and were preparing to prospect the different branches to their heads. In addition to the placer claims, two quartz ledges had been located. No mining in quartz had been done further than opening a tunnel into one of them.

Whether Minook creek will become an important gold producing district it is too early to say. It may be that the decision of the first prospecting party will be borne out by the investigations now going on. The overcrowding of the Klondike region, however, where, as is well known, all claims have been staked, will lead to a migration into American regions, during which all there is in Minook creek and other undeveloped portions of Alaska proper will be laid open.

The Jeffrey Portable Sand Elevator and Screen.

The accompanying illustration is a view of the Jeffrey portable sand elevator and screen in use at the plant of R. L. Shoemaker & Co., Franklin Station, Ohio, destined for digging and screening sand direct into the cars from the bank. The frame is made in two parts, the lower or platform being mounted on truck wheels set to standard railroad gauge, while the upper or main portion is pivoted on the lower one, giving it a complete radial adjustment. The machinery is mounted on the upper portion and consists of an elevator, screen, engine, boiler and the necessary driving connections, including also an arrangement for propelling the whole by power. The elevator, which digs its own load, is of the continuous Jeffrey bucket type, the buckets being provided with truck wheels, which travel on suitable guides in the angle iron ladder frame, thus reducing the friction as well as the wear to a minimum. The elevator is pivoted at the top and is raised and lowered by means of hoisting drums, ropes, pulleys, etc., giving it a vertical adjustment, which, together with the radial adjustment, makes it possible to reach a large area of sand without moving the machine. The sand is delivered by the elevator upon the shaking screen, the finer product passing through the meshes into the car below, while the coarser material is discharged over the end into a car on the next track.

JEFFREY PORTABLE SAND ELEVATOR AND SCREEN.

The screen is also pivoted so the turning of the elevator within certain limits does not affect its relative location with the car. The screen is usually provided with two or more interchangeable sections of wire cloth, so the size of the product can be varied to suit the market. This machine can be operated by two men, one to look after the machinery and the other after the supply to the cars and other details. It is practically automatic, requiring but little hand labor, except when cleaning up. Its capacity is anywhere from ten to fifteen cars per day at this plant, while with but little additional expense the capacity can be doubled.

This machinery is of the Jeffery design throughout, and interested parties can get further details by addressing the Jeffrey Manufacturing Company, Columbus, Ohio.

A New Process.

Henry Rhodes of Denver has a patent for "an improvement in the process of separating gold and silver or other precious metals from the ores." The preparatory method is to grind the gold and silver ores to the desired fineness and then add a certain percentage of common gypsum, also reduced to a certain mesh. To the ground ores and gypsum is added water, and the thorough mixing or churning of the primal ingredients begins. When the mixing or churning reduces the ore and gypsum to a consistency of clay the matter is taken out and moulded into any form desirable and is left to dry, which takes but a very short time. After the bricks or slabs have dried they are ready to be dumped into tanks or other receptacles and the chemical solution is turned on. The matrices being entirely porous, the chemicals permeate the bricks and, the patentee claims, carry away in solution from 95 to 99½ per cent of all gold in the ore.

COPPER MINING during the past ten years has grown to enormous proportions in the United States and become one of the principal industries of the nation. Last year the output of American mines reached 202,640 long tons of refined copper, representing a value of $48,786,080. The increase in the consumption of the metal at home and abroad during those years has been so great that whatever surplus there may have been above domestic requirements found a ready market in some quarter of the globe. Nor does the limit either in production or consumption of the product seem to have been reached. New or enlarged uses for the metal are springing up all over the world. All copper mines, but more especially young ones with an assured future, have become very popular with the investing public, and they are destined to become more so with coming years.

Gold Export Tax in Nicaragua.

Under date of Oct. 23d, M. J. Clancy, consular agent at Bluefields, reports as follows: "The owners of gold mines in this vicinity are exceedingly worried over the decree establishing an export duty of $1 (gold) per ounce on gold ingots and $2 (gold) per ounce on gold dust. The decree was published August 15 in Diario Oficial and takes immediate effect. Gold heretofore shipped from Bluefields has been subject to an export duty of 80 centavos (35.44 cents in United States currency) per ounce."

A letter of the same date from an American merchant in Bluefields who has invested heavily in mines and mining machinery states that: "The decree published July 15 in Diario Oficial has caused consternation among those who have invested capital in gold mines; and this law and the one placing an export tax of 10 centavos (4.43 cents in United States currency) per pound on rubber will gradually kill this coast and ruin the trade we have labored over ten years to establish."

The shipments of gold from Bluefields during the year ended June 30, 1896, amounted to $138,929.14 (United States). The shipments for the year ended June 30, 1897, amounted to $169,565.55 (United States), an increase of $31,636.41.

It is unquestionably true that five or six of the mines in that section are quite valuable, and that there is strong probability of discovering others equally good. Some of the quartz specimens have been rich enough to interest United States capitalists, and five or six mining experts have visited the country during the last year. An expert arrived in July last whose salary is $30 a day and expenses. This salary, perhaps, may seem to some persons rather small for a mining expert; but it is $30 in gold, and even capitalists do not pay $30 a day without some hope of getting it back. Three or four leading merchants in Bluefields have had faith in the productiveness of mines on the Atlantic side and have invested money. But, while gold in paying quantities has been taken from a few mines, the average yield, as shown by the custom-house books, has not been such as to occasion a rush for the mining districts.

With a yield of $169,565.55 for the year, the daily product (including Sundays) would be but $464.56, or less than 78 cents a day for each miner and prospector. It is reported, however, that an abundance of gold goes out of the country without paying tribute to the public treasury.

The mine owners will probably address a petition to the Nicaraguan Government.

THE Homestake Mining Company of South Dakota reports that for the year ended May 31st 395,530 tons of ore were milled. The total product was 110,851 ounces of bullion, the gross value of which was $1,840,674 in gold and $13,112 in silver, a total of $1,853,786. Deducting bullion charges, $10,285, there was left a net return of $1,843,501. To this is to be added $45,938, the net proceeds of concentrates, making a total of $1,889,439. The average return obtained per ton of ore was $4 78. The total expenditure for all purposes except dividends was $1,702,965, an average of $4.31 per ton. Excluding payments for property, the expenses were $3.74 per ton. The accounts show total receipts as follows: Balance on hand June 1, 1896, $263,455; bullion accounts, $1,889,439; miscellaneous, $35,867; total, $2,188,671. The disbursements were: Milling accounts, $424,252; mining, $910,013; blacksmith shop, foundry, tramway, etc., $106,670; general expenses and taxes, $38,920; purchase of property, $223,109; dividends, $375,000; total, $2,077,964, leaving a balance on hand June 1, 1897, of $110,797. One hundred stamps were added during the year and an engine.

AN old miner says: "I see many accounts of accidents to miners from picking out missed shots. It is not necessary to pick out any holes, if loaded in the following manner: Tamp in first powder, put in moderately, with a stick; then put in a cap and fuse; put balance of powder on cap and tamp lightly. If an upper, use a little paper on top of all. The tendency of giant is down and out, not down and up. I have tried it for the last month about six times a day. My holes break to the bottom, and just as good as when holes are filled to the brim with tamping."

Mining Summary.

CALIFORNIA.

Amador.

Ledger: The South Eureka mine and the Blue Lakes Co. have closed a contract by which the mill of the South Eureka will be equipped with electric power. The interested parties have arranged to have the 20-stamp mill, the concentrators, the rock breakers and the blowers operated by electricity within a month. The work of completing the power plant pole line from Jackson north was resumed Monday morning. The South Eureka is the first milling plant in the country to close a deal with the Blue Lakes Power Plant Company for the use of electric power.

The Argonaut mill is nearing completion, the reservoir is about ready for the water supply. F. Taylor will have charge of the mill.

The Pocahontas at Drytown will be sunk 400 feet deeper. It is now down 400 feet.

T. B. Dillon is at the Centennial mine at Dry Creek preparing to reopen the property for a San Francisco company.

The Farrell mine at Middle Bar has been leased to M. Claich et al.

Republican: The Centennial quartz mine, on Deer creek, two and one-half miles south of Plymouth, has been leased by capitalists, and work will be pressed without delay. The Centennial is owned by A. Caminetti.

The shaft of the Oneida is down about 1400 feet. Preparations are being made to repair and retimber the old shaft and take out the water, so that by the time the new shaft has reached the depth at which it is intended to commence drifting, no danger need be apprehended from tapping the old works.

At the Amador Queen a contract has been let to sink another 100 feet. The price is $9.50 per foot, which, considering the hard nature of the formation, is a low price.

The *Record* says Supt. Dillon has formed a company to join him in operating a group of mines in Plymouth district, consisting of the Centennial and other claims adjacent. Machinery is on the way from San Francisco and works will be erected capable of sinking 100 feet.

At the Central Eureka mine the contract work for sinking 200 feet is nearly finished. This will make the shaft 950 feet deep. The contractors have made the 200 feet in sixty days. A station will be made at the 900-foot level when crosscutting and drifting on the ledge will begin. Supt. Thomas is expecting orders to continue sinking 200 feet deeper.

Butte.

The Golden Feather dam in Feather river, near Oroville, blown up last Monday, was built four years ago at a cost of $100,000. It was destroyed by order of the owners because it did not serve its purpose. The dam raised the river 37 feet and backed it up two miles, making it impossible for the company to work the bed of the stream above the dam. That the stream might be lowered, it was necessary to blow out this dam. Another dam will be built higher up the river, so that when it is completed the bed of the stream can be worked. Water to run the hydraulic elevators will be brought in by a ditch from Big Bend. It is locally reported that the company will expend $250,000 on these projects. It is thought that three dams will be built on the river at different points, that the gold from the bed of the river may be secured.

Superintendent Mason of the Morris Ravine mine has discovered very rich pay gravel.

The Rock River mine near Hengy, which Major Frank McLaughlin is reopening, is one of the old mines of that county, and the *Register* says in times past it has yielded the richest rock ever taken from a mine in that section.

The *Register* figures that 1000 men are employed in the mines of Butte county, and that the gold yield for the year aggregates $1,416,000. In '96 the county was credited with a gold yield of $749,000.

Five miles southwest of Oroville are the mines of South Thermalito—1500 acres—where many prospect shafts have been sunk on the land, nearly all indicating good paying gravel near the bedrock. From 8 to 10 feet of earth must be removed ere this pay dirt is reached, and novel methods have been resorted to to move this vast quantity of dirt. In some of the diggings it was moved by wheelbarrows, in others by wagons, while in still others cars pulled by an engine were utilized. Crouch & Sutherland, the owners of 1200 acres of this land, are having a big dredger made to move the dirt expeditiously. It has been estimated that this earth can be handled, washed and the gold extracted for five cents per cubic yard.

Calaveras.

The Carson Creek mine has been bought by W. H. H. Hart, A. L. Hart, L. P. Drexler and other San Franciscans. There is a 40-stamp mill on the property, also chlorination works and an extensive equipment and a shaft 700 feet in depth. The ore is low-grade, yielding $5 or $6 per ton, and it is estimated that it can be taken out and worked at a profit. The old company got into trouble some years ago and the mine was shut down. Subsequently the control passed into the hands of four of the principal creditors, one of whom was a lumberman and another a machinery dealer. The San Francisco men have been trying for some time to get the mine and came near making a deal a month ago. They wanted forty-five days' time in which to pump out the mine, which had filled with water and examine the ore. This was refused and a sale under foreclosure was ordered. W. H. H. Hart secured an injunction, which was issued at the instance of one of the creditors, and thereby tied up the sale. Subsequently the parties decided that rather than stand the expense of protracted litigation they would all sell out to the Hart syndicate, and have done so. The price paid for the mine is said to be in the neighborhood of $125,000.

C. W. Pomeroy and A. E. Pomeroy own the Mt. Timolus quartz mine; in 1894 they bonded the mine to H. H. Bell. Bell, in his operations on the mine, placed thereon a hoisting works and a mill, but nothing was said in his agreement as to the right to remove these improvements in the event that he did not purchase the mine. In 1895, Bell abandoned the mine and commenced to tear down and remove the machinery and buildings, when he was stopped by an injunction sued out by Pomeroy. On the trial in the Superior Court, Judge Gottschalk decided that as the agreement was silent as to any right to remove the improvements, they became a part of the land and belonged to Pomeroy. The Supreme Court affirms this judgment. The case virtually decides that if a written agreement does not permit machinery and improvements to be removed on the termination of the bond, that they become the property of the owner of the land and cannot be taken away.

The *Prospect* says that the Shenandoah Mining & Development Company will resume operations on their property in Mill Valley district, above Jesus Maria, under the management of W. P. Wrixon.

Prospect: W. T. Harris, who some time since bonded the Foot and Thompson mine, reports outlook of the property satisfactory. He has now been running ten of the twenty stamps for eight days and will clean up nearly $100 per day, besides one-half ton of sulphurets saved each day, which run well.

Thomas Peachy reports the Hog Pen mine, at Angels, now down 40 feet, the ledge showing 6 feet wide; 150 tons of ore on the dump will run $30.

J. Wickman has bonded the Wickman mine, near West Point, to the Glasgow Exploration Company.

The Great Western mill at Angels, recently removed from the Rathgeb mine, at Lower Calaveritas, was started this week.

J. McClay has a bound upon the Highland Mary mine, $300 down and $2700 on or before October 1, 1898.

W. G. Drown has a sixty-day option upon the water right of 10,000 inches to be taken from the Stanislaus river at Abbot Ferry, owned by T. G. Peachy. The price named is $12,000 cash.

The Buckeye mine, in Jenny Lind district, owned by B. D. Beckley, has been bonded for $5000 to S. Bishop of San Francisco, to be paid at various times within two years.

The Utica Mining Company, defendants in the suit brought by the Lightner Mining Company to recover $200,000 alleged damages, have filed a demand for a change of venue to Calaveras county, and the motion will be presented on November 8th.

Prospect: The Petticoat, Clary, Pantaloons and Blossom quartz mines, together with rights through gravel claim owned by the Boire Bros., all in the Railroad Flat mining district, have been sold to Louis Rosenfeld of San Francisco. The price paid was $10,000, of which sum $6000 was paid over Monday last, the remaining $4000 to be paid in five months. The properties were owned by W. H. Clary, Sr., Adam Poe and John Champion. The shaft in the Petticoat is now down 400 feet, with a 50-foot chute of rock at the 400 level that assays at the rate of $50 per ton. There is a steam-power hoist on the mine and a 5-stamp mill is to be at once erected. W. H. Clary, Jr., is superintendent.

El Dorado.

Placerville reports that English capitalists have invested $500,000 in the Grand Victory group of gold mines on Squaw creek, seven miles southeast of there. The Transatlantic Mines Purchasing Syndicate, Limited, of London are stated to have bought the property from H. E. Pickett of Placerville and J. E. Wright of Indianapolis, Ind. The first payments have been made, and the property has been taken possession of by J. R. Bell. The reports on which the investment was made showed a large body of low grade ore, the vein being 215 feet wide and the ore running $4 and $5 a ton. The property comprises 160 acres of mineral land.

Nugget: E. H. William and the owners of the Rose Kimberly mine, in Green valley, near Rescue, are preparing to develop that property on an extensive scale. Seventy thousand feet lumber have been ordered. The company is driving a tunnel to tap the shaft to drain it. The force on the mine will be materially increased.

Kern.

Garlock has the following quartz mills, all at work, aggregate capacity seventy-five tons daily, with a total tonnage of 2250 tons per month; average of the ore milled, $76 per ton:

The Garlock, E. F. Garlock, owner; eight stamps, capacity fifteen tons every twenty-four hours; J. R. Hughes, superintendent.

The Maxon, Dr. Maxon of Oakland, owner; C. H. Belcher, superintendent; five stamps, capacity twelve tons daily.

The Visalia, owned by Visalia capitalists; S. N. Coffin, superintendent; ten stamps, capacity twenty tons daily.

The Henry, owned by E. E. Henry of Los Angeles; ten stamps, capacity twenty tons daily.

The Kelly, owned by John Kelly; two stamps, capacity five tons daily.

Parker & McConnell are running a 5-foot Huntington mill; capacity, twenty tons daily.

For the treatment of the tailings and ores there are also the Garlock Cyanide Works, twelve tons capacity, E. E. Carpenter, manager; Smith & Collins' cyanide plant, capacity ten tons a day.

The Rand Mining Company has leased the Visalia mill at Garlock, increased its capacity from five to ten stamps and doubled the well facilities. Garlock mills as yet operate the bulk of Rand district ores. A reduction works that cost $20,000 is in operation on the Alameda mine, Johannesburg. A 10-stamp mill that will require 30,000 gallons of water every twenty-four hours is in process of construction at Johannesburg. Milling at Garlock costs from $6 to $8 per ton; at Cuddeback lake $8 per ton. The hauling to both mills costs from $1.75 to $3. The Rand group, the pioneer mines of the district, have produced over $100,000; the Butte, Kinyon and Wedge nearly $80,000 each. The Napoleon and Merced, new claims in the Stringer district, have each produced over $15,000. The St. Elmo, Petaluma, Alameda, Val Verde and King Solomon group, also the Rocket mine, have also been producers. The total product of gold from the entire district to date is $600,000. The first discovery was made April 22, 1895. The monthly product is now about $100,000. The Wedge is down 415 feet, the Little Butte 385 feet, the King Solomon 270 feet, St. Elmo 200 feet; others have a depth of from 50 to 100 feet.

The Randsburg Placer & Quartz Mining Company's shaft is down 175 feet, without reaching bedrock, and they are arranging to sink 100 feet deeper.

Rooster: The old Patsy O'Brien mine at Havilah has been sold to G. C. Kirby of Los Angeles for $20,000, and the first payment of $3500 made. Mr. Kirby will operate a 10-stamp mill. This property was known as the Warrington mine. The Warrington Company put in a 20-stamp mill and an air compressor, investing in all about $100,000. Later the improvements were destroyed by fire. The mine has been idle for two years.

Los Angeles.

Ten miles east of Acton, at an elevation of 3500 feet, is the Black Cat mine, on which considerable work has been done. A 20-stamp mill is connected with the mine.

Mariposa.

(Special Correspondence).—The Bandarita, Star and LaGrippe mines on the North Fork of the Merced have been bonded by their owner, P. P. Mast of Ohio, to a Scotch syndicate, which will develop them quite extensively. The Martin & Walling mine, also owned by Mr. Mast, is reported as under bond.

R. C. Turner is opening up the Schilling mine in the same district in the interest of owners in the Standard Consolidated Company of Bodie.

At the Virginia the building for the new 10-stamp mill is under way, and excavation for foundations of the storage dam is in progress. Owing to difficulty in securing wood so late in the season, it is said that gasoline engines will be used at the outset. About forty men are employed. This will be the sixth mill erected in the Coulterville district in the past fifteen months.

The Merced Company has reduced the output of the Mary Harrison mine and the mill from 110 tons a day to 70 tons. They are said to be experimenting with very fine screens and correspondingly fine crushing.

New boilers are being added at the Louisiana to meet the increased depth in the shaft and the addition to the mill capacity.

At the Selleck a contract has been let to sink the shaft an additional 100 feet to the 350-foot level.

J. F. Clapp is developing a group of claims just to the northwest of the Selleck property.

Crosscutting for the Crown Lead vein continues at the Red Banks. It is hoped that the ledge will be reached by the middle of December. These properties adjoin the Mariposa grant and are under a bond, aggregating a quarter of a million dollars, to the London Exploration Company, already part owners in the great Mariposa estate. The value of the Red Banks property is conceded to be proved already, and should the present developments prove the surface values of the Crown Lead to continue in depth there is little doubt of the sale being consummated, which would mean much for Mariposa county and probably have a considerable bearing upon the often-promised opening of the grant itself.

A small force is crosscutting on the Penon Blanco.

The Mariposa Electric Power Company has reorganized with Capt. A. H. Ward president and E. A. Wiltsee vice-president, and negotiations looking to the immediate construction of the plant are in progress. The company has secured a tract of land covering both sides of the Merced river, in a narrow canyon about six miles above the old Benton mills. Surveys for canals, etc., have been made and the plats filed at Washington to secure the right of way have been approved by the Secretary of the Interior. Provisional contracts for sale of power are already made in sufficient amount to yield a handsome revenue on the estimated cost of the plant, which will be within easy reach of all Mariposa and the southern part of Tuolumne counties.

A suit of considerable interest to mining men has been started in the Superior Court of this county under the title of Reynolds vs. Bruner. Some years ago Reynolds relocated an abandoned mine and has continued ever since to work it and has developed a property of considerable value. About a year ago Bruner bought up a defaulted school land entry which ante-dated Reynolds' location, and obtained a State patent to the whole section 36, including Reynolds' mine, with the value of which Bruner was well acquainted. Reynolds now brings suit to quiet title. Frank H. Gould and Gavin McNab have the plaintiff's case in charge and it is expected that some valuable decisions may be arrived at before the case is concluded.

Mariposa, Cal., Nov. 1st, '97.

Nevada.

The great incline that the Red Dog Mining Company has been digging for three years has been pushed into the old channel that, at other places in the immediate vicinity, has given such large quantities of gold. If the gravel is satisfactory a mill will be erected.

D. L. Calkins is running a 300-foot tunnel to work the gravel lead on Selby Flat.

Transcript: At the Phœnix the new hoisting and pumping rig is in place. The trench is completed for the 4500 feet of pipe. Manager Shockley expects that everything will be in readiness to start by the 20th inst.

The Bellefontaine is still drifting from the bottom of the shaft that was sunk 100 feet below the tunnel. The ledge is only 11 or 12 inches thick, but is of high grade. The milling portion pays over $30 a ton.

Placer.

The Pioneer directors make the following statement in relation to the vein in No. 4 tunnel: "At the time we left it was 270 feet in length, averaging 5½ feet wide, and yielding from $10 to $40 per ton. In the opinion of the superintendent there was every indication of the pay chute extending a considerable distance farther north. The vein is a strong and well-defined fissure, and is now well opened and in condition for stoping, so that all the ore which is necessary for running the mill to its full capacity can easily be obtained (40 or 50 tons daily) as soon as the rainy season sets in, so that there will be plenty of water to run the mill."

The Pioneer Gold Mining Company has ordered a survey for a new tunnel on the 1500-foot level to strike the vein at the No. 4 tunnel at the 1000-foot level. The foundation for 20 additional stamps has also been ordered and the directors recommend the building of a chlorination plant to treat its own sulphurets. In the spring another compressor will be added, and those now in use will be moved to the new location near the river. Then the mill, as well as the drills, will be run by air.

A Forest Hill report of the 2nd says workmen employed in the long tunnel of the Eureka gravel mine have broken through the rim rock and came upon the bed of gravel for which the company has been tunneling for some time. "The workmen made their discovery at 3 o'clock this morning and to all appearances have struck rich gravel." Felix Chappellet of Oakland, Cal., is at the head of the enterprise, and in spite of the opinions of many prominent mining men that there were no gravel deposits where the Eureka Company was working, Mr. Chappellet continued his operations and staked his money and professional reputation that his judgment was good. The country is a very hard one in which to prospect, it being covered with deep lava deposits. The Eureka people have always had faith in their investment and own 4000 acres of land along what they believe to be the channel. They have in this manner secured seven miles of the channel, and the amount of gold contained ought to be considerable.

Plumas.

At the Star Plumas mine on Little Bear creek, men under the superintendence of F. D. Rood are busy laying pipe. A flume to convey water to the pipe is being erected. A good road, three miles of which is graded, has been made to the mine.

E. A. Davis of San Francisco has bonded the Johnny Bull mine for $20,000 for ninety days.

San Bernardino.

A strike has been made in the Rose mine between the 800 and 900-foot levels, enough ore being in sight to keep the 10-stamp mill running for years.

San Diego.

The receiver of the Golden Cross Mining & Milling Company at Hedges has filed his report. Ninety-five stamps are now in operation, employing 177 men. The debts of the mine have been paid, and there is now on hand over $50,000. It represents the profits of three months' operations. The report states that large bodies of free milling ore are in sight.

Santa Clara.

Last Thursday Commissioner Hermann of the General Land Office made a decision in reference to the Guadaloupe mine, in contest with various agricultural claimants, and claimed by the Santa Clara Mining Association as a portion of the Guadaloupe quicksilver mining claim. They contended for the whole as one compact body, while the agricultural claimants claimed separate tracts. This land fourteen years ago was decided by the Secretary of the Interior to be mineral, but the claim of the mining contestants being subsequently declared invalid, the agricultural claimants renewed in 1893 the contest which has since been waged. The Commissioner affirmed the decision of the local land office at San Francisco upon the facts, and held the lands are agricultural.

Shasta.

The Laconia Mining Company of San Francisco is capitalized at $100,000 and will operate in Shasta county.

At Harrison Gulch the Midas Mining Company will soon commence work on a cyanide plant, near their 10-stamp mill. L. Powers of Wildwood has the contract for foundation timbers.

Siskiyou.

The deed for the sale of the Bunker Hill mine was filed in the recorder's office this week, although the sale was made some time ago, the consideration having been $10,000. The Bunker Hill mine is situated on the Klamath, fifteen miles below Happy Camp, and contains 160 acres of ground. A splendid supply of water is obtained from Independence creek, through a large ditch four miles long. Two giants are kept in operation when the supply of water in the creek is not too low. The Bunker Hill mine has been paying well since the present company purchased it, and is one of the best equipped hydraulic mines in the county.

The Espy-Hunter hydraulic mine, four miles north of Yreka, will be worked again this winter, as soon as there is sufficient water in Shasta river to keep the big pump in operation. The total amount of ground to be mined is 200 acres, which will take a number of season's to work out. The owners have experienced considerable trouble in the past with this large pump, which is one of the heaviest ever built, forcing the water to a height of 432 feet.

Journal: The Greenhorn blue gravel mine

is to be worked on an extensive scale as soon as winter storms occur to furnish water; three shafts are to be utilized in hoisting pay gravel from bedrock.

The new company now working the old Spencer mine on north fork of Humbug creek intends running a tunnel below the old works 700 feet.

The Katie May ledge on Greenhorn, which has been worked by Bailey & Carrick for some time past, has been purchased by A. Wetzel & Son, and will be developed on a more energetic scale.

A rich strike has been made at the Commodore mine on Barkhouse creek, owned by Quigley & Humphreys. On last Saturday, it is reported, they took out $500.

Trinity.

A strike is reported at the Belle mine, two miles north of the Rawhide. At 200 feet crosscutting is reported to have developed an ore body of 32 feet, in which is a streak 8 feet wide which assays $23 to the ton. A 40-stamp mill is to be erected.

At the Norwegian, just east of the Belle, the average value of the milling rock is $30. It is stated that $60,000 has been produced by the mine since January. Every dollar was taken out of the new shaft, as crosscutting has just begun.

The *Searchlight* hears that Menzel & Pugh have struck a rich chute of ore in their claim on Clear creek, the rock running from $200 to $300 a ton. They are preparing to put in a mill, to be run by water power.

Journal: At East Fork the Enterprise Company are prospecting the Enterprise vein and have men at work on the Lone Jack. They have been stoping ore and now have the bins full and will begin crushing as soon as the custom run has been made in their mill of the rock from the Hoodoo mine.

At the Yellowstone R. A. Skinner, the lessee, has struck a good body of pay ore. The 10-stamp mill will run night and day, and a good cleanup is looked for.

Tuolumne.

Superintendent Tritteabach has surveyed a roadway for a branch line of the Sierra railroad to the Dutch mine. The line will begin from a convenient point on Wood's crossing, and is expected to be completed within the next few weeks.

Independent: At the Mt. Jefferson mine there are two shafts, 80 feet and 100 feet deep. In the 50-foot level in shaft No. 2 milling ore has been taken out that assays $8 per ton. The property is owned by a Boston syndicate. J. M. Mughen is superintendent.

The Sell mine, near Sonora, is to have a 10-stamp mill run by water power.

At the Longfellow Stanley & Co. have been taking out specimen rock, besides milling ore that goes $50 to the ton, from the east 120-foot level. It is stated by reliable authority that Messrs. Roberts, Moore & Mitchell have bonded it to Glasgow men.

Yuba.

The Postlethwaite dredger is slowly working its way up the Yuba. According to a recent survey the dredger is operating in the channel and scraping the bottom at 35 feet in the tough clay and red earth. The gravel is found to be richer in gold as they advance up the river. The machinery runs well.

The Consolidated Nugget and Coronado Mining & Milling Co., principal place of business, Smartsville, proposes to mine for gold and deal in electric light, heat and power.

At Strawberry Valley Supt. Darwin is pushing work on the Berry mine.

At the Independence quartz mine, three miles east of Strawberry Valley, a 2-stamp mill is kept busy.

NEVADA.

The Hawthorne *Bulletin* gives a number of items of interest from the Silver Star mines. The general conclusion is that the mines are holding out and looking well. The Bounce ledge is opened for 350 feet, and averages 3½ feet of milling ore, large runs of which mill $17 right along. A back ledge of smaller size mills $30 to $40 per ton.

Arrangements are being made for the erection of a 20-stamp mill at the new discoveries at Ione.

The Cortez mines will be worked through this winter by Simeon Wenban, the owner.

Salt Lake *Tribune*: Dick Frank came in from Cherry Creek, Nev., yesterday, and at the office of the Consolidated K. C. S. & R. Company in this city delivered forty pounds of cyanide of gold, which represents a brief run at a cyanide plant with which he extracted the yellow metal from dumps that were reared at an earlier period in the history of Cherry Creek diggings. In addition to this, the visitor is developing a mine and operating a small stamp mill about eight miles south of Cherry Creek.

OREGON.

Supt. Vass of the La Bellevue and Con. Virginia mines, near Baker City, says that in the former a connection has been made in the tunnel from the north side of Cabell mountain; that there is a continuous tunnel through the mountain for a distance of 3200 feet on the ledge, which is exposed for a distance of 4500 feet. The development work on the property amounts to about 8000 feet.

At Beekman & Huffer's ledge in Shively gulch, west of Jacksonville, recently 2½ tons of ore were crushed in their mill, and a $1200 brick was the result. Fifty sacks second-grade quartz, milled some time before, yielded $550; 2600 pounds of concentrates smelted in San Francisco produced at the rate of $180 to the ton.

The Baker City *Epigram* says: The sale of the Bonanza mine, the Geiser property, is off. It is understood that eastern parties, who were to put up $750,000 as the purchase price of the mine, discovered that the middlemen were to get a rake-off of $250,000 and this they did not propose to stand, hence they forfeited the $25,000 made as first payment and declared the buy off. This is nothing at all detrimental to the mine; it does not harm its value in the least; neither are the Geisers injured, as the Bonanza is looking better now than ever before and the Geisers do not care a rap whether they sell or not. Their fortune is made anyway. The people who are sore are those who anticipated having a real nice time cutting up that $250,000 among them.

BRITISH COLUMBIA.

A Sandon dispatch says the Noble Five mine, tramway and concentrator have closed down, throwing seventy-five men out of employment. The report comes from a source considered reliable that on October 20th the Sandon branch of the Bank of British North America refused to honor any more pay checks of the company, and served a summons on the resident manager which resulted in the immediate suspension of work. The men were promised that pay checks already issued would be cashed by the company on November 1st. It is said that the debt to the bank is $35,000, and the company is endeavoring to negotiate a loan of $150,000. The mine has the best equipped tramway in the Slocan, erected at a cost of $50,000, and the concentrator plant cost $55,000.

J. H. Suisman of Montreal, of the smelter department of the Canadian Pacific railway, is reported from Nelson as saying that the Canadian Pacific intends to have smelters along its route, and if they are not erected by a private enterprise the corporation or some of the directors in it will construct them themselves. Robson and Slocan crossing have been under consideration as possible smelter sites. Should the company or its directors construct a smelter it will run on custom ores, as the company does not intend to go into the mining business.

The Hall mines directors report the results of the company's smelter operations during a period of thirty-two days ending September 30: Sixty-two hundred and ten tons of ore were smelted, including 522 tons of matte, containing (approximately) 249 tons of copper, 141,860 ounces of silver and 98 ounces of gold.

Shipment of matte and bullion from smelters for the week ending Oct. 30 was: Matte, 80 tons; bullion, 81 ounces; pig copper, 1100 pounds; total value, $79,253.08.

ALASKA.

As previously announced, at the recent meeting of the leading owners of the Alaska Treadwell mine in New York it was finally decided to expend $500,000 in making additional equipments to the property. Three hundred more stamps will be erected at the Treadwell, making 540 in all. On the grounds of the Alaska United, between the Treadwell and the Alaska Mexican, another mill of 120 stamps will be built for the use of the United and Mexican mines. New compressors for the Treadwell and the United are other improvements that have been decided upon.

At present the power for the 240 stamps of the Treadwell and the Mexican plant is sufficient, but for the running of the new machinery an electric transmission power plant, capable of operating 600 stamps, is to be erected beyond the Gastineaux channel. This work will be accomplished in the spring, and when completed it is estimated that the ore of the Alaska Treadwell group can be mined and milled at a cost of less than a dollar per ton. An eight or ten drill compressor will also be placed next season on the Juneau mine in the Silver Bow district.

The Juneau Mining *Record*, in its latest issue, says: "The North American Transportation and Trading Company will send a stamp mill to Dawson on the first steamer going up next summer."

Postmaster W. W. Montague of San Francisco asks that the miners and general public be notified that newspaper mail cannot be sent to the Klondike before next spring, even when it is enclosed in envelopes and letter postage is paid on it. Such large quantities of papers have been received at Dyea that the Department is unable to get them over the Pass, and has issued orders that envelopes containing a newspaper, even though they may also contain letters, are to be sent back to Seattle and held until next spring, when they will be sent by way of St. Michaels.

Two new postoffices the other side of the Chilcoot Pass have been established. One is located at Tagish Lake and the other at Lake Lebarge, and bear those names. Both are in the Northwest Territory.

The pest of Alaska mosquitoes might be mitigated if what an M. D. says can be made to practically work: "I can take a minute crystal of permanganate of potash, drop it in the water containing the bacilli of the mosquito, and the oxidation that takes place will almost instantly kill every atom of life that may be present. I will show you how to kill mosquitoes or show you how to develop them. The quantity is one part to 1-500 parts, and 25 cents' worth will be sufficient to operate on a ten-acre area. A handful will be enough. It may be scattered around, a few crystals at a time, widely apart, and I promise that the production of mosquito germs will be immediately stopped. In my laboratory I have killed the germs in a 1000-gallon tank with a pinch of permanganate. There is no reason in the world why vast sections of swamp land should not be treated in the same way. A little care will save endless annoyance and destroy billions of the insects."

IDAHO.

The 10-stamp mill of the Badger Mining Company at Camp Badger, in Idaho, was started up this week.

In the vicinity of Burke, the Standard has made great improvements.

The Mammoth owners leased the Gem mill this summer, since when the force employed has been nearly doubled, about 125 men being employed.

The Tiger & Poorman Consolidated Mining Company is working about 150 men and turning out about 1000 pounds of concentrates daily for each man employed. The shaft is now nearing the 1400-foot level, with a little improvement in the ore for each additional level. With present condition it can be worked profitably down to 3000 feet.

Wallace *Press*: An English syndicate has a bond on part of the Leslie group of twenty claims, near Sohon Spur. The papers signed call for $100,000. Mr. Everett is to be manager.

Boise *Statesman*: The siphon over the Boise river, for the Twin Springs Company, will be 1700 feet in length, 4 feet in diameter, crossing the river on a bridge 60 feet above the water. The pipe is made of steel varying in thickness from one-eighth of an inch to nine-sixteenths. The sections of pipe are 15 feet long, and weigh from 2000 to 4500 pounds. Where the pipe crosses the bridge it will have to sustain a pressure of about 140 pounds to to the square inch. On the Sheep creek side the siphon will attain a perpendicular height of 386 feet above the bridge, and on the other side 360 feet. In erecting the siphon the pipe will be handled in cars, a tramway being built for the purpose. The joints will be riveted and the seams at the joints caulked. The pipe for the siphon cost $22,000.

UTAH.

From Park City, on the 1st inst., the Ontario Silver Mining Company shipped by express forty-five bars of silver, aggregating 27,978.83 fine ounces.

The *Tribune* says the construction of a mill with which to handle the enormous bodies of concentrating ore already blocked out will be the main issue at the approaching meeting of Centennial-Eureka stockholders, and that provision will be made for its early construction is believed by every person who has ever been admitted to or who is at all connected with the underground workings of the bonanza.

MONTANA.

California has many deeper mine shafts than the Butte district, some being over 2300 feet, but probably no district in the country, except it be the Comstock, Nevada, can compare with Butte in the aggregated depth of its shafts and its underground work in the way of tunnels, winzes, drifts and stopes. The *Inter-Mountain* says its shafts alone, if all together, would make a hole in the earth more than fifty miles in depth, while a conservative estimate of the drifts, tunnels, winzes, stopes or other underground workings would place it at about 750 miles. That this estimate is a reasonable one may be gauged from the fact that careful surveys of the Alice properties show that the total development exceeds twenty-five miles, while the Lexington will probably exceed that number. No man whose business does not call him underground frequently can conceive of the magnitude of Butte's underground workings. The stopes in the big copper properties are bewildering labyrinths, chiseled out of solid rock, and out of which even the experienced miner has difficulty in tracing his way.

But it is not the big producers alone that make up the sum total of Butte's underground workings. There are hundreds of shafts from 100 to 1000 feet deep scattered all over the rich district upon which miles upon miles of work has been done. They are mostly silver properties, abandoned, now, but awaiting the day of silver's restoration. To the pilgrim observer, who views them from the surface, they are but holes in the ground over which he can step at will, but to the men who have expended large sums of money and months, perhaps years, of patient toil in delving for the once precious but now debased metal, they represent much—wasted energy, blasted hopes, and in many cases utter ruin.

The following is an accurate list of the present depth of a few of the mines in operation during the present year. Many others might be added. At many of the mines enumerated below sinking is in progress at present, and by the end of the year several shafts will have neared the 2000-foot mark. Sinking is in progress now at the Mountain Con. No. 1, Green Mountain, High Ore, Mountain View, Pennsylvania, West Colusa, East Gray Rock, Parrot, Little Mina, Gagnon and other mines. The following is the list of a few of the mines operated this year:

	Depth.
Mountain Con. No. 1	1,400
Mountain Con. No. 2	1,500
Buffalo	1,000
Green Mountain	1,600
Anaconda	1,400
Never Sweat	1,400
St. Lawrence No. 1	1,400
High Ore	1,600
Diamond	1,200
Bell	1,500
Poulin	1,200
Mountain View	1,200
Silver Bow No. 1	1,000
East Grey Rock	1,400
Colusa Parrot	1,150
Original	1,000
Parrot	1,122
Gagnon	1,525
Lexington	1,465
Alice	1,500

The following is a list of the number of men employed underground by the largest companies of the district:

Anaconda Copper Co.	3,052
Washoe Copper Co.	110
Boston & Montana Co.	685
Butte & Boston Co.	198
W. A. Clark's mines	165
Parrot Mining Co.	334
Colorado Co.	334
M. O. P. Co.	252
Alice	134
Snohomish	56
Speculator	38
Other mines (est.)	500
Total	5,858

A cablegram has been sent from the head offices of the Diamond Hill Company of Jefferson county, at Glasgow, Scotland, ordering a shutdown of the entire plant for a time. The reason given is that the power that was developed on Crow creek is far short of the amount necessary to run the 120-stamp mill recently completed on the property.

The Mayflower mine, in Madison county, is now the greatest producer of the State, says the Libby *Montanian*. Last year it produced about $550,000, but this year, even if the present rich ore body holds out, it will not yield more than $200,000. The introduction of the cyanide process in many old districts in Montana this season will have an important bearing on the output of next year. In many portions of the State there are bodies of low-grade ore which, it is thought, can be profitably worked by this process.

Eugene B. Braden, assayer in charge of the United States assay office at Helena, has begun the work of gathering statistics for his annual report to the director of the mint of the metal output of Montana. Mr. Braden says the total mineral production of Montana will be greater this year than last. The increase will be mainly in copper. From what information he has obtained he believes there will be less gold, silver and lead than was produced last year, although the decrease may not be great. Several lead producers in Montana have closed down during the year owing to the low price of the white metal. There is little doubt that the copper production will be greater than ever before.

The Michael Devitt mining claim, a five-acre fraction, was sold on the 1st inst. at the referee's sale at Butte for $601,000 to Frank Klepetko for the Butte & Boston Mining Company. The Anaconda Mining Company bid $600,100 for it and the Montana Ore Purchasing Company offered $595,000.

Madisonian: Manager Henry Knippenburg of the Hecla Consolidated Mining Company expects to soon have his smelter running at full capacity. The smelter was shut down in August because of lack of lead ores. A new mine, the Ariada, gives promise of an ample supply. One of the furnaces of the Hecla smelter was started up last week. The Hecla group is owned by a company of Indianapolis men, who have taken out of their mines $2,250,000 in dividends. The Cleopatra mine, the largest of the group, produced, since it was opened up in 1877, $10,000,000. The mine was closed down two years ago, having been worked out. Its ore body, as in other mines of the group, laid in a blanket-like form, which was reached by an inclined shaft that attained a depth of 4100 feet along the lead, or more than 1000 feet vertical depth. The ore body of the Cleopatra was immense and ran high in lead. It averaged throughout all the years it was operated about 30 per cent lead and 45 ounces in silver to the ton. The ore was singularly adapted for reduction by smelting. The company has a large supply of high-grade silver ore on hand. Most of these dry silver ores are from the Cleve, a mine located about one mile below the old Cleopatra. The Cleve is a well-developed property and shows a great ore body, the vein being from 5 to 30 feet wide. The pay streak will average 5 feet wide through that part of the mine already developed. The ore runs about 100 ounces of silver to the ton and a trace of gold.

The Ariada, the mine from which Manager Knippenburg hopes to get an ample supply of lead ore, is located below the old Cleopatra mine, but on a different lead. It is being worked by a shaft 300 feet in the mountain side. Drifting is going on from each side of the shaft and development work is being pushed as rapidly as possible, Mr. Knippenburg working three shifts in the mine.

The pay-roll of the company in July was $23,000 and in August $19,000, being greatly reduced owing to a partial suspension of work because of the shortage of lead ores. It was even less last month than in August, but it is believed will steadily grow larger until its normal state is reached. In years past the company paid out in mining and smelting operations from $55,000 to $65,000 a month. Mr. Knippenburg has been general manager of the company's business seventeen years.

Basin *Progress*: The Katie mine has been paid for. The final payment was made in Helena this week by the Basin and Bay State Mining Company, which now owns the property. The mine was bought in 1894 from M. O'Donnell and A. and R. H. Kleinschmidt for $105,000, which sum has been paid in monthly installments.

WYOMING.

George Doan, owner of the Battle Lake copper mine near Saratoga, recently shipped a carload of copper ore to Chicago, containing 22,524 pounds, which sold for $1,984.34. Freight and other expenses amounted to $175.89, net proceeds, $1,808.47.

SOUTH DAKOTA.

Chicago men have put $2,000,000 into the organization of two new mining companies to operate in the Black Hills and placed an order for a gigantic ore roaster. The Chicago & Two Bit Mining Company and the Great Northern Mining Company are also interested in the Hardin Mining Company of Two Bit, S. D.

J. D. Hardin says shaft sinking has been begun, and it will be prosecuted until they have gone down from 200 to 250 feet, when good paying ore will be struck. They have every reason to think that the Two Bit and Great Northern will pan out as well as the Hardin mine, in which there is now over $1,500,000 of loose ore lying about ready to be smelted. The men who are associated with Mr. Hardin in his mine are also concerned in the companies just formed. They also own the townsite of Two Bit, which is a growing town only three miles from Deadwood. They are about to begin the construction of the largest smelter in that region, at an estimated cost of $250,000.

Deadwood *Pioneer-Times*: The plans for the Union Hill mill and system of ore breaking contemplates one of the most complete stamp mills in the country. The batteries are larger and the stamps heavier than those in use by other companies. The plans are for 1000-pound stamps, while those of the Homestake are 850 to 950. The Homestake has a 200-stamp mill with an average crushing capacity of 3¼ to 3⅜ tons per stamp every twenty-four hours. The Union Hill mill will have 180 stamps, but as the stamps will be heavier

(Continued on page 438.)

Electrical Progress.

Water Wheel Regulation.

The following is a paper read by Mr. S. N. Knight, of Sutter Creek, Cal., at the meeting of the Pacific Coast Electric Transmission Association, held at Sacramento, Cal., Oct. 20th, 1897:

During the past ten years there have been many attempts to improve regulating apparatus for water wheels, especially in the case of wheels employed to drive electrical generators where close regulation in speed is indispensable, and is especially important when currents for power purposes and for lighting are both taken from the same lines.

Makers of water wheels and regulating apparatus well know the difference between a long and a short supply pipe in respect to the difficulties of regulation, and on this coast we have had the extreme of this difficulty to contend with. In the Eastern States the heads are low and the conduit pipes so short as to scarcely involve the elements of momentum, which is a principal impediment on this coast, where the heads are usually hundreds of feet and the conducting pipes miles in length. The ordinary means of regulation are not applicable under these circumstances.

A long pipe filled with water is a moving solid, less elastic and compressible than steel. It cannot be stopped and started except in a considerable period of time, and, when accelerated, cannot be reduced in velocity except by another period of time, varying in our common practice here from five to thirty seconds, or in proportion to the length of the pipe line from which the supply is drawn.

It is evident that, under these circumstances common throttling devices would be of no use, and that a change of the regulating valve produced by vibration in the speed of a water wheel would fail to have effect, so other methods have to be adopted.

Some makers of high-pressure tangential water wheels employ what are called deflecting nozzles, by which the water is diverted from the wheel when not required, and its energy lost. This method obviates the inertia factor in regulation and permits the pressure and flow in the pipe to remain uniform, but it leads to a waste of water equal to all variations below a maximum load and is too wasteful in any case when water is paid for in volume, or is scarce.

This method is especially objectionable when there are but two or three nozzles of large size, and is less objectionable when there are a large number of nozzles of small size—in other words, the loss of water is as its sub-division and as the size of the jets or streams cut out and in for regulation.

In the case of either throttling or cut out regulation, and when the governing devices are controlled by an electric current from the switch-board of a station, either by hydraulic pistons or solenoids, general regulation is easily adjusted by comparing a scale of the indicated horse power with the Watt meter, and the number of jets or issues can be adjusted to give the maximum power required.

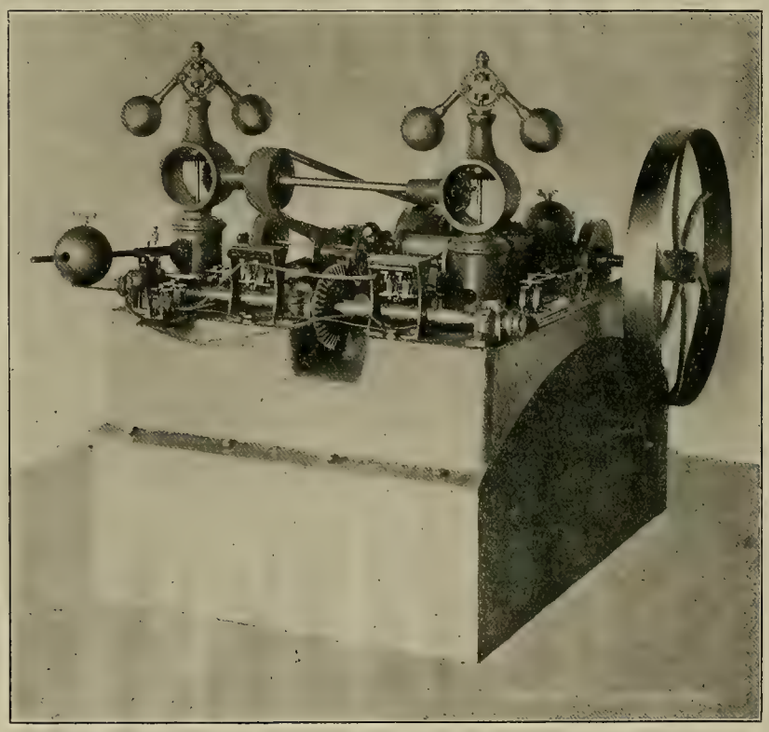
In this manner, if the number of issues be five, and the variations of current do not exceed 20 per cent, all regulation will be performed by one issue or nozzle, and any loss of efficiency in this issue due to throttling would be divisible by five, so the losses of regulation would be inconsiderable.

This method does not, however, provide for inertia and momentum in the pipe line, and at the works of the Pioneer Electric Power Company of Ogden, Utah, where the pipe line is 6 miles long and 6 feet in diameter, the periods of change in the flow of water are supplemented by heavy flywheels, that give out or absorb energy during periods of change. In this plant of 6000 H. P. are surmounted perhaps the greatest difficulties ever encountered in respect to regulation, which is provided for in several ways, one of which is provided for by overflow or relay stand pipes, designed by Mr. C. K. Bannister, chief engineer of the company.

These stand pipes, one of which is within one mile of the station, performs the functions of an air vessel, except that the resistance is as the gravity, and motion, as the square root of the head, and in these respects differs from the action of compressed air. The stand pipe mentioned, in effect reduces the pipe line to one mile in length; but even this mass of water, weighing more than 4500 tons, has to be handled with care. Its properties as to motion can be imagined by comparing it with a large ocean steamer and how such a steamer could be moved backward and forward to adjust the speed and energy of a water wheel.

Fly wheels placed on the water wheel shafts have to withstand an enormous speed of revolution, the strain exceeding the limit for cast iron, but within the strength of the best malleable metals, such as fibrous iron and alloys of certain kinds too well known to need mention.

The writer, who was the contractor for and constructed the hydraulic power plant in the Pioneer Electric Power Company's plant at Ogden, adopted a form of regulating apparatus that was intended to form the principal subject in this paper.



SIDE ELEVATION AND PLAN VIEW OF REGULATING APPARATUS.

This apparatus, of which there are five sets, applied to as many water wheels, giving out 6000 H. P., is partially shown in the engraving herewith, showing a side elevation and plan view.

It seems an extensive and somewhat complicated device, but contains only the elements required to perform the necessary functions and insure regulation under the extremely difficult conditions I have been pointing out.

It is of course impossible, in word alone, or with the aid of illustration, to fully explain the mechanism and the particular manner of its operation. The best I can do is to describe in general terms the main elements and the principle on which they operate.

There are, as seen, two centrifugal governors, driven at the same speed from one shaft. When the speed of the generators change, one governor acts by closing an electric circuit communicating to a magnet, or solenoid, that by means of lever engages a friction clutch and sets in motion machinery driven from the main shaft that opens or closes a throttling valve, or the induction issues of the water wheels. The electric circuit and action of the solenoids is not constant, however; if so, the regulating action would outstrip the change in the motion of the water in the pipe line, so the electric circuit established by the governors' action is broken intermittently by a relay of the action on the water being confined to one-sixth of the time.

If, under these circumstances, the change of speed in the water wheels and generators is not accomplished by the first governor, the second one comes into action, and also closes the electric circuit to the solenoid, which current is also intermittently broken, but at longer periods corresponding to one-third of the time. In other words, the action on the water regulating apparatus is doubled by the second governor. If, however, as is possible under extreme changes, this intermittent action of the regulating apparatus does not produce the required change of motion in the wheels, a third contact is made by the second governor, and so the current and action of the solenoid becomes constant until the speed is checked or accelerated to meet the load or resistance.

This, in general terms, is the method of operating, carried out successfully in the case named, one of the most extensive installations in the world, and certainly one where the impediments to be dealt with have no parallel in modern practice. Had the regulating apparatus been given a free range and continuous action between the extremes, the result would be destructive racing and no useful results could be attained.

In this case the adjustment of the electrical elements provide for twenty-four changes of the rate at which the clutches and water regulating gearing may operate. In other cases this range of adjustment can be less and the regulating mechanism as a whole be simplified, the mode of operating remaining the same.

I may mention that this regulating apparatus was designed and made at the works of Knight & Co., Sutter Creek, California, and while the plans and construction involve a good many intricate problems, these have been less difficult for the writer to deal with than this attempt to describe the work.

S. N. KNIGHT.

Sutter Creek, Cal., Oct. 20th, 1897.

THE San Gabriel, Cal., Electric Company, which is developing water power in the San Gabriel river, expects to be able to supply arc and incandescent lights and power for all purposes by February 1st, '98. At the headwaters of the San Gabriel the company has 150 men employed on tunnel work, nearly all the tunnels, the longest of which is 1600 feet, being worked from both ends, day and night, in eight-hour shifts.

Scientific Progress.

Limits of the Universe.

The announcement that the limits of the universe have been reached by human vision is startling. Prof. Newcomb, recognized as one of the greatest of living astronomers, says evidence is accumulating which points to a probability that the small stars which our powerful modern telescopes have brought into view, do not look small because they are farther away, but by reason of their inferior size. There are no more beyond. In other words, we are actually able to see the boundaries of our universe. Of this universe we know the general form. It has the shape of an enormous disk, the solar system being not far from the center. We may say that this disk, so inconceivably huge, has a diameter four or five times its thickness. As to the length of the diameter we cannot speak with great accuracy, because we are not acquainted with the precise distances of many of the stars. Fifty years hence we shall know a great deal more on that subject than we do at present. We may say that the distance across the disk, from one side of the universe to the other, is 20,000, or may be 30,000 light years. There is a wide margin of guess in the estimate. A light year is the distance which a ray of light will travel in one year. One can figure that out himself, the rate being 186,000 miles a second. It takes a little over eight minutes for light to come to us from the sun, which is 93,000,000 miles away. The light by which we are able to see a very distant star through a telescope may have started from that star 25,000 years ago. Assuming that to be the case, it is 25,000 light years away from us. We can see about 5000 stars with the naked eye. With the most powerful telescope we can see perhaps 50,000,000. There is no telling how many millions more there are unobserved. Presumably there are millions of stars which are dark and therefore invisible, being dead, cold and no longer luminous. All of the stars are suns, the tiniest speck of light we see in the heavens at night being comparable in size with our own luminary. Some of the stars are vastly bigger than our sun, while others are smaller. It is not possible to state the average size of them, but we can say that our solar orb is rather a small star than a big one. The star called Alpha Lyra is one of the giant suns. Another, more familiarly known, is Sirius. The latter has about twenty times the mass of our sun and shines with a hundred times the brilliancy. When one gazes on the Milky Way, he is looking through the disk edgewise from the center. Of course, the Milky Way is observable as a stream of stars continuous around the earth. Our sun is a star in the Milky Way. The Milky Way is the disk of which he speaks. Look out into the heavens on either side, and one will observe that the stars are comparatively few and scattered. One may get a notion of measments from the fact that the radius of the earth's orbit, a line 90,000,000 miles in length, not only vanishes from sight before we reach the distance of the great mass of stars, but from that distance becomes such a mere point that, when magnified by the powerful instruments of modern times, the most delicate appliances fail to make it measureable.

THE human mind is still evolving in the view of Dr. R. M. Bucke, as expressed at the Montreal meeting of the British Medical Association. By slow

and dubious steps taken in darkness our remote ancestors wearily climbed to simple consciousness, he affirms, and after another immense interval they reached self-consciousness. This cannot be the end. Our old mental faculties are some of them fading out, others advancing toward greater perfection, and alongside of them new ones are springing up, some of which will, without doubt, be of overshadowing importance in the future. So-called telepathy and clairvoyance seem to be specimens of such nascent faculties. But of infinitely more importance than these is that, superimposed upon self-consciousness as is that faculty upon simple consciousness, a third and higher form of consciousness is at present making its appearance in our race. We have had occasional and increasingly numerous examples of it for 2000 years. In the course of a few more milleniums there should be born a type of men possessing this higher consciousness, and the advent of this higher, better and happier race would justify the agony of its birth through our past.

"Gold Growth."

In a pamphlet entitled *Gold Growth* (Cincinnati, The Robert Clarke Co.), John Jacob Wagner asks: "Does Nature transmute silver into gold? If it does, can we derive and utilize such hints, from Nature's operation, as will enable us to attain artificial transmutation?" The former question he answers in the affirmative in the pamphlet before us; to the latter he promises a reply "in due time." The basis of the author's argument is that gold in nature is always found associated with silver, and the ratio of gold to silver is not uniform. If silver never occurs without some gold, it follows that the gold has grown from the silver, and the varying proportions found in different mines are due to the length of time the growth has been going on. Hence in the older rocks the proportion of gold to silver is greater than in the later rocks. Pure gold can be separated from silver alloy; but the "fine silver" resulting invariably contains gold. The inference is that the silver is "growing" into gold. This pamphlet belongs to a class of writings by no means rare, the efforts of laymen to clear up facts and theories which are far from clear to specialists who have devoted their lives to them. Granted that the premises of the writer are true, his deductions would have no weight to a chemist. He finds not merely silver and gold occurring together, but many other elements always associated with each other. If gold "grows" from silver, why not potassium from sodium, or bromine from chlorine, etc.? The only difficulty with the theory is that at present there is absolutely no evidence of facts to support it, and the wisest chemists hesitate to philosophize on the problem of the genesis of the elements.

SODIUM is made by the Castner process of decomposing sodium hydroxide electrolytically at Birmingham, England, at the rate of about 2000 pounds per diem, the product being worth about 50 cents per pound. The process has been introduced at two or three places in Germany, and in the United States at Niagara Falls. The cost of making sodium by this process is secret; very little of the metal is sold, the most part of it being consumed by the producers for the manufacture of sodium peroxide. It is said also that a good deal is used in the manufacture of potassium-sodium cyanide, it having been proved that when the yellow prussiate of potash is heated with sodium neither oxygen nor alkaline carbonates are introduced, the product being an almost chemically pure mixture of sodium and potassium cyanides.

IN his report to the Steam Users' Association of Boston, Mr. Hale traces out the amount by which the efficiency of combustion falls short of perfection by reason of the unburned fuel found in the ash-pit and flues. In one set of tests it is shown that the unburned coal ranged from 1.6 to 8 per cent of the total coal stoked, the combustible value being from 0.6 to 3.3 per cent of the total heat value of the coal used. Tests on Pennsylvania coal gave, with grate bars 1⅛ inch wide and 1 inch apart, 16.1 per cent of refuse, whose total combustible value was 4 per cent of that of the coal stoked, these figures reaching respectively 18.7 and 12.6 per cent when the same coal was stoked with a mechanical stoker.

HARTLEY AND RAMAGE, in a paper read recently before the Iron and Steel Institute, give the results of spectroscopic investigations of numerous ores from which it appears that the rare elements are much more generally diffused than is generally supposed. The Bensberg and Pierrefite blendes are richest in gallium, while that of Freiberg is richest in indium. Lithium is found almost invariably in iron ores. Rubidium is frequent in iron ores. It is a marked characteristic of siderites that they contain gallium. Ores derived from the older rocks, such as bauxites from basalts, contain chromium, nickel and gallium. In clay-iron stones gallium is found in twenty-one out of fifty-one specimens examined, chromium frequently and nickel occasionally occurring with it. Thallium is rare in oxide ores, but is frequent in pyrites. Indium is not uncommon in pyrites, but gallium is comparatively rare.

LORD KELVIN contends that the earth might be white hot 2000 feet below the surface or as cold as ice 50 feet below without changing our present climate. He attributes the intensely hot climate of an earlier age to greater heat of the sun.

Mechanical Progress.

New Mine Leveling Instrument.

According to the *Berg und Huttenmanische Zeitung*, an instrument has been designed with which accurate leveling operations may be carried out underground with equal facility in steep and narrow inclined shafts and in adit levels. The advantages presented by this instrument are the rapidity with which it may be set up, as it is merely suspended from the station-point, and the ease with which leveling may be carried out in inclines of 0° to 90°, even when they do not exceed 3 feet in height. Nine illustrations are given by the author, showing the construction of the instrument and the method of using it. Briefly described, it consists of a spirit level screwed on to a good telescope, the whole being fastened by collars to a rod hanging from the station point. The telescope is provided with a diagonal eyepiece for convenience of sighting when the eyepiece comes so close to the wall of the level that direct sighting is not possible. A screw serves to clamp the instrument to the rod at any height. The iron hanging rod is 5 feet long, 0.67 inch square in section, and hollow. From the top downward it is graduated in centimeters, while a vernier fixed to the leveling instrument renders it possible to determine the distance between the station point in the roof and the line of sight. A weight keeps the rod vertical, and a second rod slides inside it and may be raised or lowered and clamped. At the base of the second rod is swiveled a two-pronged fork, which sticks into the floor and prevents the whole from swinging. The total weight of the apparatus is ten pounds. The leveling staff recommended is 20 inches long and 4¾ inches wide, the scale being drawn in Indian ink on Whatman paper. The scale reads to 1 millimeter, and is placed between two sheets of glass inclosed in an iron frame fitted with a hook and an adjusting screw. When the scale is illuminated from the back the position of the horizontal wire of the telescope can be rapidly and accurately estimated to a half millimeter. The weight of the leveling staff is four and one-half pounds. The varying height of the mine roadways necessitates the addition of four to six lengthening rods. These are made of 0.2-inch iron wire bent to an eye at each end. As a rule, four rods 1 metre long, and two rods of half that length, are sufficient. With this instrument underlying shafts and inclines can be leveled with rapidity and accuracy, and adit levels may be leveled at three to four times the speed that is possible when the ordinary tripod stand is used.

Cleaning Parts of New Steam Machinery.

A great deal of damage, annoyance and often serious accidents are caused with steam machinery by neglecting to thoroughly clean the castings, piping and connections before they are put together and to work. A case has just come to our notice, says *Power*, where a good-sized cylinder and piston were utterly ruined by cutting from this cause after a very brief run. A considerable quantity of sand was found in the mud drum of the boiler, and the engine makers claim that the sand with which the boiler tubes were filled while being bent was not entirely cleaned out before the boiler was assembled. It must have been an exaggerated case of priming which would carry sand from the water space of the boiler to the cylinder; but, however it got there, sand had been in the cylinder to an extent that ruined it. When piping up an indicator, especially with side pipes, open the cock after all the connections are made and let steam blow through freely, tapping the pipe at the same time.

If you hold your hand in the jet of steam you will feel the sharp impact of the pieces of scale as they are detached and discharged, and if you replace your hand by a sheet of clean paper you will have a visible and surprising evidence of the amount of stuff that is liable to find its way to the indicator and produce the "explosive water" effect on the expansion line. When one thinks of the amount of this kind of matter which must come from a newly erected system of steam piping the advisability of being able to blow it out thoroughly in some other way than through the cylinder of a working engine is apparent. Core sand in the castings of the engine itself is a fruitful source of trouble, and the careful engineer will use every means to assure himself that this has been thoroughly removed before he relaxes his vigilance upon a new machine.

Rust Preventive.

A new rust preventer is highly spoken of by engineers, who claim that it has at length overcome one of the greatest sources of trouble with which those who have charge of machinery have daily to contend. It has been adopted by the German army and navy and by a large number of European manufacturers. It is composed of greases and volatile oils, which evaporate on exposure to the air, leaving an airtight film or skin, which adheres tightly to the metal and absolutely and permanently prevents the corrosive action of salt air, salt water, rain, snow, dampness, steam, gases, and fumes of acid or ammonia. It is neither a paint nor lacquer, nor a product of petroleum. It is, and remains, absolutely neutral, contains no acid and leaves neither spots nor marks when removed. The coating is transparent, and as it does not dull the appearance of bright metal surfaces it is of special service to machinery builders and dealers who have goods in stock. It does not crack and is not absorbed by dust, paper or cloth wrappers, nor does it rub off in handling, as do oils and petroleum jellies. This quality makes it invaluable for the shippers of machinery. As it stands a very high temperature without melting, it can be used on the bright parts of boilers, engines, etc. A given quantity covers a large amount of surface—one gallon being sufficient to protect 1100 square feet. It is easily applied with a rag or soft brush, and can as quickly be removed with turpentine or benzine, a point of superiority over white lead. It is claimed that an article once coated with it is protected from rust as long as the film is allowed to remain.

Belt Dressings.

The saving of power, belt leather, etc., that follows the use of a good belt dressing on drive or race belts of spinning mules and other machinery is of considerable consequence to any manufacturer, says the Boston *Commercial Bulletin*. In order to detect a good from a poor belt dressing, so far as frictional properties are concerned, an apparatus can be used with benefit. It consists of the upright stand in which a pulley is arranged to turn in a bearing.

A piece of 2 or 3-inch belting should be secured to the floor and the other end to a lever. One end of the lever is studded and the other end held down by a bolt. The pulley may be turned from the main shaft of the mill by putting another pulley on the shaft with the second pulley, and belting the former to a pulley on the mill shaft. The dressing compound to be tested can be applied between the pulley and the belting and the affair started running. The proportion of increased friction obtained by using the belt dressing may be figured out according to the tables in any engineer's handbook, using as a basis the proportion of additional friction which has been brought to bear upon the belt as a result of drawing down the lever by means of a bolt.

Pneumatic Pulley.

The lack of efficiency in the ordinary belts is due principally to the air cushions between the belt and pulley, causing slippage. In the pneumatic pulley this air is entirely eliminated by means of perforations all around the face of the pulley. These perforations are regularly placed in rows parallel to the axis, the perpendicular positions of the perforations of each row alternating with those of the next. The belt closely grips the face of the pulley and operates, therefore, without the loss attending pulleys permitting an air cushion between the belt and the face.

The use of this pulley, it is claimed, enables the use of a smaller and looser belt, owing to the elimination of nearly all slip, which, with the ordinary pulley, is said to be equivalent to a loss of about 10 per cent in power. A more uniform speed can be obtained between the driver and driving element, which is an important feature in high speed work. Less tension on the belt means less oil in the bearings, and smaller belts mean smaller first cost.

Rapid Construction Work.

A record for extremely rapid construction work has been made on the new Fair building, State street, Chicago. The building, which is a nine-story and basement fireproof structure, occupies the whole of a regular city block and was built in sections. One was begun in January, 1897, and finished in March. For the last one, 143x140 feet in size, the excavation was begun May 24th, 1897, and finished on June 21st. On June 24th all concrete piers were finished and ready for foundation stools and basement columns; 4,125,600 pounds of structural iron were erected in twenty-four days; 185,000 square feet of fireproof tile arches were set in twenty-one days; 460 steel columns were fireproofed in five days; 1,946,000 feet of flooring were laid in eleven days; 40,000 square feet of polished plate glass were set in five days; nine stories of elevations, including all terra cotta, sills, caps and terra cotta courses, including 400,000 brick, were set in thirteen days; 60,000 square feet of plastering was finished in nineteen days; five elevators were constructed in twenty-nine days; 20,000 square feet of roofing was done in three days.

Mining Summary.

(Continued from page 435.)

with same number of drops per minute and the ore much softer, the aggregate number of tons per day should equal that of the 200-stamp Homestake mill.

COLORADO.

Only two of Colorado's ten smelters deposit at the Denver mint. These are the Argo and Omaha-Grant. The Globe refinery sends its dore bars to San Francisco, where the gold is separated from the silver. The gold is deposited at the San Francisco mint and the silver is sold for transmission to China and the Pacific islands. The refinery of the Guggenheim smelters is near Jersey City.

The Buena Vista Smelting and Refining Company has been incorporated at Buena Vista, Col., capital stock, $100,000, to operate in Buena Vista.

Republican: Mine companies of the Cripple Creek district are now paying out 12 per cent of the monthly output in the form of dividends, and a sum equally as large is being earned by mines that are closely held and on which no reports of profits are made. A third 12 per cent is going into the treasuries of companies or into improvements on the property and the bank account of individuals, so that it is possible to say with a certainty that of the $1,000,000 produced monthly $360,000 is clear profit to the owners and workers of the big properties. The profits of the prospecting companies and lessees are not to be considered in this, but they would add quite handsomely to the amount.

The dividend list has been growing rapidly of late and is larger now than ever before, although there was a time when fewer companies were contributing to approximately the same total of money paid. That was when the Portland was paying $60,000 and the Victor $20,000 monthly, but with the Victor withholding its dividends and the Portland payments cut in half, there came a heavy loss to be made up, and it is creditable to the camp that in six months time there have come up properties that can and do offset this $50,000 monthly loss.

The total now includes the Portland with $30,000, the Elkton $30,000, Moon-Anchor $15,000, Anchoria-Leland $6,000, Lillie $8,100 and 11 per cent stock dividend equalling $50,000, the Gold Coin $10,000, Golden Cycle $10,000, El Paso Gold $6,500, with the Isabella earning for its quarterly distribution, and the El Dorado Leasing, making eleven companies paying the $120,000. The Independence, Last Dollar, Orphan Belle, El Paso, Gold King and Strong form the second class of profit makers, and the money cleared by them each month will equal the dividends paid the other companies. In the list that is adding to the treasury come the Anchoria-Leland, Victor, Moon-Anchor, Theresa, Vindicator, Mabel M., Gold Dollar, Gold Coin, Moose and others, and the sum of their monthly additions to their reserve funds can be readily computed to above $120,000.

A new departure in the way of milling is to be tried at the old Perigo mine, Gilpin county. The Perigo is a large body of low grade ore of the quartz-feldspar gauge, with less than the usual amount of sulphide The new mill, now almost completed, is equipped with thirty extra heavy stamps with ninety drops or over to the minute. On this arrangement it is expected that the mill will handle 100 to 130 tons of ore per day, at an average cost of 40 cents per ton. The Perigo will be the first stamp mill of its kind in the State. The Gilpin county mill of the old class averaged one ton of ore per day to the stamp.

Colorado Springs *Telegraph*: A company has been organized to construct a mill for the treatment of low-grade ores at Buena Vista. The company is capitalized at $100,000.

A new mill has been constructed at the Hidden Treasure mine, at Lake City, to concentrate the ores of that locality. The mill will be connected with the mine by a 3300-foot tramway and the ore bin at the mill will hold 600 tons. A 4-foot vein of lead and silver ore has been opened up for several hundred feet, which will supply the mine for some time.

The output of the Gold Coin Company's mines at Nevadaville for September amounted to $25,000. The company's total output amounted to many times that sum.

NEW MEXICO.

At Kelly the Iron Mask has a record of high grade ores extracted. The Magdalena district is generally a low grade silver-lead camp, where large bodies, systematically worked, yield big returns. The Iron Mask is high grade gray copper, copper glance, silver glance. Some of the richest carload lots of ore shipped from the mines of the Territory came from this property. A cave-in in the old working shaft, and the general bad condition of its timbers, which made it unsafe and impracticable to continue further work there, has decided its owner, A. B. Keeler, to sink a new double-compartment shaft 50 feet farther east. They are now down 38 feet, averaging a foot a day, with one shift using a steam drill. At present the water is kept down with an ejector, but a large sinking pump is in readiness for an anticipated early increase. The old working shaft contains at present about 120 feet of water.

Silver City *Enterprise*: The shipment of lead ore made from the Rio Grande mine last week ran 34 per cent lead, and 4.4 ounces silver per ton. The 300-foot level on the Texas mine has reached the end of the vein where the shale formation cuts it off at about 150 feet from the shaft. A shipment of three tons of ore was made to the Kansas City Smelting and Refining Co., at El Paso, last week. The stopes on the 300-foot level are turning out more ore than ever before produced by this mine.

Supt. Dawson of the Santa Rita Copper and Iron Co. is shipping two cars of iron per day to Pueblo, Colo. This will be increased to 100 tons per day when the new branch railroad from San Jose is completed.

The ore from the Guadaloupe shows a large proportion of pure cuprite, it runs 30 per cent in copper. About 125 tons per month are shipped.

New Mexican: The question is often asked "Why, with such immense bodies of low grade ore in sight in the Cochiti ledges, ore that would long before this have made a booming camp in Colorado, have four years passed by without witnessing the erection of proper reduction plants in the district?" Until the recent decision of the United States Court of private land claims, the titles of the district have been under a grant cloud. But this dark cloud, having been happily dissipated by the court of last resort, no doubt it is entertained that the capital needed to develop the mines and reduce the output therefrom will be forthcoming before another year.

The New Mexico Iron Mining Company has incorporated; capital stock $1,000,000; Gray, Lincoln county.

ARIZONA.

At the Fortuna mine, Minnehaha Flat, near Prescott, 500 tons of soft porphyry ore are being treated by the cyanide process; and 100 tons have already been treated with a result of $5 gold per ton gross; $1 per ton is said to be the total cost of mining and treating the ore. The cyanide plant is located at the foot of the hill; the vein of decomposed porphyry breaks over at the top of the hill, where it is plowed up with a plow, shoveled into a chute and slid down 200 feet to the cyanide plant directly below. The amount of cyanide per ton so far used is .71 of a pound, worth about 22 cents.

Four mills are within sound of each other near the head of the Hassayampa—the Senator, Chicago Gold Mining, Sun Dance and Storm Cloud Mining Companies. Jos. Carmichael has charge of the Senator mill; it is running successfully on ore from the Evergreen and Snoozer mines. J. Laube is in charge of the Chicago Company's mill. H. E. Armitage is superintending the Sun Dance Company's property, and it requires two or three teams to freight the product of the mill to Prescott.

Of the Commonwealth mine at Pearce it is said that of all the places on earth that an experienced prospector would go to seek a mine the butte where that mine is located would be the last. Standing on the western edge of the Sulphur Spring valley, among various others of similar shape and appearance, is a little hill, barren of any vegetation other than grass, and presenting none of the rugged appearance and metamophic form which prospectors always look for. In this hill is now the most profitable gold mine in America, and perhaps in the world. To verify this declaration the mine works a force of about fifteen men, and the mill six; and the output is said to be nearly $250,000 per month. Everything that is broken in the mine goes for ore; the anomalous feature of a mine without a dump.

The mill is supposed to have a crushing capacity of forty tons per day, and an addition is being erected equal to three times that amount; besides that, several carloads are shipped daily to the smelters.

Five hundred tons of soft porphyry ore from the Fortuna mine, in Yavapai county, are being treated by the cyanide process. One hundred tons already treated showed that it carried $5 per ton in gold. The total cost of mining and treating the ore is $1 per ton. The big vein of decomposed porphyry is mined with a plow, where it breaks over at the top of the hill. There it is shoveled into a chute and slid down 200 feet to the cyanide plant at the foot of the hill.

The *Globe* reports the Kasser Gold Mining Company's mill in Lost Gulch completed. When the new hoist is finished, sinking will be resumed.

Kingman *Miner*: Gaddis, Spear and Dexter have closed a deal on the Union Pass group of mines to Emmens, Strong & Co. of New York. Work will be commenced on the property November 15th.

MEXICO.

Mexico City reports several local American companies are prospecting the Zacatecas gold belt with great success. This belt was first discovered in 1895. The San Cristobal mines, owned by a New Jersey company, will put up another 20-stamp mill on the property.

Walter Renton Ingalls before the American Institute of Mining Engineers: "In addition to the localities in which tin ores have been found in Mexico, mentioned in my paper on the 'Tin-Deposits of Durango,' presented to the Institute in March, 1895, the following should be recorded. I am indebted to Captain Henry Freeman, of Durango, for the notes as to these occurrences: In the Sierra de la Candela, west of the Sierra de San Francisco and El Promontorio (the Llano de Guatimape intervening between the two ranges), cassiterite is found in veins and stream beds. The veins are narrow, and the ores have the same characteristics as those of Potrillos. They were exploited by miners from Coneto in 1882–86, the more extensive work having been done on the northern side of the mountains. In the Sierra de las Palomas, on the western edge of the Otinapa ranch, about 25 miles W.N.W. from the Diablo mine in the Cacaria district, there are several small veins, of which the ore, gangue and country rock are similar to those of the Cerro de los Remedios, near the city of Durango. The latter are essentially the same as the Potrillos veins. In the Cerritos del Olote, in the Murphy grant, about 50 miles W.S.W. from Durango, there are old mines, now partially filled. The veins are narrow and poor; the ore is highly ferruginous; the country rock is rhyolite, with some granite; immense quantities of chalcedonic rubbish are strewn along the course of the veins. In the Cerro Blanco, overlooking the pueblo of Mezquital, 48 miles south of Durango, tin ore is mined by the natives. The mountains are of an eruptive character, rising 3000 feet above the valley of Mezquital, and sloping eastward and southeastward to join the Sierra de Michis. The formation is granite and trachyte. Tin ore is found in ill-defined veins in the decomposed trachyte. The veins are narrow (from 18 to 26 inches wide), but the ore is rich and free from arsenic and antimony, and is smelted easily in the Mexican adobe furnaces. The veins are worked in a desultory manner, between January and June, by the Indians of Mezquital, who refine the product with the aid of resin (*brea*) and the green branches of the red oak, and sell it to the storekeepers of the pueblo at 20 cents (silver) per pound, in 'trade.' At Guanajuatillo, a series of ridges in the Sierra de Michis, about 40 miles S. E. of Cerro Blanco, and 85 miles S.S.E. from Durango, there are several strong veins, in places 10 to 14 feet wide, of very ferruginous tin ore. Captain Freeman says that he smelted 1300 pounds of this ore and obtained 13.1 per cent of fairly clean, merchantable tin; but owing to the situation of the mines, the experiment was unprofitable. In the Cordon de la Sierra de Sacrificio, 68 miles east of Durango, and 28 miles east of Nombre de Dios, on the main road to Zacatecas, stream and vein deposits were worked by *gambucinos*, previous to 1881. The stream-tin was dressed to 50–56 per cent SnO_2, and the lode-tin to 30–37 per cent. The lode-tin is contaminated with iron, arsenic and wolfram minerals. In my former paper I referred to an analysis of metal from Canitas, Zacatecas, which probably came from Sain Alto in the same State, Canitas being the nearest railway point. The localities now mentioned by no means complete the list of tin-occurrences in Mexico. It is found at various places in Guanajuato, whence small lots of metal are from time to time brought into the towns by natives. Aside from the native smelting, the total of which is insignificant, there is no production of tin in Mexico at the present time. So far as information can be obtained, all the occurrences of tin ore in the Republic are in young, highly acid igneous rocks."

SOUTH AFRICA.

The State Mining Engineer of the Transvaal has adopted a system in his statistics of showing all values in shillings and fractional parts thereof, thus indicating the value of the gold left in the ore. For the Witwatersrand he furnishes the following figures:

	Assay Value. Shillings per Ton.	*Value of Yield. Shillings per Ton.*
1. Cyanide process—		
Tailings	20.86	14.27
Concentrates.	130.22	112.29
2. Chlorination—		
Concentrates.	416.73	372.89
3. Siemens & Halske process--		
Tailings.....	19.74	13.74

AUSTRALIA.

At the Broken Hill Proprietary 15,456 tons ore were treated for the four weeks ending Oct. 14, the output from the refinery was 291 ounces gold (estimated), 392,284 ounces silver, 1,256 tons lead, 25 tons antimonial lead (estimated), the copper matte containing 13 tons copper (estimated), and 4,858 ounces silver (estimated). Reduced output caused through fire furnaces shut down.

NEW ZEALAND.

Journal: With a view to finding the efficiency of dredging appliances in dealing with finely divided gold, the following investigation has been made: A sample of fine gold from the Electric Company's dredges, about two grains in weight, which had been sifted through a sieve of 3600 holes to the inch, was again sifted through one of 4900 holes, and the gold which passed through sorted under a powerful lens. One hundred of the smallest of these pieces was thus selected and examined under a microscope. Measured with a micrometer, their dimensions in fractions of an inch varied between 0.009 x 0.006 and 0.003 x 0.002, the mean of twenty measurements being 0.0065 x 0.0042. The hundred particles were then carefully weighed and found to have a mass of 0.097 of a grain. The mean weight of the pieces was therefore 0.00097, or a little under one-thousandth of a grain. With a moderate power only the larger pieces were found abraded, and then only slightly; the smaller were not water-worn, and one specimen was dendritic in appearance. The finest particles are nearly equal in width and depth, and could by no means be termed flaky, but would rather come under the heading of shotty gold, although where edges and angles occur they are well defined. Magnetite in an equally finely divided state with sharp edges is saved with the gold, also transparent fragments probably of quartz crystals. Only one garnet was found. Roughly speaking, it may be said the Electric Company's dredges are saving gold of which it takes a thousand particles to weigh a grain.

The Restraining Dam Committee.

Under instructions from the recent convention of the California Miners' Association, President Neff and Secretary Sonntag last Thursday appointed the following committee to urge the early construction of restraining dams: Ex-Congressman A. Caminetti, Amador county; George H. Ten Broeck, El Dorado; John Spaulding, Placer; J. M. Walling, Nevada; A. M. McDonald, Tuolumne; J. F. Cowdery, Sierra; Louis Conrath, Yuba; J. M. Gleaves, Shasta; W. E. Duncan, Sr., Butte; George C. Sargent, San Francisco; S. P. Lunt, Sacramento; A. B. White, Plumas, and Mark B. Kerr, Calaveras.

The sum of $500,000 is now available for building dams to prevent the debris from hydraulic mines obstructing the navigable streams of the State, particularly the Sacramento river. The United States engineers have not yet selected sites for the proposed dams, and it is to expedite this work that the committee has been appointed.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING OCTOBER 26, 1897.

592,578.—CARRIER BELT—M. L. Akers, Gooseberry, Or.

592,645.—HAT FASTENER—C. E. Campbell, Portland, Or.

592,692.—VOTING MACHINE—C. Christensen, Oakland, Cal.

592,585.—CAN LABELING MACHINE—Grace & Reynolds, S. F.

592,586.—AIR COMPRESSOR—F. M. Graham, San Jose, Cal.

592,294.—SWITCH LAMP—Jones & Hoke, Tacoma, Wash.

592,634.—BICYCLE HANDLE BAR GRIP—W. Lampert, Sacramento, Cal.

592,519.—PEDAL FOR CYCLES—E. W. Lincoln, Pasadena, Cal.

592,251.—GATE—D. D. Ogilvie, Lee, Nevada.

592,574.—TRESTLE—F. Ring, Portland, Or.

592,533.—CHECK PROTECTOR—Rogers & Hall, S. F.

592,483.—REVERSING GEAR—J. H. Therien, S. F.

592,674.—MOTOR—J. M. Trotter, Alma, Cal.

27,781.—DESIGN, CAN OPENER—J. J. Gallman, Fullerton, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong&Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

VOTING MACHINE.—C. Christensen, East Oakland, assignor to California Voting Machine Co. of San Francisco, Cal. No. 592,692. Dated Oct. 26, 1897. This invention relates to an apparatus which is designed for mechanically indicating the choice of a voter from a list of candidates, and means for registering the same and totalizing the entire number of votes cast for each of the candidates. It consists essentially of a casing having screw shafts passing horizontally through, these shafts being adapted to engage and advance nuts which are fitted to them, the nuts carrying indicators which move over numbered sheets and thus show an additional vote for each time that the shaft is turned. The ends of the shaft are provided with segmental rotatable keys corresponding to each of the names to be voted for, so that the voter may turn either of the keys and record a vote for the corresponding candidate. There are means for locking all of the other keys so that but one vote can be cast and after the whole vote has been cast, the complete revolution of the shafts may be made and the shafts then locked so that they cannot again be returned. In conjunction with this mechanism is a device whereby votes for independent candidates may also be cast, and a means by which the entire vote for a straight ticket can be cast without operating each of the shafts.

BICYCLE HANDLE BAR GRIP.—Wm. Lampert, Sacramento, Cal. No. 592,634. Dated Oct. 26, 1897. The object of this invention is to provide a handle bar grip for bicycles which is normally rigid against any upward pull upon the handles, but which is made yielding for downward pressure so as to relieve the hands from the constant jar and dumbness caused by riding over rough roads. It consists in applying to the outer end of the handle bar a hollow hinged grip which is so pivoted that it can move vertically with relation to and independent of the bar and in conjunction therewith of springs so arranged that the grip will be normally held up so that the lower part being in contact with the bottom of the bar will be rigid therewith against any upward pull, but the spring will yield so that any pressure of the hands upon the grip will push it down so that there is no actual contact between it and the handle bar which would cause jar, the spring absorbing all of this vibration.

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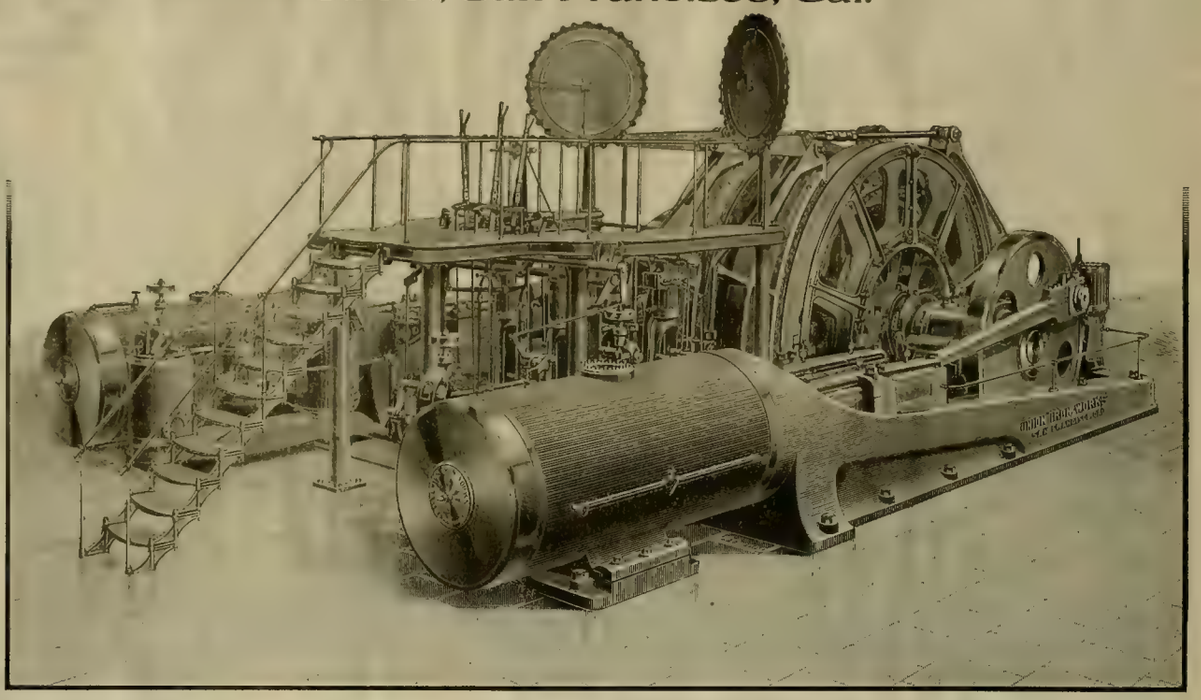

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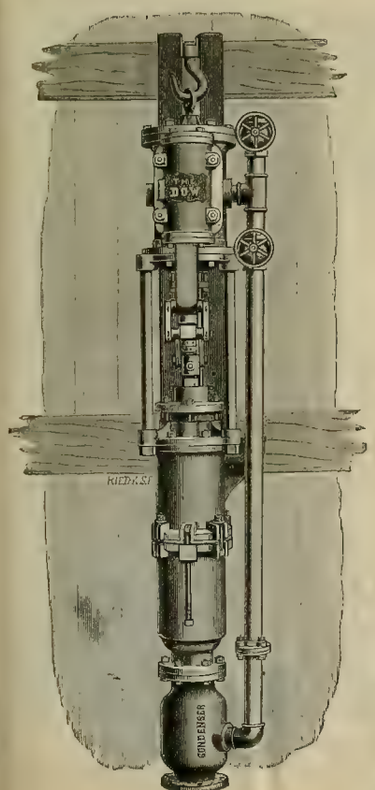

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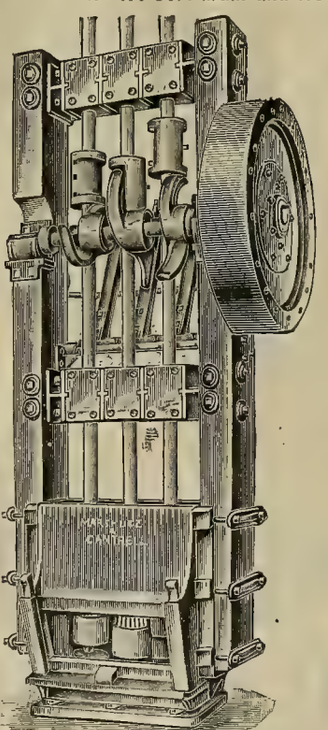

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Coast Industrial Notes.

—Hay sells for $30 a ton in Panamint, Cal., and grain from $45 to $50.

—It is expected that the branch railroad will be completed to Johannesburg, Cal., by December 1st.

—From Eureka and Elko counties, Nevada, fully 75,000 more sheep will likely be driven south into Nye county this winter than usual.

—The Union Pacific Railway from Council Bluffs to Ogden was sold at Omaha last Monday to the reorganization committee for $57,564,932.76.

—An English syndicate has secured charge of the customs revenue of the Republic of Santa Domingo for a period of 100 years, making a loan of $7,500,000 to the local Government.

—It is estimated that 10,000 sheep were shipped from Elko, Nev., last week. From Winnemucca 13,000 sheep are being sent to Omaha, the greater part of them being lambs, for which $1.50 per head was paid.

—The Sierra Railway Company of California has finished laying track to Jamestown. The road is forty-four miles long. Next Wednesday excursion trains will be run to witness the driving of the last spike, which will be made of Tuolumne gold.

—Forty miles of road for the San Francisco and San Joaquin Valley Railroad are being graded from the northern part of Kern county south into Bakersfield. Tracklayers will follow the graders, and it is expected that the new branch will be in operation next January.

—In the Southern Pacific carshops at Sacramento 2215 men are at work. In the company's repair shops at Oakland 816 men are at work. In the repair shops at Bakersfield and Mojave for the San Joaquin division there are 182 men; in the Los Angeles shops, 437 men; at Dunsmuir 63, and in the coast division repair shops 341.

—In the Ojai district, Ventura Co., Cal., are large deposits of asphaltum, which is being marketed in novel a manner. Distillate is pumped up thirty miles in a 3-inch pipe, when the asphalt is dissolved and pumped back in a 4-inch pipe. In pumping the distillate it is raised 1800 feet by force pumps. Then the product is distilled again at the coast.

—A new postal district has been established, consisting of the States of Oregon and Washington. Heretofore Oregon and Washington have been a part of the Pacific Coast district, including California and other Coast States, and the postal inspectors who covered these States had their headquarters in San Francisco. Spokane will be the headquarters for the new district.

—The Southern California Railway Company is reported meeting with encouraging success in its oil development at Fullerton, having recently struck a strong flow of oil in the fifth well at that place. The total output amounts to several hundred barrels daily. The company uses about 800 barrels daily in its locomotives, and will continue development at Fullerton.

—The Los Alamitos, Cal., Sugar Company will enlarge its refinery to 1000 tons daily capacity. The present plant, built for a third of that capacity, has just finished its season's run. It exceeded the expectations of its designers by 100 tons a day. This led to the purchase last month of thirteen square miles of additional lands for the sugar company by W. A. Clark of Montana and an order for enlargement.

—When the California powder pool was formed last spring the Vigorit Company was left out. Later it closed its works in Marin county and purchased a site for the factory at Point Isabel, in the neighborhood of the works of the Stauffer Chemical Company, with which a contract was made for the supply of acids. On the 10th inst., the manufacture of dynamite will be commenced. The capacity of the new works is 300,000 pounds a month.

—Secretary Strasburg, general manager of the business of the Oil Producers' Trustees, reports to the Los Angeles *Times* the affairs of the compact to be in excellent condition. A great deal of oil is being exported, aggregating from 1500 to 2000 barrels per week. The heavier consumers are still holding aloof in the hope that the combination will go to pieces and leave the market congested with cheap oil, but the organization declares that such a contingency is not among the probablities.

—The Hemet dam, Riverside county, Cal., is 40 feet long on the bottom, 260 feet in length on the crest, 135½ feet high at present, 100 feet thick at the base, 10 feet thick at the top. It is built of granite laid in Portland cement concrete. Over 1,500,000 feet of timber were used in it, and this was cut by a sawmill erected for the purpose. Cable tramways were built for moving the stone. The total cost was not quite $200,000. The capacity of the reservoir inclosed by this great work is 3,430,000,000 gallons. The dam will ultimately be increased to 160 feet in height, when it will restrain three times as much water as at present.

—Regarding the discontent expressed with the recent order of the Secretary of War establishing a military reservation in Alaska, with St. Michael, at the mouth of the Yukon, as the central point, Secretary Alger has issued a reply, in which he says that the military reservation at St. Michael was established in the interest of the security of life and property and the preservation of order and of legitimate business interests; that no monopoly was given or intended to be given to any company or persons, and that any proper company or person who desires to conduct legitimate business there will, on application to the War Department, be permitted to do so.

—An approximate estimate of the total number of acres of vacant public lands in the several States and Territories on June 30, 1897, is: Arizona, 54,400,211; California, 43,341,044; Idaho, 45,962,855; Nevada, 61,578,586; New Mexico, 56,983,047; Oregon, 35,892,318; Washington, 17,958,536; Alaska, 369,529,600. These totals do not include vacant lands embraced in military, timber and Indian reservations, reservoir sites or tracts covered by selections, filings, railroad grants, etc.

—The representative of the Hooley-Jameson syndicate, which has been negotiating a loan of £16,000,000 to the Chinese Government on the proposed security of Chinese customs, wires from Pekin that the Government had finally acceded to the terms demanded by the syndicate. The loan will be secured on the balance of the unfettered customs, which yield a revenue of £600,000 annually, and upon the salt and likin taxes in all the provinces, which are entirely unincumbered and amount to about £3,900,000 annually. The Chinese Board of Revenue will stand as security for the bonds, which will be stamped with the seal of the Board of Revenue and Tsung Li Yamen.

—About 500 miles of the Siberian transcontinental railway are completed eastward from Vladivostock, the most southeasterly point in Russia on the Sea of Japan. Chinese and Russian capitalists will construct a line, probably from Pekin, through Manchuria to the same point. A second line will pass down through Manchuria to Port Arthur on the Yellow sea. The Russian Government line will lie wholly in Siberia and on Russian soil. The whole cost of the work is estimated at $261,000,000. Already this coast is doing business with Siberia as a result of this work. Railroad ties, other timber and flour are being shipped from Puget Sound, Portland and San Francisco. The total length of the road from Cheliabinsk to Vladivostock is 4547 miles. Nearly half of this is completed and nearly 1000 miles a year are being built. The largest ferryboats in the world are being constructed to take trains bodily across Lake Baikal, nearly 100 miles wide. There are 70,000 men at work on the line. The branch from the main line direct to Pekin, a distance of between 600 and 700 miles, is under way. From Vladivostock to Nagasaki, Japan, is 600 miles.

Personal.

J. D. McGILLIVRAY will winter at Fort Yukon, Alaska.

M. J. HELLER has returned to San Francisco from Silver Peak.

PERCY MCMAHON, of Colorado, is the new superintendent of the Wedge mine, Randsburg, Cal.

COL. G. W. COOK, representing the Illinois Steel Co., is examining mining property at Boise, Idaho.

GEORGE LAYTON, of Mercur, Utah, is the new superintendent of the Carriso mine, South Pass, Wyo.

CAPTAIN THOMAS MEIN of the London Exploration Company has returned from a business trip to London.

BERNARD MACDONALD of Butte, Mont., is at Rossland, B. C., to examine the Coxey mine, on Red mountain.

SUPERINTENDENT RIVES, of the Golden Cache, Lilloet, B. C., is in San Francisco buying mining machinery.

CLARENCE KING, who spent two weeks examining the Continental and Black Warrior copper properties, near Globe, Arizona, has returned.

J. J. CRAWFORD, ex-State Mineralogist of California, has formed a company to operate the old Richmond mine he has owned for many years.

E. B. PRESTON, whose recent work in gold milling attracted deserved attention, is now assayer and assistant mineralogist at the State Mining Bureau in this city.

EX-SENATOR DORSEY is in San Francisco. He expects to soon have men at work in his Picacho mines, and contemplates building a 40-stamp mill on the Colorado near Yuma.

CHAS. E. UREN of Nevada City, Cal., is at Oroville, surveying for a dam of masonry to be built in the Feather river to enable the Golden Feather M. Co. to exploit the river bed.

L. S. STORRS, geologist for the Northern Pacific Railway, and P. M. Gallagher, his assistant, have completed an examination of the coal fields lying north of Missoula, Montana, and gone East with samples of the coal, which they will analyze and report on.

THOMAS A. EDISON was asked the other day what he thought of those Chicago men who claim to be manufacturing gold from the baser metals. The inventor, it is said, did not reply categorically to the question, but smiled significantly and picked up from his desk a cablegram which had just been received from Italy. The dispatch read: "*To Edison, Orange, N. J.:* Have invented perpetual motion. Will you help me perfect it?" "You will notice," he said, with a far-away look, "that a great many remarkable discoveries are being made this year."

Recent California Mining Incorporations.

San Justo M. Co., San Francisco; capital stock, $1,000,000; subscribed, $5000; T. Flint, D. C. Nichols, W. H. Hart, E. Dexter.

Grapevine Canyon M. Co., San Francisco; capital stock, $100,000; subscribed, $25; P. J. Kerrigan, J. L. Bromley, W. A. M. Van Bokkelen, J. Stadfeld, Jr.

Yukon M. D. & L. Co., S. F.; capital stock, $100,000; $25,000 subscribed; E. F. Seward, F. Lawrence, W. W. Allen, H. E. Lumar.

Ready Gold M. & M. Co., S. F.; capital stock, $100,000; $100 subscribad; W. E. Meeks, D. Fisher, C. Shea, T. F. Burke, J. Fisher.

Bonanza K. Klondike M. Co., S. F.; capital stock, $500,000; $500 subscribed; C. J. Decker, M. D. Young, R. S. Douglas, W. B. Grove, C. T. Hubbett.

New Pyramid Q. M. Co., Sacramento; capital stock, $100,000; subscribed, $50,850; F. Elder, C. Rodoni, H. E. Harvey, W. S. Kendall, C. A. Beardsley.

Pasadena and Klondike M. Co., Los Angeles; capital stock, $250,000; T. J. Phillips, C. F. Dandy, F. J. Eddy, H. A. Perkins, C. H. Wright.

California Gold Fields Co., Los Angeles; capital stock, $1,500,000; E. L. Allen, J. R. Manning, J. L. Stanley, D. C. Donoghue, W. T. Allen.

Alaska G. & C. M. Co., San Francisco; capital stock, $500,000; subscribed, $7000; J. Farrell, C. Reilly, P. O. McDonald, O. J. Humphrey, H. J. Knowles, E. S. Griffith, H. N. Humphrey.

Nellie M. Co., Stockton; capital stock, $150,000; subscribed, $5; L. Oliveri, G. E. Wilhoit, F. E. Lane, M. De Vries, W. E. Johnson.

Yukon M., D. & L. Co., San Francisco; capital stock, $100,000; subscribed, $25,000; E. F. Seward, H. E. Lamar, M. E. Allen, F. Lawrence, W. W. Allen.

Recently Declared Mining Dividends.

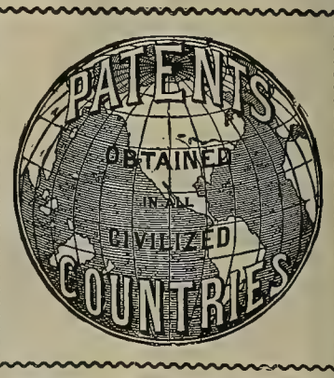
Swansea, Utah, dividend No. 14, $7000; Nov. 2.

Pennsylvania, Grass Valley, Cal.; dividend No. 11, five cents per share, $2,575; payable immediately.

October mining dividends, so far as reported, were as follows:

Alaska Mexican $18,000, Alaska-Treadwell $75,000, Alice $20,000, Bunker Hill $15,000, Calumet & Hecla $1,000,000, Champion $8,500, Dutch $7,500, Elkton Corn $30,000, Geyser-Marion $9,000, Highland $20,000, Homestake, regular, $31,250, Homestake, extra, $31,250, Hope $10,000, Iowa $5,000, Mercur $25,000, Montana Ore Purchasing $40,000, Moon-Anchor $12,000, Morning Star $19,200, Napa Con. Q., regular, $10,000, Napa Con. Q., extra, $10,000, New York and Honduras $15,000, Silver King $37,500, Standard Con. $17,000, South Swansea $7,500, Swansea $500. Total, $1,478,700.

PATENTS



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Our U. S. and Foreign Patent Agency presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American reports, with full copies of U. S. Patents since 1872. All worthy inventions patented through DEWEY, STRONG & CO.'S Patent Agency will have the benefit of a description in the *Mining and Scientific Press*. We transact every branch of patent business, and obtain patents in all countries which grant protection to inventors. The large majority of U. S. and foreign patents issued to inventors on the Pacific Coast have been obtained through our agency. We can give the best and *most reliable* advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and circulars free.

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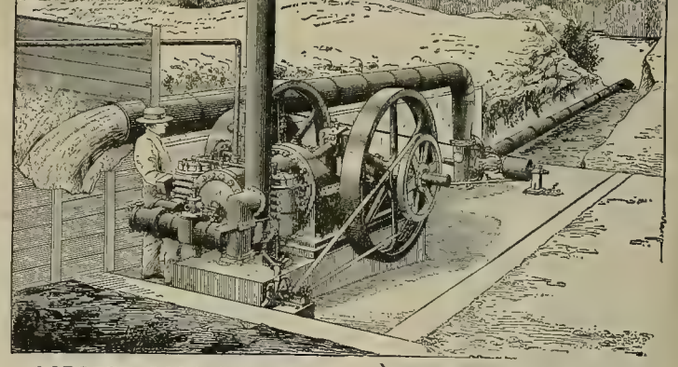
Has prospects for sale in Trail Creek and the whole of the Columbia basin. Will buy legitimate stock and mines for investors. Will examine mines. Has lots for sale in Trail and Deer Park.



LARGEST GASOLINE PUMPING PLANT IN THE WORLD

The illustration shows the gigantic pumping plant recently built by the Hercules Gas Engine Works on the Packer Ranch, Colusa Co. 80 h. p. Hercules Engine, pumping 7200 gallons a minute, 27 feet high. Burns Gasoline or Distillate oil. Cheapest power known. Gas, Gasoline and Oil Engines, 2 to 200 h. p. Send for Catalogue. HERCULES GAS ENGINE WORKS, 217 Bay St., San Francisco.

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Contractors' Machinery, 506 N. Y. Life Bldg., Chicago, Ill.

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NOT SCRAP IRON,
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Of standard make and modern design. Have most everything for Hoisting, Excavating, Crushing, Pumping, Quarrying, Etc. All repaired and ready for service. ATTRACTIVE PRICES.

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Quick Armature Winding.
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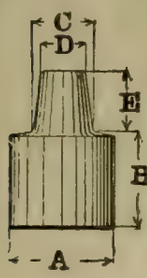
PUT YOUR ADVERTISEMENT.....

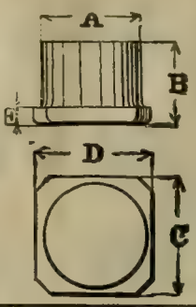
IN THE PAPER READ BY THE MEN WHO BUY WHAT YOU HAVE TO SELL.



A=.....inches.
B=..... "
C=..... "
D=..... "
E=..... "

RISDON IRON WORKS,

Office and Works, Cor. Beale and Howard Sts., SAN FRANCISCO.



A=.....inches.
B=..... "
C=..... "
D=..... "
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MINERS, ATTENTION!

We beg to call attention to our RISDON HAMMERED PROJECTILE STEEL SHOES AND DIES, which are made of a special quality of steel, are hammered and then compressed in moulds so as to give the greatest possible density.

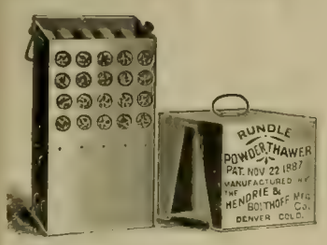
These Shoes will outlast any other make and will not chip or cup.

We have attached a sketch showing sizes; fill in the size of your Shoes and Dies, and order a trial set.

Our prices are as low as any, and the article we offer should commend it to all mine owners and mill men.

An ounce of prevention is better than a pound of cure.

POWDER SHOULD NEVER BE THAWED BY DRY HEAT.



The Rundle Powder Thawer

Is the only Absolutely Safe device for thawing Giant Powder or other high explosives.

Indorsed by Mine Inspectors and Mining Men generally.

Warm Water entirely surrounds the tubes.

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Mine Owners Intending to Operate Their Plants Electrically Will Find the Apparatus Made by Us "Ideal" for all Purposes.

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PHILADELPHIA, Girard Building.
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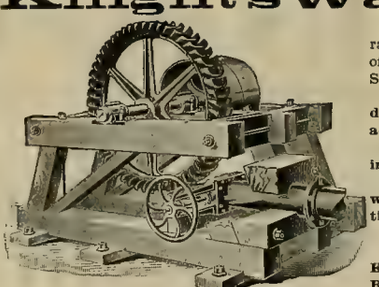
Patronize Home Industry.

Knight's Water Wheel.



The accompanying cut shows the general arrangement of **Knight's Standard Water Wheel** of which there are **hundreds in use** in different States of the Union.

These Wheels are made from **2 feet to 6 feet in diameter, from 10 to 1000-horse power, and adapted to all heads and purposes.**

Wheels inclosed in iron cases, from 6 to 24 inches.

Wheels for electrical power can be furnished **with or without Governors. Highest regulation guaranteed.**

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TUTTHILL WATER WHEEL.

The Best Jet Wheel in the Market, BARRING NONE.

Wheels, Buckets and Nozzles Designed to Suit Special Requirements. When Head and Conditions Are Given.

Theoretically as Well as Practically Perfect. Highest Efficiency Guaranteed.

We have a Sensitive, Simple Governor that will positively regulate speed of wheel. Specially adapted for electric railway and lighting plants.

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CAPACITY FROM 4 TO 50 H. P.

The GOLDEN GATE uses Gas or Gasoline; it is the simplest and most reliable engine built. It furnishes power wherever required at the lowest cost.

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WITH MINE HOIST CONNECTED.

These HOISTS are now in use on several mines and they have proved practical, safe and economical. Starts and stops with ease. Speed under perfect control.

The entire plant, engine and hoist, is light and compact. Can readily be placed in any position, on the surface or underground.

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MODERN METHODS as applied to the handling of Freight, Grain, Ores, Raw and Manufactured Products.

MALLEABLE IRON BUCKETS, Approved Pattern and Weight; ROPE POWER TRANSMISSIONS, SHAFTING, PULLEYS, GEARING, CLUTCHES, ETC.; ELECTRIC COAL MINING MACHINERY.

SEND FOR CATALOGUE NO. 20.

DEWEY STRONG & CO., Patent Solicitors, 330 Market St., San Francisco, Cal.

Cheaper Way of Sending Circulars.

DURING the recent Miners' Convention in San Francisco it was noticed that some firms dealing in mining machinery issued circulars that were supposed to be distributed throughout the hall; but of that, probably the janitor of the hall who removed the debris could probably tell better. It is also noticed that those firms now and then get up circulars that they mail, mostly to men who moved from the place a year ago.

It was supposed that everybody understood what a waste of money is always involved in issuing circulars—whether distributed by hand or sent by mail; and while it is evident that those who get out circulars really want to advertise, it is equally evident that they don't know how to get at what they do want. As there appears to be a few who still think that a circular is a good thing and forget that the circulars that they send out, even when received, are always accorded the same fate that they themselves give to any circular that they receive, namely, throwing it away unread, it is deemed advisable to suggest to them a way in which they can have their circulars do them some good.

To those who have mining machinery for sale and feel disposed to cling to the old exploded notion of circulars sent by mail at random to probable or possible customers, it is suggested that they can, without doing violence to their established notions, secure better results in a better way. The following tells them how it can be done, being an illustration of how to do effective circular work at a greatly reduced cost. There are very few circulars that contain more than can be prominently displayed in one page of this paper:

6,000 good circulars, well printed on fine paper, cost, say,	$ 14 00
Envelopes for same,	5 50
Addressing them,	5 00
Postage (sealed envelopes),	120 00
Total,	$144 50

Thus we find that to get 6,000 circulars into the postoffice costs $144 50. This is on the supposition that the 6,000 names to whom the circulars are addressed are those of men likely to be customers of the concern sending the circulars, which is very unlikely, as no one firm can secure a live list of possible customers that would equal in value a list containing the same number of subscribers of a good live paper that is bought and paid for and seen every week, passed around in many cases until it is worn out from the number of readers through whose hands it goes. Now, instead of spending $144 50, which is mostly thrown away, how would it do to take that same circular and put it on one page of the MINING AND SCIENTIFIC PRESS, the cost of which in place of $144 50 would be $42, or less than one-third, with a hundred times the greater likelihood of value? The manufacturer or dealer in mining machinery who will spend $144 50 in an attempt to get his business before 6,000 people, could save $102 50 by putting that same circular on one page of this paper and be sure to get it before 6,000 definite, known men, thus securing a certainty instead of an uncertainty and at less than one-third the old way cost.

If a circular is so good a thing as some seem to imagine, here is a chance for them to make money and save money at the same time and to get what they want at very little cost, and in place of firing a scattering shotgun, they can shoot with a rifle and concentrate all their ammunition that way.

In figuring on the cost of these circulars it is assumed that each one is sent sealed, which involves a two-cent stamp; but even were they sent unsealed they would still cost one cent apiece for postage, which would make them cost $84 50. Herein we show how lovers of circulars can substitute certainty for uncertainty and for less cost to themselves. The force of these remarks lies in their personal application.

MINING AND SCIENTIFIC PRESS, 330 Market St., San Francisco, Cal.

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The "SPADONE" Curved Edge Concentrator Belt is attracting much attention among mining men, its merits appealing to the millman o practical experience.

Illustration (Fig. 1.) shows a cross-section, and (Fig. 2.) shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. *We avoid this Mechanical Defect by our Spadone Curved Edge.* Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

FIG. 1.

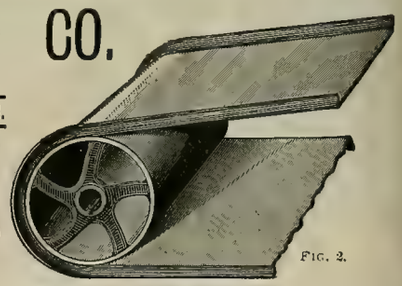
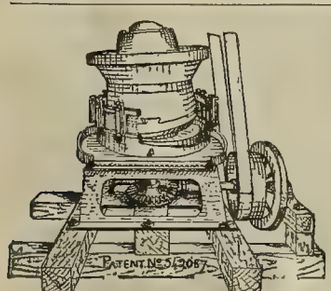


FIG. 2.

We shall be pleased to quote you also on Water, Air Drill, Steam, Suction and Fire HOSE, RUBBER BELTING and RUBBER PACKING. Correspondence Solicited.

THE GUTTA PERCHA RUBBER AND M'F'G CO.
TELEPHONE, MAIN 1813.



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Correspondence solicited with SHIPPERS OF ORE TO COLORADO SMELTERS.

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ROOM 49, CROCKER BUILDING,
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Will act as AGENT for the sale of RELIABLE Mining Property. Principals desiring valuable quartz or gravel investments at reasonable prices will do well to see what I may have. Only legitimate mining properties handled.

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ASSAYERS AND MINERAL SURVEYORS.
Mines Examined and Reports Furnished.
Samples by Mail Solicited.

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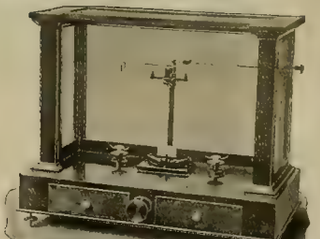

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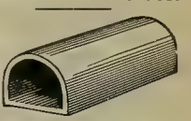

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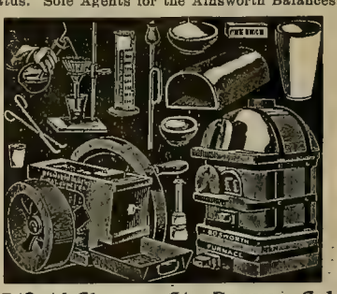

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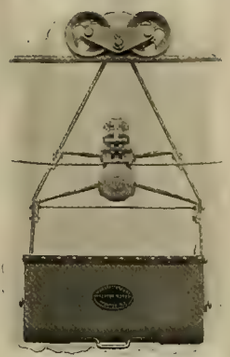

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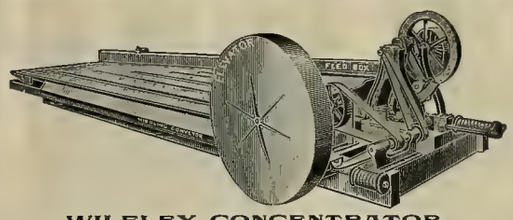

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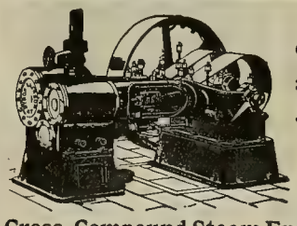

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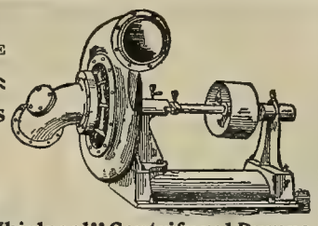

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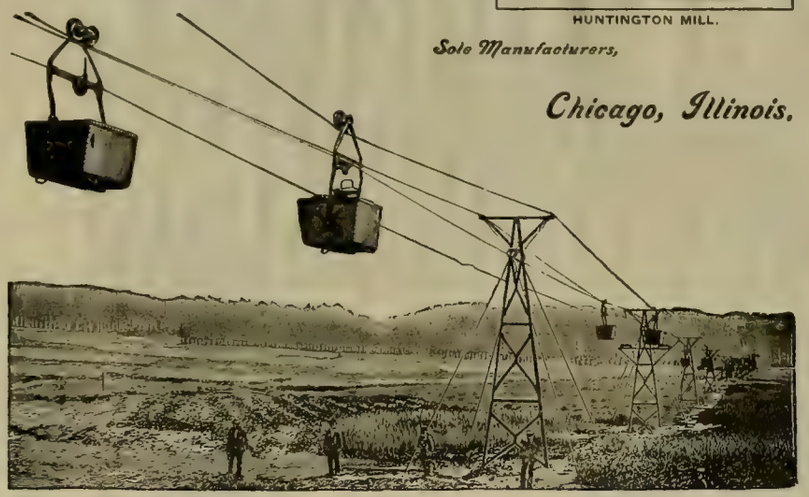

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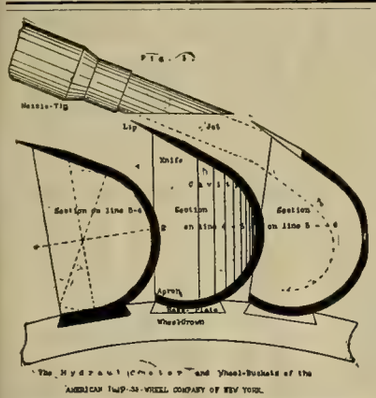

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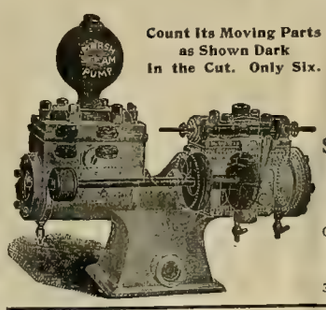

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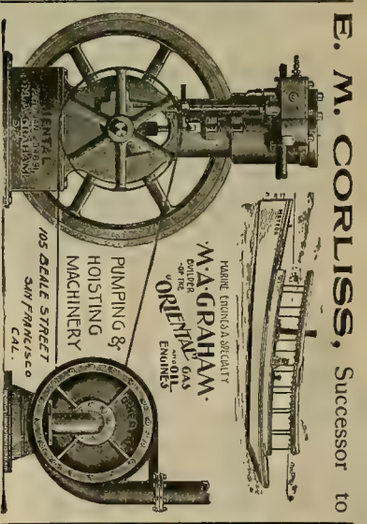

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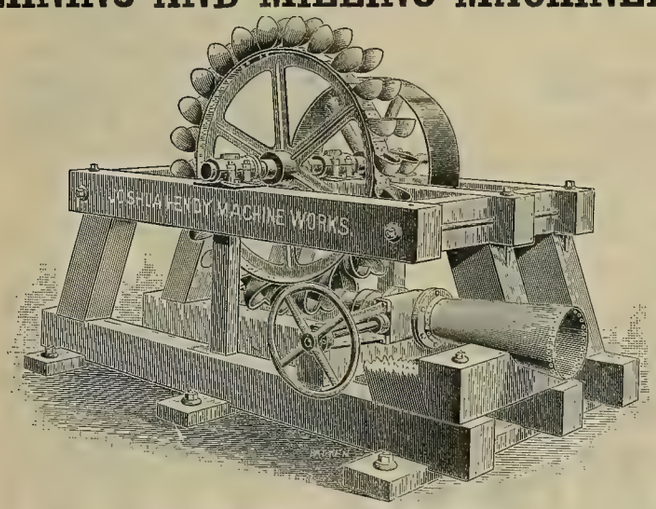

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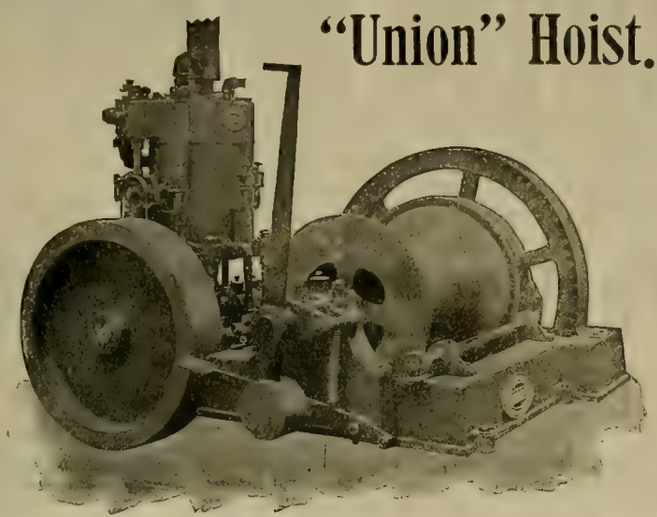

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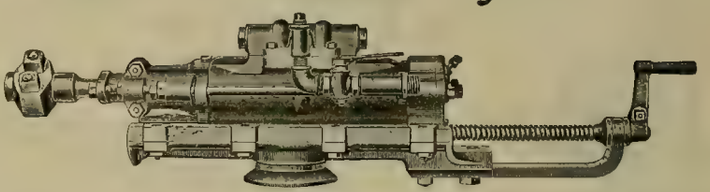

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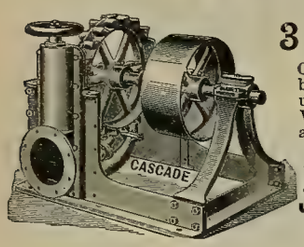

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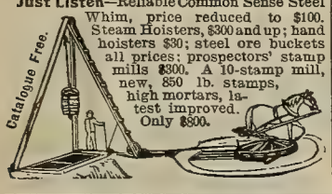

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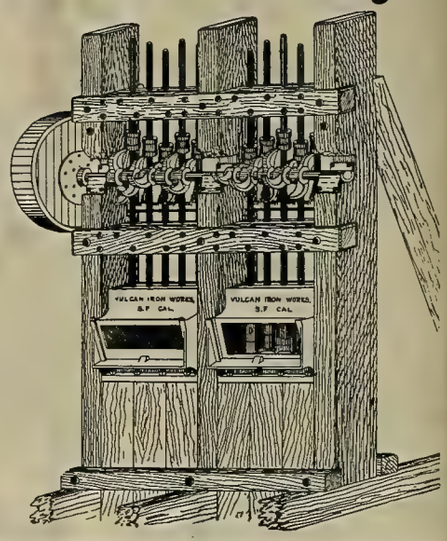

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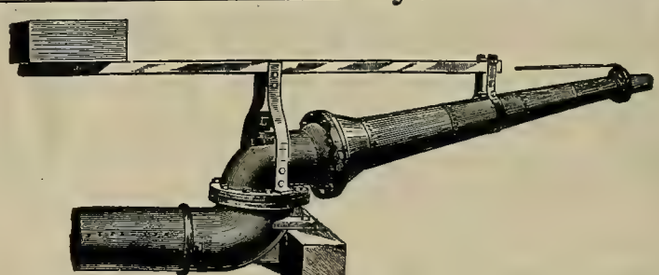

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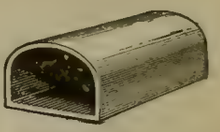

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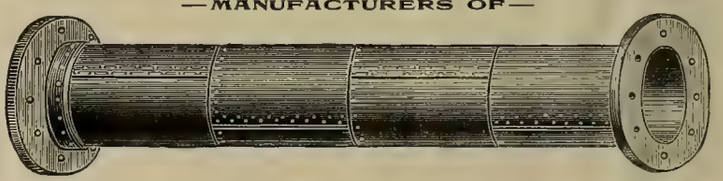

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Market Reports.

The Markets.

SAN FRANCISCO, Nov. 4, 1897.

Considering the season of the year, trade holds up remarkably well, although to-day, owing to rains, it is slack. The present rain comes down slow and easy, which is considered good for agricultural purposes, as it soaks into the ground, by which a good reservoir is secured for growing plants to draw from. The belief grows that there will be a decided increase in the acreage seeded to wheat and also that seeded to sugar beets. With an increase in acreage put in and favorable crop weather, it is quite reasonable to expect a large increase in the call for agricultural implements, which will cause more work for agricultural machinery works. The outlook is quite promising for next year's business in structural, mining machinery and other iron work, being considerably in excess of this year's. This will put a large amount of overflow work from the big establishments into the smaller works, but to get it close figuring will be the order, owing to strong competition. Those in a position to know of what they speak, say that the call for mining machinery next year will be the largest in the history of the city, and that about all will be for gold mining. If this proves correct, more men will be assured work and the consumption of raw material will be no small item.

The local money market continues easy, making it difficult to place funds on strictly gilt-edge security without sharing asking rates of interest. The very heavy exports by sea to foreign ports, aggregating over $1,200,000 a week, gives a good supply of sterling and exchange to other points, while the heavy shipments of coast products by rail to the East give a good supply of bills on New York and other Eastern centers, but not enough to meet the demand for remitting. This demand has been largely increased by the heavy imports of gold from Australia. It is stated that the retail trade is making close collections and paying up quite well. This allows retailers to meet obligations in this city, which is making the wholesale trade quite easy and admits of many firms not favorably situated to discount their bills at the East. The East reports an active money market, although the call for crop-moving purposes is falling away and the flow of funds is to the money centers on the Atlantic seaboard. A leading New York authority reports that market for exchange as follows: "The market has developed a better tone, and it looks as if the decline were stayed. Bills that have been expected to come on the market do not seem to have appeared, and, on the contrary, there has been a demand from unexpected sources. Money in London continues firm, although the position there seems a little easier than it was. A certain amount of investment of long exchange is going on here and may be expected to continue."

New York Silver Prices.

NEW YORK, Nov. 4.—Following are the closing prices for the week:

	Silver in—	
	London.	N. Y.
Friday	27⅞	58½
Saturday	27⅞	58½
Monday	28	57⅞
Tuesday	28⅛	58⅛
Wednesday	28⅛	58⅛
Thursday	28⅛	58⅛

	Copper.	Lead.	Iron.	Tin.
Fri.	10 85 @11 00	3 85½	10 00@12 25	13 70
Sat.	10 90 @11 10	3 95½	10 00@12 25	13 70
Mon.	10 90 @11 00	3 95	10 00@12 25	13 75
Tue.	10 85 @11 00	3 95	10 00@12 25	13 77
Wed.	10 85 @11 00	3 95	10 00@12 25	13 70
Thur.	10 85 @11 00	3 95	10 00@12 25	13 70

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, ¾ per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	3@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	15c Prem
New York Telegraphic Transfer	17½c Prem
London Bankers' 60 days	$4.88½
London Merchants	$4.85½
London Sight Bankers	$4.89½
Refined Silver, peroz. 1000 fine	58½
Mexican Dollars nominal	46

SILVER.—The market sold down the past week, due to freer offerings abroad and a slower demand, due partly to reports that the Straits contemplate adopting the gold standard. What effect, if any, the elections in the Eastern States will have, it is hard to say, for the issue on silver was clearly defined and the largely increased vote for the white metal advocates is quite a surprise. As these elections were not for Congressmen—which comes next year—it is hardly likely there will be any effect, or, if there is, it will be temporary. The last steamer for China took out $87,000 in bullion for Bombay and $53,000 for Hongkong.

MEXICAN DOLLARS.—The last steamer for China took out the largest shipment made at any one time this year. It was $52,549. The market is nominally unchanged.

COPPER.—The market is easy with concessions obtainable on quotations. James Lewis & Son of Liverpool report October 15th as follows: "Good merchantable copper has declined 10s 3d per ton during the past fortnight, the arrival of a large cargo of of Bolleo copper—1620 tons fine—off the coast being the signal for general selling, especially when it was ascertained that though ordered to Dunkirk it was to be brought back to Swansea. Though sold to smelters, this cargo goes temporarily into stock, causing a large increase and counteracting the exceptionally large deliveries of Chili and American bars from the Liverpool stocks. The production of the Bolleo mines for the past quarter is returned as 2892, against 2755 tons for the first quarter of the year. Consumption in England continues large, and would be much larger were it not for the strike and lockout in the engineering trade, the end of which appears to be approaching. In manufactured copper purchases continue to be made for India."

Our market is quoted as follows:

Ingot casting, jobbing	13 @—
Ingot " wholesale	12½@—
Sheet copper	—@16½
Bolt	¼ and 5-16, 2c; ½ and larger, 16½

QUICKSILVER.—Exports to Mexico the past week aggregated 850 flasks. The market is steady at an advance.

Our market is quoted at $39 for domestic consumption and $35@36 for export to the west coast of Mexico.

LEAD.—The market has ruled weak and while some shading is reported, yet large handlers do not quote any lower. The demand at the East is slow.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	4 75 @ 5 00
Sheet	6 25 @ 6 50
Pipe	5 50 @ 6 00

TIN.—The market is quiet and weak, both on this coast and at the East.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C cake, heavy, per box	$4 10@4 25
" light, "	4 00@—

SHOT.—The market is easy.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 40
Drop, B and larger sizes, " "	1 65
Buck, Balls and Chilled, do. "	1 65

POWDER.—There is a good demand.

The market is quoted as follows for Hercules: No. 1, from 11½c to 17½c, according to strength and quantity; No. 2, from 9 to 11c, according to strength and quantity.

COAL.—The market shows a freer demand for household purposes. The call for steam is also quite free. Imports the past week were as follows, in tons: Departure Bay, 4810; Puget Sound, 23,449; Comox, 2,500; Coos Bay, 2025; Newcastle, N. S. W., 2800. Total, 35,165.

COKE.—Considerable foreign has come to hand the past week.

The market is quoted as follows:

Gas Companies'	— —
English, to load	— — @ — —
" spot, in bulk	11 00 @ — —
" in sacks	12 00 @ — —
Cumberland	13 00 @ — —

IRON.—The market is easy from first hands for both foreign and American. The consumption continues free.

AMERICAN.	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	23 00
Salisbury	25 00	31 50
ENGLISH.		
Barrow	$21 00	$23 00
Garisberrie	21 50	23 00

NAILS.—The market is steady at full prices.

We quote the following basis: 20d to 60d inclusive, wire $2.45, out $2.35.

BORAX.—The market is firm at quotations.

The market is quoted as follows:

Refined, in carload lots, in barrels	5
Refined, in carload lots in sacks	4¾
Powdered, in car lots	5
Concentrated, "	4¾

PLATINUM.—The market is steady.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is firm.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

NAILS.—The market is steady.

Wire, carloads, basis per keg	
" jobbing " "	$2 45
Can, carloads, " "	
" jobbing, " "	2 35

ANTIMONY.—The market is steady.

Our market is quoted at 8½c in a jobbing way. New York mail advices quote 8c for Cookson's, 7½c for Hallett's and 7c for Japanese.

Chemicals.

So far as we are able to learn our market is practically unchanged, with trade confined largely to jobbing lots. New York advices to October 30th report as follows:

Nitrate soda for future shipment is still rather weak and the market suffers more or less from wider circulation of the report that the producers' combination is not only cracked but broken. Purchases could have been made easily at $1.60 for future shipment and at $1.65@1.67½ on spot, in large way. Crude brimstone for future delivery was a shade weaker, with some sellers of unmixed seconds at $20.75 and thirds at about $1 less. Chlorate potash, prussic acid, tartaric acid, cream tartar and citric acid are rather weak at second hands, but other chemicals remain without quotable change. Business generally is rather quiet.

SULPHURIC ACID.—The demand is fair.

We quote in a jobbing way at 1½c per lb for 66°.

ACETIC ACID.—The market is steady at 6 to 10c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported steadier from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is steady.

We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is steady.

Our market is quoted in a jobbing way at $1.40 a pound.

BONEASH.—The demand is only fair.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is easier.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is steady at $1.35 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is steady at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—The market is quiet at 2½c a pound from stores.

NITRATE OF SODA.—The market is irregular, with concessions obtainable on quotations.

Our market is quoted from store at 4c for 95%.

Mining Share Market.

SAN FRANCISCO, Nov. 4, 1897.

With the exception of a small skyrocket move in Hale & Norcross, which sent it to $1.75 a share, the market has hung around alternating between a sick go-all-to-pieces look and a healthy, strong pull-altogether look for an upmove. Whether the hanging around has been to sell shares or buy shares is one of the mysteries of the game which are only solved by time. To an outsider the market acts very much as if the insiders are preparing for lower prices within the next thirty days, although before this is done the market may sell higher. The low prices ruling for some of the shares indicate that the public is not greatly interested in the market. Take as an illustration, Seg. Belcher, next to Belcher, with equally as good if not better chances for ore, sells at about one-sixth of what the latter brings. Then there is Kentuck, between Crown Point and Yellow Jacket, does not sell for one-third what either of the two latter, and yet it is known by miners that they can strike a good-sized body of ore in that mine when desired. It is also known that before the present superintendent was appointed his predecessor reported high grade ore in the mine. It is quite possible that the change was made so as not to let the facts be known, for the purpose of freezing outsiders out of their holdings. Be this as it may, the present management, so far as the writer can learn, has not been able to find anything except assessments. Then there is Con. Imperial, Exchequer, Alpha and Bullion. The shares in these mines should on merit, if reports are true, and well informed miners believe them, be selling at prices considerably above those ruling. As a rule the work under way in nearly all the mines is not pushed with that energy indicative of a desire to develop them, but it looks to be more for the purpose of killing time and getting rid of assessment money so as to disgust the public still more. There is only one mine listed on the Exchanges that pays dividends, and that is the Standard in the Bodie district. The mine seems to be managed more as an investment proposition than for gambling.

From the Comstock mines the news does not indicate any great degree of activity in any of the mines. Some report a fair degree of activity, while others do not report any or else only sufficient to call it work, but to an outsider it has more the appearance of playing work. Con. Virginia has levied an assessment and others are to follow its example. The money to be raised will help in paying for mine work for at least three months and perhaps still longer, as this mine seems to be economically managed. The letter from Alta and Justice is not of a particularly encouraging character, although they point to more activity before long—probably by next spring. From Overman nothing of particular interest comes to hand. The work is on the same levels heretofore reported. Seg. Belcher continues to raise a few tons of ore, which calls for an assessment probably to pay the milling. In Belcher the work, while quite interesting, does not point to any desire to find much ore, at least in the near future. They are still raising a few tons of ore each week. The work that is being watched with interest is that calculated to strike the continuation of the ore found in Crown Point. In the latter mine they will raise on the rich streak of ore in the hopes of its developing into something of importance. We are not able to learn anything about Kentuck's future work. In Yellow Jacket it is reported they are working only one shift. The work is towards Kentuck, where they feel confident of striking ore. The same reports, with a few variations, were from Confidence, Con. Imperial and Alpha as have come to hand previously.

Considerable interest is being shown in the work on the upper levels of Potosi, owing to the finding of some ore. Last week 112 tons were extracted, assaying over $13 a ton in gold and 16 ounces in silver. They are still in the repairing business in Chollar. It looks as if they ought to be through with it by Christmas, if not sooner. No work in Hale & Norcross. There is nothing new to add to our last week's published reports from Savage, Best & Belcher and Gould & Curry. The work in Con. Virginia is of an exploiting character on the 1550-foot, 1650-foot and 1750-foot levels. Favorable material is showing in the Ophir west crosscrift on the 1000-foot level. They are also crosscrifting in the Central tunnel level. They are still going east on the 1000-foot level of Mexican. They have extracted thirty-three tons of ore from the 1465-foot level which has been sold at $11.47 per ton, net. Some day they are liable to open up the 1465-foot level. In Union there is no change in the work heretofore reported. From Sierra Nevada our advices state that in No. 4 west crosscrift on the 900-foot level the formation has improved. Nothing new comes from Utah or Andes.

From the Brunswick lode our advices continue to report active work in Occidental, with prospects on the 750-foot level looking quite favorable. They will probably start a joint Potosi-Chollar crosscrift on the 500-foot level in about two weeks. Good results are looked for, but it may take well into December before results will be known. The ore stopes on the 400-foot level are about exhausted, but on the 300-foot level ore is being extracted. There was milled last week 112 tons, which went to the ton about $19 in gold and 18 ounces in silver. Active work is being done on the 500-foot and 600-foot levels. Nothing new comes to hand from Savage, nor from the joint work by Gould & Curry, Best & Belcher and Con. Virginia.

The following illustrates the changes of the week:

MINES.	Oct. 28.	Nov. 4.
Alpha		
Alta Consolidated	$ 10	
Andes	37	
Belcher	50	$ 46
Best & Belcher	48	49
Bodie		
Bullion	17	15
Challenge	37	
Chollar	65	66
Confidence		1 00
Consolidated California and Virginia	1 25	1 20
Consolidated New York		
Crown Point	36	40
Exchequer		
Gould & Curry	38	37
Hale & Norcross		1 65
Justice	28	27
Mexican	45	48
Ophir	88	96
Overman	12	15
Potosi	73	71
Savage	48	49
Sierra Nevada	77	78
Union		45
Utah		14
Yellow Jacket	50	52

San Francisco Stock Board Sales.

SAN FRANCISCO, Nov. 4, 1897.

9:30 A. M. SESSION.

500	Best & Belcher	49	100 Occidental 1 15
300	Bullion	15	100 Ophir 96
500	Chollar	66	500 Overman 15
100	Confidence	1 00	1050 Potosi 71
400	Crown Point	40	100 Savage 49
500	Gould & Curry	37	400 Seg Belcher 09
100	H. & N	1 65	600 Sierra Nevada 78
1050	Justice	27	400 Union 45
400	Kentuck	04	400 Yellow Jacket 52
700	Mexican	48	

SECOND SESSION—2:30 P. M.

500	Ophir	86	700 Yellow Jacket 47
300	Mexican	47	200 Belcher 46
300	Gould & Curry	38	450 Sierra Nevada 71
600	Best & Belcher	45	200 Utah 14
900	Con Cal & Va	1 20	200 Bullion 14
100	Savage	48	200 Overman 13
300	Chollar	67	400 Union 42
750	Potosi	64	200 Caledonia 17
1050	Crown Point	35	

WILL NEGOTIATE with owners or their duly authorized agents only.

WILL INVESTIGATE only thoroughly bona-fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

E. N. BREITUNG,
Marquette, Mich., U. S. A.

Operator and Dealer in

Mines, Mining Properties and Mineral Lands,

Mining Stocks, Bonds, Options, Leases, Contracts and Securities.

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WILL EXAMINE on reasonable terms all kinds of Mines, Mining Properties and Mineral Lands as to their value, method of working and the condition of their titles.

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DO ALL OUR OWN EXPERT AND CHEMICAL WORK.

Working Capital for Mines.

PACIFIC EXPLORATION COMPANY

Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 430 Chronicle Building, S. F.

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Belcher S M Co, Nev.	56	20c	Sept 15	Oct 21...Nov 11	C L Perkins, Mills Building
Best & Belcher M Co, Nev.	63	25c	Nov 2	Dec 7...Dec 28	M Jaffe, 309 Montgomery
Caledonia S M Co, Nev.	47	10c	Oct 6	Nov 10...Dec 2	A S Groth, 414 California
Con Cal & Va M Co, Nev.	10	25c	Nov 8	Dec 8...Dec 28	A W Havens, 309 Montgomery
Con Imp M Co, Nev.	36	10c	Sept 27	Nov 30...Jan 20	C L McCoy, Mills Building
E Best & Belcher S M Co, Nev.	6	15c	Oct 30	Dec 3...Dec 18	E W Sachse, 337 Pine
Eureka Con D M Co, Cal.	20	30c	Sept 14	Oct 16...Nov 6	D M Kent, 330 Pine
Exchequer M Co, Nev.	40	50c	Nov 1	Dec 6...Dec 30	C E Elliott 309 Montgomery
Gold Ridge Con M & M Co, Cal.	5	40c	Aug 3	Sept 18...Nov 11	H Sylvester, 43 Sixth
Gould & Curry S M Co, Nev.	28	30c	Nov 2	Dec 7...Dec 29	A K Durbrow, 309 Montgomery
Hale & Norcross S M Co, Nev.	11	10c	Mar 20	Dec 28...Jan 18	R R Grayson, 331 Pine
Kentuck Con M Co, Nev.	14	5c	Oct 27	Dec 1...Dec 22	A Waterman, 309 Montgomery
Red Cap M Co, Cal.	1	$9	Aug 25	Oct 1...Nov 6	H H Martin, 125 Beale
Thorpe M Co, Cal.	8	2½c	Sept 28	Nov 6...Nov 29	A F Frey, Phelan Building

Rainfall and Temperature.

The following data for the week ending 5 A. M., November 3, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

CALIFORNIA STATIONS.	Total Rainfall for the Week.	Total Seasonal Rainfall to Date.	Total Seasonal Rainfall Last Year to Same Date.	Average Seasonal Rainfall to Date.	Minimum Temperature for the Week.	Maximum Temperature for the Week.
Eureka	.02	3.85	4.77	4 29	38	78
Red Bluff	T	2 71	1 83	2 35	40	82
Sacramento	00	1.80	2.20	1.77	48	76
San Francisco	T	2.13	1 06	1.37	44	74
Fresno	00	1.20	1 56	.95	46	78
San Luis Obispo	00	.85	1.68	...	38	78
Los Angeles	T	2.52	1.33	1.04	46	82
San Diego	00	1.05	1 10	.61	50	74
Yuma	00	81	1 14	.97	42	88

Assessment Notices.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 28th day of September, 1897, an assessment (No. 8) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, Room 44 Phelan Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 4th day of November, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 29th day of November, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—Room 44 Phelan Building, San Francisco, California.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 2d day of November, 1897, an assessment (No. 82) of 20 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of December, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 29th day of December, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

BEST & BELCHER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 2d day of November, 1897, an assessment (No. 63) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to secretary, at the office of the company, room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of December, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 28th day of December, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

M. JAFFE, Secretary.

Office—Room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

CONSOLIDATED CALIFORNIA & VIRGINIA Mining Company.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3d day of November, 1897, an assessment (No. 10) of 25 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of December, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 29th day of December, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office—Room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from J. F. Cowdery, in the Sackets Gulch Mine near St. Louis, Sierra Co., to deposit tailings in old pits; from the Santa Clara Mining Co., in the Richardson Ranche Mine near Shasta, Shasta Co., to deposit tailings in Clear Creek; from W. T. Sherman and O. F. Cays, in the Canada Mine near Fort Wine, Sierra Co., to deposit tailings in French Ravine; from R. Cordez, in the Mosquito Mine near Comptonville, Yuba Co., to deposit tailings in a ravine; and from C. N. Foote, in the Montalgo Mine near Uno, El Dorado Co., to deposit tailings in Cedar Creek, gives notice that a meeting will be held at room 59, Flood building, San Francisco, Cal., on November 8, 1897, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from T. Larimore, in the Conrad & Wheeler mine, near Forbestown, Butte Co., to deposit tailings in a ravine, and from Edward C. Rigney, in the Round Butte mine, near San Andreas, Calaveras Co., to deposit tailings in Batista creek, gives notice that a meeting will be held at room 59, Flood building, San Francisco, Cal., on November 15, 1897, at 1:30 P. M.

DEWEY, STRONG & CO.
SCIENTIFIC PRESS PATENTS PATENT AGENCY
330 MARKET ST. S.F.

DELINQUENT SALE NOTICE.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 5) levied on the 3rd day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
John A. Heninger	16	250	10 00
Nils Johnson	120	100	4 00
Nils Johnson	121	100	4 00
Hattie E. Gray	124	100	4 00
Wm. Westhoff	144	250	10 00
A. O. Lindstrom	148	250	10 00
Wm. Westhoff	177	500	20 00
Richard Phelan	188	5	20
Wm. Westhoff	200	100	4 00
Wm. H. Lillie	202	10,500	420 00
Mark Strouse	208	5	20
P. E. Robertson	215	250	10 00
Sarah Spalding	218	100	4 00
Abe MacCreadie	220	500	20 00
Alfred H. Hogg	221	300	12 00
Abe MacCreadie	222	250	10 00
J. W. Brown	234	4,099	163 96
C. D. MacNeill	236	200	8 00
Paul Muller	239	50	2 00
Paul Muller	240	100	4 00
Paul Muller	242	1,000	40 00
Chr. W. Heyer	243	755	30 20
Chr. W. Heyer	246	606	24 24
Abe MacCreadie	247	200	8 00
Wm. Westhoff	250	200	8 00
Mary Ann Robertson	251	250	10 00
Mary Ann Robertson	252	250	10 00
R. H. Daley	268	1,000	40 00
C. M. Howe	272	1,000	40 00
C. M. Howe	274	500	20 00
R. H. Daley	275	1,500	60 00
Francis Brady	277	700	28 00
R. H. Daley	278	100	4 00
Dr. H. Sylvester (2,000 shares of this cert. have been paid by H. Sylvester, being part of his stock.)	280	51,278	1,971 12
L. V. Merle	286	10	40
J. T. M. Kelly	289	500	20 00
R. H. Daley	290	100	4 00
R. H. Daley	294	750	30 00
R. H. Daley	295	185	7 40
E. Swenson	296	1,750	70 00
Mark Strouse	297	5,000	200 00
Mark Weil	299	750	30 00
C. W. Heyer	300	400	16 00
Mark Strouse	301	100	4 00
Geo. Day	302	1 000	40 00
Dr. H. Sylvester, Trustee	305	1,105	44 20
Dr. H. Sylvester, Trustee	306	5 000	200 00
R. H. Daley	307	250	10 00
R. H. Daley	308	240	9 60
F. Heard	309	125	5 00
Mark Weil	310	125	5 00

And in accordance with law, and an order from the Board of Directors, made on the 3rd day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Rooms 12 and 13, No. 43 Sixth St., San Francisco, California, on SATURDAY, the 9th day of October, 1897, at the hour of 12 o'clock M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

The day of sale of the above delinquent stock has been postponed by order of the Board of Directors to THURSDAY, October 28th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, the 4th day of November, 1897, at the same hour and place.

H. SYLVESTER, Secretary.

Office—Rsoom 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, November 11th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

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COMMERCIAL DEPARTMENT.
C. E. FINNEY, Manager
GENERAL OFFICES:
ARGENTINE, KANSAS. S. T. Hayes, President
NEW YORK, N. Mitchell, Vice President
ADDRESS ALL REPLIES TO THE COMMERCIAL DEPARTMENT.

Argentine, Kansas July 2nd, 1897.

Re: Gasoline Engine.

RECEIVED JUL 3 1897 Ans'd JUL 3 1897 WEBER G. & G. E. CO.

Weber Gas & Gasoline Engine Co.
Kansas City, Mo.

Gentlemen:—

You shipped us, last month, to our mines at Sierra Majada, one 30 horse power gasoline hoist. I wish you would make for us, and ship as quickly as possible, a duplicate of this hoist for our mines at Chihuahua, Mexico.

I am Yours very truly,
C. E. Finney

Weber Hoists are Winners.

GOLD IN COLORADO!

Colorado has within its limits some of the greatest gold mines that has ever been discovered. In Cripple Creek in 1892 there were a few prospectors looking over the hills; in 1895 the camp turned out over $8,000,000 in gold. Leadville, the old bonanza camp and the mineral product of which made Denver what it is to-day, is becoming a big producer of gold. New inventions for working low-grade gold ores, together with the discoveries made to work rebellious ores, have opened up a field for the miners such as they have never enjoyed before, and Colorado has inducements to offer such as no other district in the world possesses; the record of the State in gold production for the last three years speaks for itself. Among the other prominent camps in the State are Telluride, Ophir, Rico, Silverton, Mineral Point, Durango, La Plata, Ouray, Saw Pit, Ironton, the Gunnison district and many others. New finds are being made and new camps are springing into existence every day. The Denver & Rio Grande Railroad, which is the pioneer road of Colorado and which has always been the miner's friend, reaches all the mining camps in Colorado. For elegantly illustrated descriptive books, free, of mines in Colorado send to

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Opening up the most magnificent scenery in the Rocky mountains, and passing through the
Famous Gold and Silver Fields of San Miguel and Do'ores Counties,
—AND THE—
✦ Montezuma and Shenandoah Valleys, ✦
The Great Agricultural Region of the
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HOMES OF THE CLIFF DWELLERS.
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ALL RAIL "AROUND THE CIRCLE TRIP."
E. T. JEFFERY, PRESIDENT.

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SOUTHERN CALIFORNIA
EN ROUTE EAST VIA THE
Great Santa Fe : : Route.
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SANTA CATALINA ISLAND,
HOTEL DEL CORONADO,
Pullman Palace Drawing Room, also Modern Upholstered Tourist Sleeping Cars, Oakland Pier or Los Angeles to Chicago via Kansas City. : :
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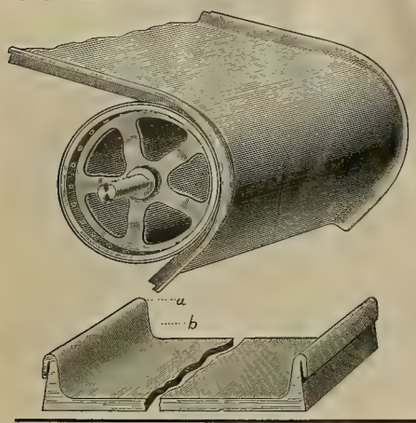
JNO. L. TRUSLOW, General Agent. S. H. PERKINS, City Ticket Agent.

THE BROWNELL "PATENT LIP" FLANGE FRUE VANNER BELTS.



It has taken years of ceaseless testing and experimenting to produce the superior belt which we now offer, with elastic flanges and pliable body reinforced with specially woven duck. Every belt is manufactured by experienced workmen, and carefully tested on machines especially built for that purpose; consequently we are to-day manufacturing the best belts that mechanical ingenuity, combined with honesty of construction, can possibly produce.

RAWHIDE GOLD MINING COMPANY,
JAMESTOWN, TUOLUMNE CO., CAL., Feb. 21, 1897.

J. S. BROWNELL, ESQ.—DEAR SIR: Replying to your query of Feb. 15th, will say that I have used your Patent Lip flange belt more than one year, and judging from their appearance after more than one year of hard service, I do not hesitate to say that they are the best belt I have ever used and I take great pleasure in testifying to the fact. Yours truly, W. A. NEVILLS, President.

AMADOR CITY, CAL., Feb. 18, 1897.

MR. J. S. BROWNELL—DEARR: I take pleasure in saying that I have used your Patent Lipped flange belt for several years while connected with this company, and I consider them the best that we have used. The quality of rubber in the flange seems to be the best, and we are not bothered with the flange cracking and thereby destroying the life of the belt. At present we are using 14 concentrators, and have in use several kinds of belts. We consider your Patent Lipped flange the best. Yours very truly, THE CONS. SOUTH SPRING HILL G. M. CO.
By JOHN R. TREGLOAN, Superintendent.

For any information regarding Frue Vanner or Belts, call on or address

JAS. S. BROWNELL, Western Agent FRUE VANNING MACHINE CO.

(Successor to Adams & Carter.) 132 MARKET STREET, ROOM 15, SAN FRANCISCO.

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Office and Works: Cor. Beale and Howard Sts., San Francisco.

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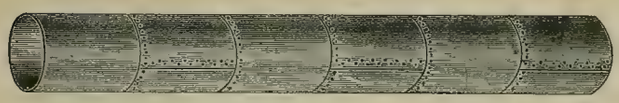

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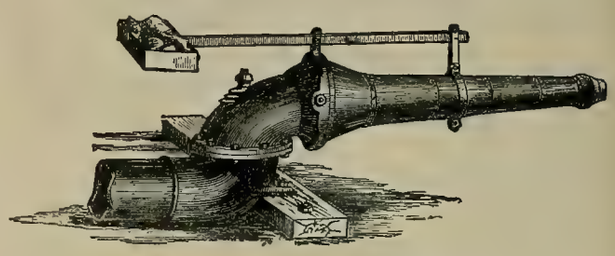

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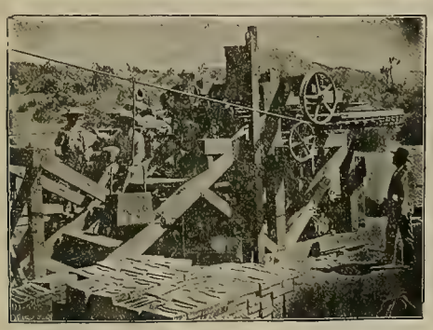

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Extracts from Letters Received from Mr. Philip Argall, Manager the Metallic Extraction Co., Cyanide, Colorado:

January 2, 1897.

"The roasting is invariably good. We can do 80 tons per day to 0.13% sulphur, when everything runs smooth. Our month record which, of course, includes all delays, is 1700 tons, from 1.94% sulphur to 0.16%."

February 19, 1897.

"Our furnace is now running very nicely indeed, averaging 90 tons per day to 0.10% sulphur, and doing excellent work; in fact, it has improved right along and we are highly pleased with it.

"For 24 hours ending 7 A. M. to-day 102 tons were roasted."

The ROPP FURNACE is now in successful operation at the following reduction works: The Hanauer Smelting Works, Salt Lake City, (one furnace); The Metallic Extraction Co., Cyanide, Colo. (one furnace); The Colorado-Philadelphia Reduction Co., Colorado City, (three furnaces); The Selby Smelting & Lead Co., Selby, Cal; (one furnace); The Mount Morgan Gold Mining Co., Rockhampton, Queensland (one furnace); and Broken Hill Proprietary Co., Broken Hill, New South Wales (two furnaces).

Catalogue on Application.

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MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

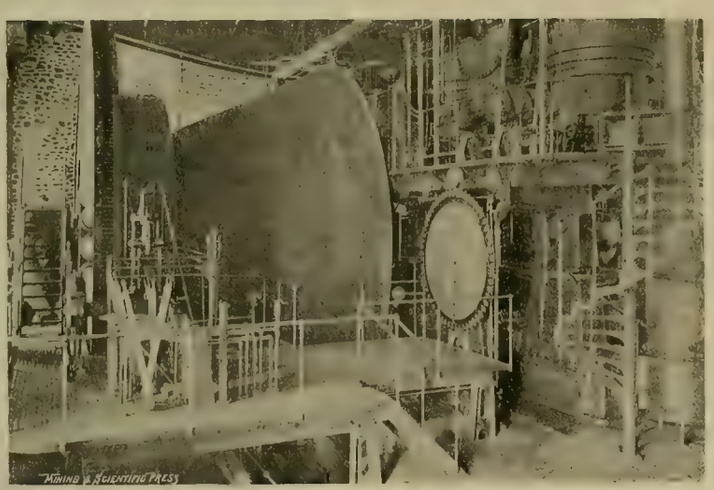
No. 1949.—VOLUME LXXV. Number 20. SAN FRANCISCO, SATURDAY, NOVEMBER 13, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

GOLD is the one commodity that has risen in value for the last ten years with marked constancy. The wages of the gold miner are the only wages that have not depreciated. California is the one commonwealth that produces annually more gold than any one of the other forty-four States. The market produced by the needs of the gold miners of California is the one demand most productive of satisfactory payment to farmers, manufacturers and merchants. The San Francisco County Miners' Association is the one city organization that sees this, that wants to develop gold mining in California, that wishes to thus advertise the State's gold resources and afford opportunities for profitable investment. This is why the MINING AND SCIENTIFIC PRESS supports the new movement. In season and out of season this paper has steadily advocated these ideas, and gladly joins with any earnest practical effort along those lines looking to public benefit.

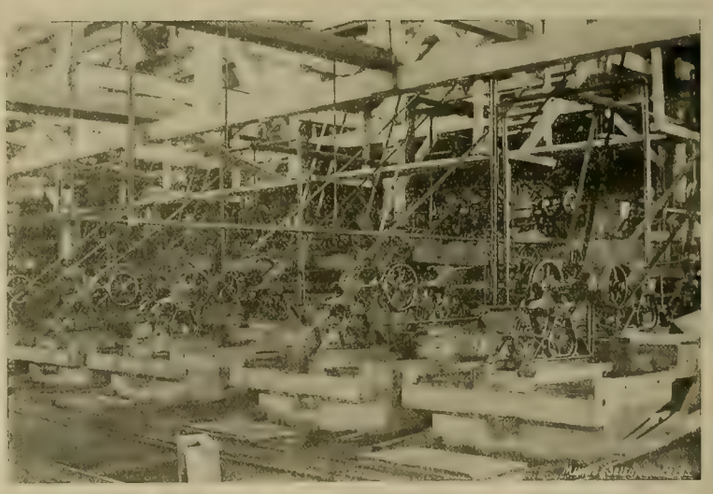
A SINGULAR FEATURE of the Klondike, unheard of elsewhere, is, that there are no surface indications of the gold underneath. The surface is moss, swamp and muck. To start a shaft the moss is first scraped off, then the miner sinks from five feet to twenty feet through muck to the gravel underneath, where he finds his first colors. He keeps on sinking through various depths of gravel down to the paystreak upon bedrock. In many places a sheet of solid blue ice that has never thawed since its first congealment overlies the deposit of gravel. When the air strikes any uncovered ground, like the walls of a shaft, the frozen mass begins to thaw, and in a short time the shafts and drifts are filled with water. This seepage during the summer is a great drawback to both mining and prospecting. The Klondike was prospected, or rather run over, a number of years before the discovery was made. The writer of the letter to this paper, printed on page 415 of the issue of the 30th ult., tramped over the Klondike placers nine years ago, and, although an old experienced placer miner, had no inkling of the millions that lay beneath.

IN relation to the gold discoveries said to have been lately made upon the slopes of Skookum gulch, near Dawson, it is to be observed that, in general, the slopes of hills, the sides and tops of long spurs, and even the tops of main ridges, under the surface skin, are sometimes covered by a certain depth of soil, boulders, gravel and clay, containing a surprising amount of gold, and, under the same conditions, large masses of quartz and loose deposits of gold-bearing rock, rich in metal, are at times discovered. The gold and rock, so found, is often in such a condition as to indicate the close proximity of the orignal source, yet, in the majority of cases, this will probably not prove to be the case. These slope deposits often appear to be created by concentration from high-lying gravels or glacial morainic matter, in the gradual formation of the country, and the gold so found may and very likely has been transported from more or less distant places. Cases are in mind where the sides and tops of long extending spurs have had the thin skin of gold-bearing material covering them carefully scraped away, every square foot of it proving rich. This gold came from the kind of concentration spoken of, and there were no gold-bearing veins anywhere in that region.

MINE TIMBERING, CALUMET & HECLA.



TRIPLE EXPANSION HOISTING ENGINE, CALUMET & HECLA.



VIEW OF STAMP MILL, CALUMET & HECLA.

(See page 458.)

CONSIDERABLE is being claimed at present for the bromine process of gold extraction, in contrast or competition with the cyanide and chlorination processes, and recent experiments in Colorado go far toward establishing the correctness of those claims so far as high percentage of extraction is concerned. But, so far, the increased expense of the process militates against its use. That calcined gold ore treated with bromine and caustic soda will give up a very high percentage of its assay value is an undoubted fact, but the present high price of bromine bars any claim to economy in the process, and it is the most economic method where suited to the ore that is in special demand. Mr. Cassell, the manager, says the process "in a majority of cases is bound to supersede all others," which, under the circumstances, is a most sanguine view.

IT is evident that many thousands will go from all parts of the country to the Yukon region early next year. There will be a large business in the way of outfitting transportation. The rush last July and August will be beaten in numbers and interest by next spring's stampede, and no amount of argument or sober statement of facts will prevent it. Already enterprising coast cities are preparing for the business of which San Francisco can easily handle considerable. Innumerable bogus stock and transportation companies are being formed in all parts of the country and the inevitable aggregate of disappointment will be unusually large.

THE Denver *Republican* makes a good point, where, in discussing foreign mining investments, it says: "There is nothing to be gained by a mere transfer of title from a local to a foreign company, in the case of a developed and producing mine, except where the purchase money is reinvested in local enterprises."

THE Witwatersrand, South Africa, district yielded 1,120,868 ounces gold in 1892; 1,478,473 in '93; 2,024,159 in '94; 2,[illegible],635 in '95; 2,281,875 in '96, and about 2,400,000 ounces for the first ten months of '97.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....General Manager

San Francisco, November 13, 1897.

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AT a temperature of 50° F. a cubic foot of compressed air on the surface of the earth weighs 536 gr.

AS COMPARED with twenty-five years ago, forty per cent more gold can now be extracted from the same ore at a less cost of thirty per cent.

IT is believed that the mill at the Dalmatia mine, El Dorado Co., Cal., was the first quartz mill on this coast to be run by electricity, the installation having been in Sept., '89.

THE Salt Lake, Utah, *Tribune* notices the fact that cyanide works are quietly being established in a small way in many parts of the West, and run like moonshine stills, to avoid paying royalty.

RICH ore is by no means synonymous with large profits. The character of the ore, the size of the vein, the situation of the mine, the water supply are now the chief factors in what is purely a commercial problem.

THE most noticeable difference between Idaho and Nevada mines is that in the former the percentage of gold in the ore increases with depth; in the latter, usually, the deeper the mine the greater the percentage of silver.

WHILE miners' wages in California rule as high and in some instances higher than elsewhere, there are no more $4 per day jobs, the usual price now paid being from $2.50 to $3 per day. The Comstock, Nevada, and some Butte, Montana, mines still pay $4 per day.

THE Witwatersrand district, South Africa, is a good example of what science has done for mining. That district in the last four years has produced 7,385,000 ounces gold. This production has largely been made possible by the cyanide process. The whole thing is a chemical problem, successfully solved. Another illustration is the reduction in the cost of milling quartz at the Treadwell, Alaska, mine to about one dollar per ton.

THERE is a balance to the credit of the U. S. Patent Office, in the National Treasury, amounting to $5,093,614.23, an excess of receipts over expenditures. Meanwhile the Patent Office is cramped, the accommodations inadequate, the surroundings wretchedly insufficient, and the money piles up. The work of the office is in arrears, but the National Government constantly neglects this important branch of the Government, which, though it has a faithful commissioner, is notoriously lacking in many essential elements—a chronic condition of untoward affairs that calls loudly for relief.

Monuments, Etc.

It is seriously proposed to collect and expend $100,000 in the erection of a "monument" on the intersection of two principal streets in San Francisco, to be built of various mineral productions from California counties, "to testify to California's varied mineral resources." Anything that will do that should not be discouraged, as California is proverbially modest in announcing its attractions in any line; but it is believed that this monument idea is unworthy of serious notice. It would be more practical and to the purpose to spend one-half or one-fourth of that amount in actively aiding publicity of the resources of the State. The settled policy seems to be to conceal rather than proclaim the natural riches of the Commonwealth. The railroad companies seem afraid some one will find out that we have great gold mines here, and sedulously decry any effort at publicity. In all their published literature, any reference to the mines—the chief industry of the State—is kept out. In contrast to this is the action of the Colorado railroads. They annually spend tens of thousands of dollars in issuing handsome folders, superbly illustrated, portraying the different mining sections of Colorado, and telling how they can be reached. This pays; the railroad companies certainly don't do such costly work for the fun of it. Advertising is the secret of success. A good thing always is worthy of good advertising, whether it is a State, city, mines, mining machinery, Klondike outfits, or anything else. Colorado understands this and advertises. So does Los Angeles. On a recent Sunday the *Times* of that city of 100,000 people had 134 columns of advertisements; the *Examiner* of this city of 400,000 people had 78, the *Call* 63, the *Chronicle* 53. This proposed "monument" is an advertisement or nothing. The money could be better spent in better forms of advertising.

At present about 100,000 people contemplate going to the Yukon region as soon as possible. They will spend $250 each in starting. Here is an aggregate of $25,000,000 to be spent by men whose road lies through San Francisco. 'Twould be business to take the whole or part of that proposed monument fund in sending out reliable information regarding the value of San Francisco as an outfitting point for those 100,000 men who propose to pass on to the Klondike early in '98.

Concerted effort is now making by mountain and valley residents to satisfactorily solve the problem of resumption of hydraulic mining. Appropriate expenditure of this proposed $100,000 would materially aid therein.

There are a good many ways such a sum could be expended so as to practically help the mining industries of the State, but monuments in this city are not among them. We have a good many fine mining "monuments" now. With the exception of the new Spreckels building, which is a monument to the profitable character of the sugar business, the new Spring Valley building, which illustrates the value of supplying water, the new Gas Co.'s building, which exemplifies the financial possibilities in that direction, there is not a handsome structure in San Francisco that is not a "monument" to the mining industry of the State or coast, as it was money made in mining that built them.

IT is with pleasure we note the successful completion of the narrow gauge Sierra railroad from Oakdale as far as Jamestown, Cal., and the driving of the "last spike" at the latter place with appropriate ceremonies last Wednesday. It is particularly pleasant to chronicle such success, as it was a series of editorial articles in these columns two years ago that led to the attempt that has proved successful. In one of those articles the exact route followed by this new road was indicated and the starting point (Oakdale) specifically pointed out. Such roads will do much for the mining and industrial interests of this State. As has heretofore been shown in detail, their construction in other localities is feasible and their result financially satisfactory. In this regard it is now amusing to recall that when the MINING AND SCIENTIFIC PRESS was advocating the building of this road, which is now in successful operation, it was bitterly assailed by a local journal, which now triumphantly announces "our great industrial awakening." The opposition was because of the "injury" it would be to the freighters. Such hidebound notions have no place in this new era of mining. The business of mining is now purely business. There is no moonshine nor sentiment nor romance about it. The sooner this fact is put into practical observance in other sleepy sections of the State the better for the general prosperity of the commonwealth.

A Smelting Trust.

A Denver, Colo., dispatch says: "For several days the managers of all the smelters from Texas to British Columbia have been conferring together in this city with a view to the promotion of the allied interests of mining and smelting. There appears to be a unanimous determination to devise some means, if possible, to obtain the true market price for their products, instead of the doctored and insufficient quotations now furnished by certain New York jobbers. In the case of lead, for instance, there is no good reason why the market price in New York should not be quoted daily at $4.25 instead of $3.75, and it is believed that, through concerted action on all the lead smelters, justice can soon be obtained. The same is true of silver." It has been the custom all along to have two sets of quotations, one being "exchange," on the same obsolete principle of "steamer day" in San Francisco. It is evident that some good will come of the present conference in securing a basis for quotations that will be clear and satisfactory to buyer and seller alike.

Another Denver report is to the effect that during this week a new smelter trust has been in process of formation in that city, the leading smelting plants of that State being represented and also the smelters of Utah, Montana and Washington, together with the companies recently organized for business in British Columbia, which are closely related with the industry on this side of the line. This new trust is said to have two main purposes in view. The first is to confine the chemical plants, using cyanide, chlorination or mixed processes to gold ores which average $20 and less per ton, thus diverting to the smelters all material of a higher value. This diversion of the field is expected to do away with too sharp competition. The second purpose in view is to cut down the fees of the ore samplers, who, in many of the districts, stand between the producers of ore and the smelters. The sampler affords a cash market to the miner, whether he be leaser or owner, regardless of the size of his shipment. It is, therefore, next to impossible to rule the sampler out; but, if the trust can limit its profits, more margin will be left for the smelting companies.

PRESIDENT NEFF of the California State Miners' Association has appointed a committee of thirteen, to whom is delegated the delicate duty of "urging upon the attention of the members of the U. S. Debris Commission the importance of expending the money now at their command in erecting restraining barriers in the Yuba river." It is not likely, however, that the committee, or any portion thereof, will more than mildly suggest to the Commission. While, doubtless, upon being "urged," the members of the Commission may convey to the members of the committee assurance of their distinguished consideration, it is unlikely that any manifestation of civic impatience will hasten or retard the movements of the members of that military board. The duties that devolve upon the Debris Commission are in addition to an immense amount of work that those U. S. engineers have to do in connection with general coast matters, and are necessarily secondary to the original scope of official work. It is probable that while in common with the committee the members of the Commission regret the untoward delay in the active expenditure of the half million dollars, they are obliged by daily limitations of time to devote much of their available hours to many other calls upon their official capacity. It is noted that, in addition to this committee of thirteen, a committee of three has also been appointed to confer with a similar committee from the Anti-Debris Association, with a view to further co-operative urging the matter of river improvement upon the Commission. The work is of immediate importance, of present and pressing necessity, and it is to be hoped that proper presentation of the facts will enable the Commission

to make such showing to the Administration at Washington as will result in more activity in that direction.

Mining Investments.

In considering mining investments, the investor should carefully distinguish between "mines" proper and "prospects." While this seems trite, there is no point more commonly lost sight of by those who purchase shares in the various mining ventures proposed to the public.

All mines begin as "prospects," but it does not follow that all "prospects" will develop into paying mines. Its location does not necessarily imply that a mine is valuable; being in the "well-known mining district" does not give it value, since a portion of the territory of any mining district is worthless for mining purposes. Being the "extension of the celebrated ——— mine" or located on the "same vein as the rich ——— mine" does not insure value, since the "extension" may be in the wrong direction, and "veins" are by no means equally mineralized in all portions of either their length or depth; being "adjacent to" or "alongside of" some good paying mine in effect may mean that it is worthless as far as the work done in the mine that may be cited proves anything, since it may be on the side "away from the dip of the vein."

And yet all of the instances given when properly understood, actually form a legitimate basis upon which to found an expectation of a profitable business to the owners of a piece of mining property or prospect. Veins are rarely vertical, ore seldom occurs in pay quantities equally along all portions of their length, and where chimneys do occur, they frequently do not run straight down on the vein, but incline along it, so that the work in one mine may show that two pieces of property, one on one side of it, towards which the veins dips, and another on one end of it, towards which the pay ore dips or trends, may be valuable although the owners of the adjacent ground have spent no money beyond that needed to protect or secure their titles. A "prospect" is a legitimate subject for investment: its value is of course, largely speculative, since the element of risk enters into it, under any circumstances, but that is also the case in any other investment, and is hardly more than that attending the purchase of the stock in new railway enterprises, town sites, trolley lines, building and loan associations, or even new banks, or other financial itstitutions; the element of uncertainty is perhaps greater, but on the other hand the actual ready capital called for at the start is small and returns in many cases are larger than those of any other line, and, on the average will compare favorably with any.

A "mine," that is, a piece of mineral territory, originally a prospect, which has been opened up by shafts or tunnels, various working levels, etc., is hardly a speculation at all, but is as much an investment as a house and lot in any town or city. By exposing blocks of actual ore its workings have not only created real value, but have provided the means for conveying that value from its site to the surface and thence to market. It is not only in such shape that the actual net value can be easily determined, within very narrow limits of error, for all the ore "in sight" or exposed to view, but also more certain data are attainable than in the case of prospects for estimating and determining the probabilities for the future, that is, the results to be expected from territory now unexplored, but which is to be depended on for furnishing profits when the present ore reserves have been extracted and marketed. Such properties have been put in shape by the owners by the expenditure of capital, whether money taken actually out of their pockets or yielded by the mine, and by them spent on the mine, is immaterial. In such cases the market value will certainly be high enough, and with reason, to make the annual profits a near approach to the ordinary rate of interest, assuring a safe investment with but relatively moderate returns.

ELSEWHERE in this issue appears a more detailed account of Edison's work at his New Jersey iron mines, in addition to the report of the process in the preceding issue. He certainly has "the courage of his convictions," having, so far, spent $3,000,000 of his own money to secure success. He has staked his great reputation, an immense amount of money, and his personal faith, against the advice and judgment of many experts, and, while 'tis not in mortals to command success, he certainly deserves it.

PROFESSOR CHAS. D. WALCOTT, Director of the United States Geological Survey, has returned to Washington after an absence of four months spent in the field. In the course of his journeys Mr. Walcott gave a short time to geologic investigation in the Sierras, on his own account, and to attending to the general affairs of the bureau. He was engaged principally, however, in looking after the surveys and investigations of the suspended forest reserves, a work only just entered upon by his bureau, and to start which Congress, at the last session, made an appropriation of $150,000. This work was started and got under way last July. In connection with this branch of the work, topographic and subdivision surveys are being made in nine of the forest reserves of the West, the field being divided between two of the topographic divisions or sections of the survey. Mr. R. U. Goode, of the Pacific Section, will work in the San Jacinto reserve of southern California this fall, sending some of his parties into that area when they are driven by bad weather out of the more northern reserves. Data on which to base definite statements of the results of the surveying work of the season are not yet available. Preceding the topographic work proper triangular and spirit-level lines are being run, except in the higher and more rugged regions, where there are no roads and trails. The subdivision surveys are being made in the usual manner. An additional feature is the outlining by the surveyors, in the course of their other work, of all wooded and forested areas, and another is the erection, at suitable intervals, of permanent bench marks, to mark the elevation above sea level. There are from one to three parties in each reserve. Such data as are at hand indicate that the surveys have progressed satisfactorily, considering the lateness of the start, the rugged character of much of the country traversed, etc. The topographic maps which will result from the topographic surveys will be on the scale of two miles to the inch, with 100 foot contour intervals. These will serve as base maps for the representation of forestry details, agricultural and mineral lands, etc. The subdivision surveys will enable the demarkation of tracts of land for agriculture, for minerals and for timber.

ANOTHER of the absurd administration rulings have been reversed. In apparent collusion, Hoke Smith and his man Friday, Lamoureux, some time ago ruled that lands containing petroleum are not subject to location under the mining laws. Smith was Secretary of the Interior and Lamoureux was Commissioner of the General Land Office. It was a corporation victory. The miners waited till time put a broad gauge man in power and got a rehearing with the result that the present Secretary of the Interior rules squarely opposite to his predecessor of unhappy memory and decides that petroleum is mineral, and hence the oil tract in dispute is not to be included in the railroad grant. Secretary Bliss quotes the law and cites standard authorities in support of his ruling. In effect it is that land containing deposits of petroleum is mineral land and subject to entry as such under the laws regulating the location of placer mining claims. Where such prompt attention is given to the requirements of justice the action goes far toward compensating for the absence from governmental counsels of a Secretary of Mines and Mining.

ON another page is given the outlines of a scheme for a telegraph line to the Yukon. The enterprise cannot fail to call to the minds of old residents of this coast the costly effort of a generation ago to build what was then known as the Collins telegraph line, an extension of the Western Union, being a project to connect Europe and America overland by reason of the failure of the first Atlantic cable. The Western Union secured concessions from the Russian Government—which then owned Alaska—and from the Canadian provincial authorities, divided the work into four divisions, and in the summer of 1865 started exploration and construction expeditions from San Francisco. The stock was held at fancy prices and everything pointed to success. Nearly thirty steamers and sailing vessels, accompanied by a man-of-war from the United States, Russia and England, respectively, sailed from this city. During that season considerable work was done and nearly 800 miles of line built across British Columbia into Russian territory toward the headwaters of the Yukon. St. Michaels—which is now a wintering place for stranded Dawsonites—was established in that year and the country was thoroughly explored. In August of the following year, Field and his associates successfully completed the cable across the Atlantic from New York to the Irish coast, which was the death knell of the Pacific enterprise which cost the company first and last about $3,000,000. Now the present projected line traverses for hundreds of miles the route of its ill-fated predecessor of thirty-two years ago.

THE workings of a recent Arizona statute was recently commented upon herein, the case being where the University of Arizona is required to make assays of gold and silver for fifty cents, the result, of course, being that the business of the private assayer in Arizona is not, at present, a particularly lucrative one. In answer, the author of the bill, who is the editor of the Florence, Arizona, *Tribune*, defends the measure, and says: "The law is a good one. It is in the interest of prospectors and miners, who can illy afford to pay $1.50 for such work, and, besides, fifty cents is the prevailing price in Colorado, and most of the assays from that section went to that State. Now the money is kept at home,and helps to educate the youth of the Territory." In this case, as in many others, so much depends upon the point of view.

ONE of our most valued exchanges is the Patent Office Official Gazette, a Government publication which usually is composed of about 160 pages. It has run as high as 194 pages for one issue; but the issue of October 27th, '97, exhibits a degree of business which would be the envy of a private publication. The issue in discussion contains 288 pages, the large size being due to the description of 125 patents granted to M. G. Kellogg of Chicago relating to switchboards for telephone exchanges. Though the Government printing office is able to do a tremendous amount of work in a short time, the exigency of the occasion compelled even that great concern to wire for extra type and to put on sixty extra men to complete the job.

THE tremendous advertising that the Klondike has received will start 100,000 adventurous men into that region next spring. Their wants must be supplied and the millions they will expend for transportation and supplies can as well be spent in San Francisco. Ultimately, they will drift to California anyhow, as they gradually realize that gold can be secured in this State without the hardship and risk of life attendant in northern wilds; but till that degree of knowledge is vouchsafed them, the coast can outfit them for their new quest of the golden fleece.

THERE is a difference between business methods and intent. Some "journals" send men through the mining regions soliciting mine owners for money to secure publication therein of "writeups." For close on to thirty-eighty years the MINING AND SCIENTIFIC PRESS has paid practical men to travel and report on mining properties without cost to the owners, and in this way has given world-wide publicity to the mining resources of this west half of America.

THE statement of our Shasta Co., Cal., traveling correspondent regarding the Chinese is illustrative of how difficult it is to get correct statistics of the gold yield of this State. Between Chinese who never make any reports and Caucasians who decline giving any information as to the gold output of the properties in their control, it has always been evident through the years that the reported gold yield of California has been necessarily incomplete.

THE assertion is again made with considerable positiveness that the Le Roi, B. C., mine was sold in London, this week for $5,000,000, "to the Rothschilds," as usual. Last week the Rio Tinto Co., were the reputed purchasers.

Notes on Dredging for Gold.

Written for the MINING AND SCIENTIFIC PRESS by JOHN W. GRAY.

After great effort, numerous trials, many failures, and some large losses, this system of gaining gold has been evolved from crude beginnings into a systematic and satisfactory method of mining. Dredging for gold is now attracting attention and bids fair to become an established form of mining for gold. In New Zealand, where more work of this nature has been done than elsewhere, the evolution of the industry has been the work of years. The rivers upon which dredging operations are carried on are swift-flowing streams, subject to frequent floods, having a considerable depth of gravel, with boulders, and with runs of pay dirt interstratified. The conditions are, therefore, not the best for economical and successful work, and it is not surprising that many failures have occurred. The runs of gold are, however, often extensive and rich, and operations carried on upon such reaches have in a number of cases given satisfactory results.

The improved form of dredge is a double pontoon, with ladder and chain bucket arrangement between. Screens separate the coarse from the fine material. Wide sluicing tables catch the gold, centrifugal pumps supply the water, and the waste material is handled by elevators. The power is usually steam, although electricity is used in a few instances, where conditions are favorable. The dredges vary in size and capacity, but are now built of large size and great strength. Twenty thousand dollars is the cost of a large dredge with all the latest contrivances. Under favorable conditions, material has been handled without loss that only yielded a grain of gold to the cubic yard. The real cost, in actual continued working, is believed to be very much in excess of that figure where average conditions exist.

According to the report of the Mines Department for 1896, the gold-saving appliances of the dredges operating upon the Clutha river and tributary streams were imperfect, and the work was considered remunerative only because of the richness of the ground worked. No information as to the yield of gravel or cost of work is given, and secrecy is maintained by those operating dredges regarding yield and value of gravel, cost of work, and all the details of their operation. One dredge on the Clyde side of the Shotover, working to a depth of 20 feet below water level, lifted forty tons per hour when operating. Six men were required to work day and night, and three tons of coal were consumed per day. According to the New Zealand *Mining Record*, eleven dredges during the four weeks ending July 24th, 1897, secured $29,548, working expenses being about 21 per cent of the total yield. This would give an average for the month of $2686 for each dredge. Nothing is learned regarding value of gravel, amount worked, or expense of working, save as a percentage of total yield. This is an unsatisfactory and misleading way of reporting results of operations, and gives no information that is of value to those interested in such matters. According to the Government expert of the Mines Department the dredges have, as a rule, been under the management of men with mechanical skill only. The gold, it was thought, would save itself if the dredges handled the material. Many of the failures are attributed to the fact that the men in charge were not familiar with or skilled in gold-saving operations, and it is believed this has been the prime cause of nearly all failures where the conditions for operating were favorable.

So far, in this country, with a few exceptions, dredging operations for gold have not been financially successful. From crude beginnings, however, the machines have been rapidly improved and perfected until now, in some localities, dredges believed to be the most complete yet constructed are being put in operation, and results are promised, not yet attained, in the way of economical working and high percentage of saving. During the last few years a number of dredges have been operated in California, British Columbia, Idaho, Montana and Colorado, but with poor success. Very few proved themselves capable of paying their way. Some of the machines were faulty within themselves, others were entirely unable to cope with the swift currents and large boulders of the streams upon which they were operated. This latter is said to have notably proved the case with the dredges tried upon the Fraser and Quesnelle rivers.

Dredging operations upon Grasshopper creek, near Bannack, Montana, are now carried on successfully upon a large scale. The upper Sacramento river, in this State, has a dredge doing profitable work and, in a small way, dredging is successful upon the Klamath. A dredge upon that river, composed of two flat boats with a large steel scoop between, is able to cut and hoist the gravel and soft bedrock, and to handle boulders of from four to six tons weight. The dredge is run day and night, has a 25 H. P. engine, and requires three men for each shift. In gravel 10 to 25 feet deep 400 cubic yards can be handled every twenty-four hours. Cost of dredge, $8000.

A large dredge of the chain-bucket variety is operating in northern Mexico, in a dry country, where there is little water. The actual capacities of these machines are 60, 100 and 150 yards per hour.

Perhaps the most interesting dredge yet brought to the notice of the public is one lately built by the Risdon Iron Works of San Francisco, and now operating upon the Yuba river, near Smartsville, Cal. It is of the elevator or chain-bucket type, 96 feet long, composed of two pontoons, separated by a space 5 feet in width, in which is operated the ladder carrying the buckets. One man controls the dredge, by means of a power winch with six drums. Four drums carry lines from the corners of the dredge to anchorages on shore—one a head line and one the ladder line. The machine is to dredge to a depth of 45 feet, and is said to have a gross capacity of ninety-three cubic yards per hour. The material discharges from the buckets into a revolving and perforated screen. This segregates the large material, which is then conveyed away by the tailings elevator. Water (3000 gallons per minute) is supplied to the revolving screen for washing and sluicing purposes by a centrifugal pump, and the fine stuff falls through the holes in the screen into a distributing box, from which it passes to a set of gold-saving tables, and thence to a flume. The tables are covered with cocoa matting and expanded metal. The top tumbler of bucket chain is operated by a vertical compound condensing engine indicating 35 H. P., which also operates the pump. It is claimed for the dredge that for any ground not deeper than 60 feet below water level or more than 20 feet above, and which contains boulders of not more than one ton weight, the material can be handled at from 3 to 5 cents per cubic yard. If the capacity of the machine is given without deduction for water raised, imperfect filling and general delays, and the increase in volume of the gravel when broken up in filling the buckets, the actual working capacity would be less, and from these causes and the losses from wear and tear, breakages and repairs the cost of operating would be increased. The cost of the dredge, complete, upon the river is said to have been $25,000.

In the evolution of the dredger into the elevator or chain-bucket machine, now the popular form, the various kinds of dredges were given trials. The dipper dredge is not adapted to dredging for gold, because it disturbs the gravel in the act of digging, and some of the gold is lost. With agitation of the gravel the gold soon settles, and is not recovered. It is also very difficult, if not impossible, to construct a dipper dredge that is watertight. Another objection is that the material is supplied intermittently, thus making necessary certain undesirable arrangements for supplying the material in a continuous flow to the gold-saving tables. The same objections apply with greater force to the clamshell form of dredge. It is by no means watertight, and loses most of the gold in the act of dredging and bringing up the gravel. The objections would seem not to have the same force if applied to hard cemented gravel, or to gravel with sufficient clay or other binding material, to make it consistent. It is well to remember that these forms of dredges are, in many positions, economical of operation.

The hydraulic dredge has had fair trials and proved a failure. Large stones greatly lessen the efficiency of this form of dredge, and numerous boulders hamper the pumping work. The suction force, being intense near the pipe and decreasing rapidly a short distance away, causes the sand and gravel to be carried off, leaving the gold behind. A centrifugal pump is, therefore, of little use to catch coarse gold and clear a hard, uneven bottom. Cutters do not remove the trouble, since the gravel is disturbed by the cutting and the gold is separated therefrom.

These objections would not obtain under certain conditions, and it would seem quite possible that conditions might be found existing where the suction dredge might be arranged to do good work. A dredging company is now constructing at Seattle two dredges of the suction type to operate upon the Yukon river. This would indicate that there are those who believe that deposits occur in and along that river which can be successfully worked in this way.

The chain-bucket machine, the popular form for operating under average conditions, is a combination of the following elements: An excavating apparatus which clears the bottom and handles the material with little agitation, and slowly and continuously delivers a regular quantity of gravel to the gold-saving appliances; a revoving screen to receive and wash the material, and separate the coarse from the fine; an elevator or contrivance for carrying off the coarse gravel and stones; a gold-saving arrangement or tables, over which the fine material passes and upon which the gold is caught; a pumping apparatus to supply water for washing and sluicing.

The proper capacity of a machine seems to be regulated by the capacity of the gold-saving appliances. The tables should be as wide as possible, with frequent drops, and the fine material should be distributed over the tables in a thin film. The tables are covered with plush or cocoa matting, and sufficient water supplied to keep the material clear. The material should be supplied evenly, continuously and regularly to the tables. Care and attention are required to catch the fine gold. A disregard of the foregoing results in great loss, more particularly in the fine gold. Mechanical skill is required to properly design and construct a dredge, and the care of a competent mechanic is necessary to see that the machine is kept in order and economically operated. The saving of the gold, however, is what makes dredging operations a commercial success. A man skilled in these matters should be in charge of mining operations. Dredges should be built of determined capacities, and should be designed to suit the conditions under which they are to operate. Careful examination and investigation of the ground to be worked should be made beforehand, and the surrounding conditions studied, and it goes without saying that these matters require engineering skill and experience.

The field for dredging for gold seems large. Where the proper conditions exist, it is a system which commends itself and which gives promise, in competent hands, of being an economical method of mining. There is probably a very large extent of country where dredging for gold will be carried on profitably. Ground need not be in a river, if there is seepage water sufficient to float the dredge and supply clear water for the saving of the gold. Dredging requires little water as compared with that required for sluicing and elevating, and this water can in many dry localities be supplied at small expense, where a supply for hydraulic work or elevating would cost a very large sum or be impossible at any cost. Any power suitable for driving the prime motors can be utilized to run the dredge. Indeed, it would seem as if a system of mining was about to be perfected which may make possible the profitable working of many deposits not easy to be worked by other methods, and which may, in many instances, solve problems regarding the successful working of deposits which hitherto have seemed most perplexing, and even impossible of solution. Some doubt exists as to possible economical dredging operations under the water of torrential streams. The strong currents, frequent floods and many large boulders found in the channels of such streams make the working of the machines difficult and costly. This would not be so much the case in the long stretches of less current, nor would it be so at all in the valley-like reaches in the lower portions of such streams, nor in the wide, flat portions of country where the streams enter the plains.

Although dredging for gold as a method of mining has passed the experimental stage, there is a great lack of reliable data regarding all details of operations and the actual cost of real and continued working. For this reason it would seem especially desirable that all projected enterprises, in the way of dredging work, should first receive the most careful investigation, and that afterwards all operations undertaken should be under the direction of skilled and experienced men.

New Steel Process.

Many of the failures of cast-steel apparatus are due to flaws. The drooping of big guns, the bursting of smaller ones, the fracture of engine cranks, railway wheels and propeller shafts are more often due to hidden flaws in the steel than to any other cause. This has made it a matter of moment that some plan by which the occlusion of air could be absolutely prevented. A new invention designed for this purpose has been patented by W. E. May. By this process the castings are made in an air-tight chamber from which the air is exhausted, the mold or casting being placed in the chamber before the exhaustion of the air. This chamber is surrounded by a series of other chambers, each connected with the central chamber by a pipe controlled by valves. In these chambers a reserve of vacuum is stored, the air from them being exhausted by vacuum pumps.

When a casting is ready to be run in, the controlling valves are opened and the residue of air in the casting chamber is instantaneously sucked out into the surrounding chambers, at the same moment that the molten steel is poured into the mold. The casting thus takes place in vacuo, the secluded air and gases rush out of the fluid metal and diffuse themselves in the vacuum chambers, and a flawless, homogeneous steel casting is the result. In the case of large ingots or armor plates the process provides additionally for subjecting the fluid metal to uniform compression by means of hydraulic power while in vacuo, so that cavities which might result from contraction of the metal while cooling will be rendered impossible. It is usual at present, when making large castings, to use about 40 per cent more metal than is required for the work, because the upper part of the ingot, being permeated with air and gas bubbles, has to be cut off and discarded as useless. By the May process it is claimed that this waste will be avoided.

There seems to be some diversity of opinion as to the practical value of this method of casting steel; and the process is not receiving much encouragement from steel manufacturers. This, however, was the case with the Harvey process till its merits were demonstrated.

Notes on Selenium and Tellurium.

EDWARD KELLER.*

It is not very frequently that the technical chemist and the assayer, or the metallurgist, meet with the two elements selenium and tellurium, although the assayer's work in gold assaying and treatment of the ores is often rendered more difficult by their presence. No analysis of any of the Western crude copper, however, is now complete without the joint, or separate, determination of selenium and tellurium.

It is not the object of this paper to fully describe any of the methods in use for their separation from other elements. A few new features, merely, will be pointed out.

It has long been known that many acid-forming elements are precipitated by ferric hydroxide as insoluble salts from ammoniacal solution.

To have introduced this principle into copper analysis is entirely the merit of present and former chemists of the Baltimore Copper and Smelting and Rolling Co.

The elements of this group which occur, or may occur, in copper are phosphorus, arsenic, antimony, tin, selenium and tellurium. With all these elements this method may be most successfully employed when they are present in small quantity and the precipitation of the copper becomes impracticable. When the proper conditions are observed it is most efficient, rapid and simple. From five to many hundred grammes of copper, with a comparatively very small amount of iron, are dissolved in nitric acid, enough ammonia added to hold all copper in solution, boiled, and the ferric hydroxide filtered and washed.

From this precipitate the enumerated elements can easily be separated by known methods.

The following is illustrative of the behavior of selenium and tellurium in relation to this ferric hydroxide separation method. Of each element one gramme was taken, and by oxidation with dilute nitric acid a solution of selenous and one of tellurous acid obtained. One gramme of ferrous sulphate was dissolved and oxidized, and that amount of iron added to each solution, as well as to each succeeding filtrate (previously acidified) after the ferric hydroxide, precipitated by ammonia, was collected on a filter and washed. The ferric hydroxide precipitates were each dissolved in hydrochloric acid of the proper strength, and the selenium precipitated with ferrous sulphate, the tellurium with sulphur dioxide, and determined on tared filters.

The quantitative results were as follows:

It is clear that the reaction is quantitative only when a certain excess of iron is present, which for selenium must be many times greater than for tellurium.

The method universally recommended for the separation of selenium and tellurium is the potassium cyanide method, selenium being readily soluble in a solution of that compound. Tellurium is also dissolved in small quantities, which must be again separated, and for that reason the method is unsatisfactory.

The best precipitant for both elements is declared to be sulphur dioxide.

To obtain the metallic precipitates by any reducing agents the two elements must be in solution as selenous and tellurous acids. The same is true if the sulphides are desired by precipitation with hydrogen sulphide. Selenic and telluric acids are only reduced to the lower form of strong boiling hydrochloric acid. In describing the experiments made, the solutions spoken of are always those of the former acids.

In the reaction of selenous and tellurous acids with sulphur dioxide the two show characteristic differences. When precipitated by that gas no heavy metals must be present, since they are also, at least partially, precipitated.

Example.—With ½ gramme of copper and 0.1726 gramme of selenium in solution, 0.0865 gramme of copper was thrown down.

In the following determinations, the acid of which the percentage is given is strong hydrochloric of the specific gravity 1.175. The amount of selenium and tellurium in each case is $\frac{1}{10}$ gramme. The sulphur dioxide passed through the solution until thorough saturation. Time of standing about twenty hours. The reaction was conducted in the cold.

PRECIPITATION OF SELENIUM AND TELLURIUM BY SULPHUR DIOXIDE.

	Percentage of Acidity of Solution.			
Precipitation of—	*0.5*	*1*	*2*	*3*
Selenium	.....	0	.....	trace
Tellurium	total	0 0761	0.0525	0.0653
	Percentage of Acidity of Solution.			
Precipitation of—	*5*	*8*	*10*	*0*
Selenium	0.0124	.....	0.0349	0 0935
Tellurium	0.0745	0.0931	total	total
	Percentage of Acidity of Solution.			
Precipitation of—	*30*	*40*	*50*	*60*	*65*
Selenium	total	total	total	total	total
Tellurium	total	total	total	total	0.0965
	Percentage of Acidity of Solution.			
Precipitation of—	*70*	*75*	*80*	*90*	*100*
Selenium	total	total	total	total	total
Tellurium	0.0882	0.0411	0	0	0

The accompanying graphical representation of these figures perhaps conveys a more clear idea of the difference of behavior of the two elements.

From the above facts we learn that even with sulphur dioxide in a hydrochloric solution of over 80 per cent acid a separation is possible. We also see that to obtain a total precipitation of the two elements together in this way the acidity must be confined to definite limits, safely between 30 and 50 per cent; otherwise, one or the other of the two will remain wholly or partially in solution.

If, after saturation with sulphur dioxide, of a selenous acid solution of insufficient acidity, the necessary amount of hydrochloric acid be added, the precipitation becomes total. The same is the case with tellurium in case of insufficient acidity. In case of too high acidity diluting to the required strength calls forth total precipitation.

The figures for partial precipitation are not absolutely constant. They show variations under different conditions, such as temperature and time of exposure to the action of the reducing agents.

Both elements are more voluminous when precipitated from weak acid solutions than when precipitated from stronger ones.

Ferrous sulphate does not precipitate tellurium.

A series of determinations of selenium, precipitated from solutions of various acidity by ferrous sulphate, showed that the reaction is rapid and quantitative in strong hydrochloric acid. The degree of rapidity of precipitation diminishes as the acidity is reduced. It is total within twenty-four hours as long as the acid is 30 per cent or more. In fact, the reactions of ferrous sulphate and selenous acid are almost identical with those of that acid and sulphur dioxide.

These facts furnish a simple method to separate selenium from tellurium, or any other of the ordinary elements, for analytical or industrial purposes. Gold and silver only, of the metals usually present, interfere. Gold may previously be precipitated by oxalic acid, which does not affect selenium, and silver is so readily separated as chloride that it is no obstacle. Or gold may be precipitated with the selenium and weighed together, and the latter dissolved with nitric acid, leaving the gold in weighable form. Selenium is then obtained by difference.

In attempting to make electrolytic copper determinations in copper residues (from electrolytic tanks), these were treated with strong nitric acid, the silver precipitated as chloride, and filtered. The filtrate, now being freed from gold, silver, and much antimony, was then evaporated to dryness and the residue boiled with hydrochloric acid until the nitrates were fully decomposed. The excess of acid was next neutralized with ammonia, and into the slightly acid solution was conducted hydrogen sulphide. The precipitate, after filtering and washing, was digested with a sodium sulphide solution, and after again filtering and washing redissolved in nitric acid, made ammoniacal and, for the purpose of precipitating lead and bismuth, ammonium carbonate and phosphate added, and boiled. After cooling and filtering, the ammoniacal copper solution was acidified with sulphuric acid and subjected to electrolysis. It was thought to have been freed of all deleterious elements. The precipitate of copper, however, failed to come down bright and thoroughly adhesive, and on solution with somewhat diluted nitric acid a reddish residue would be visible on the cathode. This proved to be selenium.

The selenium in the same residue was then separated, and it was found by a number of quantitative determinations that by precipitation with hydrogen sulphide, and subsequent treatment with sodium sulphide, from two-thirds to seven-eighths of the selenium was retained by the insoluble sulphides of copper, bismuth and lead, the remainder being in the sodium sulphide solution, the latter always containing all of the tellurium.

Looking over many text books and considerable original literature, I found only one allusion to this fact. William Crookes, in his "Select Methods in Chemical Analysis," p. 426, 1894, says: "Selenium cannot be separated from metals with which it is combined when the sulphides of these metals are insoluble in ammonium sulphide, by making use of the solubility of selenium in this reagent. The insoluble metallic sulphide is almost always mixed with selenide."

Here it should be remembered that the precipitation of selenium, as selenium sulphide, SeS_2, from a solution of selenous acid with hydrogen sulphide, should be conducted in the cold. The precipitate has then a lemon-yellow color and is very readily dissolved by the alkaline sulphide solutions. On heating, this yellow precipitate darkens to an orange color and becomes insoluble. This is said to be due to decomposition and the insolubility of selenium.

Ditte tells us that when selenium and sulphur combine in the above-mentioned manner heat is absorbed, or the heat of formation is negative. This sulphide, like hydrogen iodide, belongs, therefore, to a class of compounds which readily decompose.

After a number of quantitative tests, demonstrating that copper, bismuth and lead separately retain selenium to a greater or less extent, according to conditions, the quantitative determinations shown in Table A were made.

TABLE A.

Element	Quantity taken	Number of precipitations. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	Quantity found.
	Gramme.	Gramme.	Gramme.	Gramme.	Gramme.	Gramme.	Gramme.	Gramme.	Gramme.	Gramme.	Gramme.	Gramme.
Se	1	0 0892	0 0673	0 1546	0.1297	0.2219	0.1416	0.1236	0 0513	0.0121	0	0 0213
Te	1	0.9548	0 0448	0								0.9996

The quantity of selenium in each case was about two grammes. This and the varying quantities of copper were in hydrochloric acid solution, with just enough free acid to prevent any precipitation of copper selenite. The precipitation with hydrogen sulphide was conducted under cooling, and the resulting precipitate washed with cold water, digested with a strong solution of sodium sulphide, then washed with water containing a few drops of the same reagent, then with water to which a little ammonium sulphide was added, and finally with strong alcohol. Sulphur, selenium and copper were then determined in the precipitate. The results are given in the table below:

	I.	*II.*	*III.*	*IV.*
	Gramme.	*Gramme.*	*Gramme.*	*Gramme.*
Sulphur	0.3787	0.1649	0.1730	0.0416
Selenium	0.2828	0.1726	0.1565	0.0239
Copper	0.9880	0.4880	0.4909	0.0979

Figuring the theoretical amount of copper, as combined with the sulphur and selenium found, we obtain:

	I.	*II.*	*III.*	*IV.*
	Gramme.	*Gramme.*	*Gramme.*	*Gramme.*
Cu combined with S	0.7503	0 3267	0.3428	0.0824
Cu " " Se	0.2263	0.1385	0.1256	0.0192
Total	0.9766	0.4652	0.4684	0.1016

In another experiment selenium and copper were subjected to the action of hydrogen sulphide in ammoniacal solution, and the precipitate treated as those previously described. The results obtained were:

	Gramme.
Sulphur	0.0098
Selenium	0.0138
Copper	0.0231
Copper (theoretical)	*Gramme.*
Combined with sulphur	0.0163
" " selenium	0.0111
Total	0.0274

The initial amount of copper in this last case was 0.05 gramme, and, as was expected, a large portion remained in the ammonium sulphide solution.

While the results do not appear very satisfactory from the standpoint of analytical accuracy, it should be stated that the purpose of the determinations was to find the existence or non-existence of a definite reaction, and the molecular proportions of the sulphide and selenide formed. At first sight the results might be considered of a negative character. On closer observation, however, two out of the first four determinations show a maximum of selenide, or a minimum of sulphide formation, in which the atomic ratio of selenium and sulphur is approximately 1 : 2, or the same as in selenium sulphide, as formed by the reaction of selenous acid and hydrogen sulphide.

$$SeO_2+2H_2S=SeS_2+2H_2O.$$

By the precipitation in ammoniacal solution the contents of selenium in the precipitate are higher. It is quite likely, however, that in this case more of the copper sulphide than of the selenide was held in solution by the ammonium sulphide, and it is clear that in acid, as well as in alkaline, solution only a certain maximum quantity of copper selenide is formed which never equals the amount (molecularly) of copper sulphide.

According to the above it may plausibly be supposed that the reaction takes place in two stages:

I. $SeO_2+2H_2S=SeS_2+2H_2O.$

II. $3CuCl_2+SeS_2+3H_2S=2CuS+CuSe+6HCl+3S.$

For this theory there is no positive proof; but it is plain that the hydrogen sulphide must reduce both copper chloride and selenous acid, that copper and selenium may combine in their nascent state, and that sulphur is precipitated, or that copper may combine with previously formed selenium sulphide, and that this also must be accompanied by sulphur precipitation.

The reaction appears one of the most interesting in inorganic chemistry, and deserves further investigation.

DR. BELL, of the Canadian Geological Survey, has discovered that Baffingland is the third largest island in the world; that it contains vast herds of reindeer; that it is a land of great lakes and also of great riches. What is now found to be one great island, to which this name has been given, was formerly thought to be divided by channels or sounds into several islands. It is by far the largest island in the Dominion and is only inferior in extent to Australia and Greenland. It lies northwest and southeast, and is 1100 miles in length, and may become valuable for fisheries and mines.

*American Chemical Society.

Edison's Ore-Working Process.

A brief description of the Edison magnetic iron works on the summit of Iron Mountain, Sussex Co., N. J., appeared on page 432 of last week's issue. The Eastern papers are full of the scheme, and if half what is claimed for the enterprise proves true Edison will save the Atlantic slope from the tremendous losses that would follow the migration of the iron industry to the great iron and steel centers west of the Alleghanies. That migration began years ago and had progressed to the point of closing many eastern plants before Edison discovered the enormous deposits of low-grade iron ore in New Jersey and set about devising a cheap process of separating the metal from its bed of useless rock. Now the iron and steel industries of the East feel that they have been saved from annihilation. They may not be able to compete with the Lake Superior ores, which are torn from the ground with steam shovels and loaded directly upon the railroad cars, but it may be possible to keep the western products from taking the home market away from the old mills along the Atlantic seaboard.

The system is simple. The iron-bearing rocks are ground to fine sand in immense crushers. The sand is dropped in a stream near a magnet. The iron is deflected far enough to fall in a special receptacle, while the sand drops down and lands in the waste heap. The fine particles of iron are compressed and baked into bricquettes and poured into a rattling stream into flat cars which carry them to the iron mills. Seventy-five carloads of pure iron are torn out of the rocks daily by Mr. Edison's great plant in the wilderness of New Jersey. It competes successfully with the iron from mines where these processes of separation are not required. And there is enough of it in the 16,000 acres of land around the town of Edison to supply the whole United States for seventy years. It is predicted that in a short time these immense beds of ore lying near the Atlantic will not only supply the iron used in the Eastern States, but will be sent abroad to keep the industries of Great Britain from stagnation. The possibilities of the work are so vast that it is not surprising that the inventor has left for a time his work of doing startling things with electrical novelties to work out this industrial revolution. It may be that his name may be remembered longer in connection with the iron industry than in the field in which he had before gained so much fame.

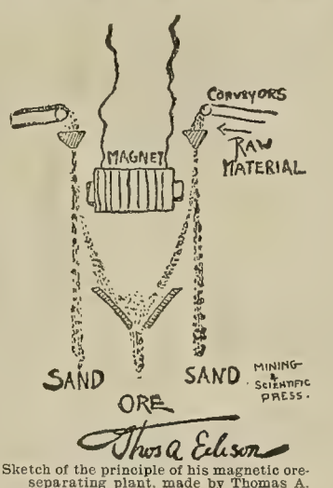
In reading the descriptions sent to the MINING AND SCIENTIFIC PRESS the first thought is that the stated amount of work must necessarily tear any machinery to pieces. Edison says he has gone into the matter of repairs and renewals thoroughly, and calculates that $14,000 per annum is a liberal allowance therefor.

Sixteen years ago Edison was walking along the seashore on Long Island, when he noticed a pile of black sand piled up on the beach. With the zeal of the scientific investigator, he carried some of it home to his laboratory, procured an electro-magnet, held it near the mass, and immediately little dark grains separated themselves from the heap and scurried across like so many black ants to the spot over which the magnet was held. The little ants were really grains of iron ore. This sand covered the shore in spots for fifteen miles along the coast, just as the black sand is found in bunches all along the California coast from the Oregon line down to a point south of San Francisco. Unlike our California beach sand, there was no gold in it. This Atlantic coast black sand was due to the erosion of Connecticut rocks by water—for magnetite is one of the constituents of the primal rocks found in Connecticut. Edison calculated that the deposits must contain millions of tons of iron which, if it could be smelted, would become a valuable product. On the basis of his find he evolved his famous magnetic ore separating machine, which he exhibited at the last Paris exposition. Then he let out the privilege of using it to a contractor, who set up a plant on the beach and proceeded to separate the iron ore from the sand, with every prospect of developing an extensive industry. But the sea proved to be less generous than it had at first promised to be, for one dark night there came a storm such as had not visited the place for many years, and when the contractor came to visit his plant the next morning not a vestige of the black sand remained. It had all been swept into the sea from whence it came, a parallel case to that of the beach sand gold mines at Port Orford, Curry Co., Or., and on the Humboldt Co., Cal., coast. When the condition of affairs in the iron trade was brought to Mr. Edison's attention, eight years ago, he thought of the ill-fated Long Island enterprise, and of his discarded magnetic separator, and wondered if it might not in the end present a true solution of the difficulty. In order to assure himself of the exact condition of the iron mines in the East, he made a tour of the mines in New Jersey, for the purpose of seeing how much ore there was left in them and how long it would last. It was on this trip that he made the discovery that most of the rocks of New Jersey were underlaid with immense deposits of iron. He invented a magnetic needle which would dip towards the earth whenever it was brought over a large deposit of iron ore. He was driving along in a buggy one day between two mines. The needle was on his lap and his mind was drifting away from the subject in hand, when suddenly he noticed the point of the needle dip violently towards the earth, and remain pointing downward. He wondered how this could be, for, as far as he knew, there was no iron ore anywhere near him. He tested the needle and found it all right. He was driving over gneiss rock at the time, and he noticed that whenever he was above this rock the needle continued to point towards the earth. His amazement became great, for, if the needle did not err, it simply meant that the ground under him was underlaid with immense deposits of iron. Determining to find out if this was so, he set a corps of men at work making a magnetic survey of the rocks of New Jersey. As a result of this survey it was found that iron ore, in a finely divided state, existed in nearly all of the older rocks of New Jersey. He then planned a magnetic survey of the whole East, and it remains probably the most comprehensive undertaking of its kind ever accomplished.

With his magnetic needle, or as he calls it, his "magnetic eye," he tested every large body of gneiss rock extending along the eastern coast of the United States, from lower Canada to the Smoky mountains of North Carolina. He found immense deposits of iron. For instance, in the 3000 acres immediately surrounding the village of Edison there are over 200,000,000 tons of low-grade ore. In the entire district there are 16,000 acres in which the deposit is proportionately as large. The world's annual output of iron ore does not, at the present time, reach 60,000,000 tons; so that in the two miles surrounding the village of Edison he calculates there is enough iron ore in the rocks to keep the whole world supplied for one year, or the United States for three years, even with the natural increase in demand. Sixteen thousand acres, or twenty-five square miles, of land contain enough iron ore to keep the whole world supplied for seventeen years, allowing, of course, for all natural increase of demand, due to the needs of a growing population. These acres would more than supply the United States with iron, including necessary exports, for the next seventy years; and they contain more than has been mined heretofore in this country since its discovery.

This was a remarkable condition—smelting works shutting down for want of iron ore at low prices when billions of tons of it lay idle in a strip of land which in most cases was within seventy-five miles of the great iron mills of the Atlantic coast. Here was an opportunity of which the inventor immediately took advantage. He set to work to plan out a great industry. It has taken him eight years to do it, but the result has justified all the trouble and money which he has expended upon it. Engineers used to large enterprises of the kind have smiled incredulously. Some of them have spoken of it as Edison's hobby and others as his folly. Some have shown him on paper that no machine could be constructed powerful enough to crush five, six and seven-ton rocks, or if such a machine were constructed it would never stand the jar and strain exerted upon it. This particular difficulty, it may be said, Edison claims to have surmounted so completely that less than 100-horse power is required to reduce rocks weighing six and seven tons to dust in three seconds from the time they are thrown into the crushing machine.

Yet, after all, he has accomplished a very simple thing. He is crushing rocks and dropping the resulting powder past powerful electro-magnets. The sand is not attracted by the magnetism, and passed straight on; the iron ore is attracted to one side and falls in a heap of its own, as shown in the accompanying sketch from the pen of Mr. Edison. This is



Sketch of the principle of his magnetic ore-separating plant, made by Thomas A. Edison.

the whole principle, yet in the actual working out, it becomes one of the most tremendous processes in the world. It is, after all, no small matter to crush the very vitals out of a mountain and then extract all of the ore from the millions of tons of sand.

The village of Edison stands on the summit of Mount Musconetcong, in northern New Jersey, 1200 feet above the sea, in the center of a wilderness. On all sides are the roar and whistle of machinery, the roar of conveyors, general noise and bustle. The workmen look like millers, so coated do their clothing become with the flying white particles, and everyone wears a patent muzzle.

Big wheels revolve in the engine house and big dynamos transmit heavy currents through overhead wires to the various points of the plant. Little narrow-gauge locomotives move about. A line of freight cars runs through the place. To the right of the village lumbermen are cutting down trees and making the land ready for the steam shovel, which is tearing away at the rocks half a mile distant. Further over, on a half-cleared section of land, a great stream of water rushes through a hose with mighty force from a hydraulic pump and washes the debris free from the rocks, somewhat after the fashion of a monitor in our California foothills. Steam drills rattle and the boom of dynamite resounds when the rock is riven into boulders and laid on five-tons skips or trays, to be transmitted to the crushing plant. The steam shovel does the work of loading, and as it has a capacity of lifting ten tons of free rock a minute, the local activity is tremendous. Flat cars carrying two skips each move along at lively speed. A long line of them is constantly leading up to the crushing point, where big electric cranes rid them of their load, and a little switching engine pushes them around a loup and allows them to run down an incline into the cut again.

Edison says: "We are making a Yosemite of our own here. We will soon have one of the biggest artificial canyons in the world." This remark is occasioned by the fact that the steam shovel is working three-quarters of a mile from the works proper. It is somewhat down the hillside, but it is eating its way on a level straight into the hill.

"It will take us a year to reach the hills, but when we do get that far in we will have a trench with walls 100 feet deep. I suppose we will take out over 600,000 tons of rock before we get there. Then, when the trench is completed, we can blast off the walls with dynamite, taking off 32,000 tons at a time."

The ore-bearing rock is blasted into boulders, laid on flat cars with a steam shovel and conveyed to the crushing plant. The cars are run in under each end of the crushing mill. The trays containing the rock are lifted by the cranes to the second story of the mill, where the rock is dumped into a large square pit.

Ten feet below is the crushing apparatus of two rollers, six feet in diameter and five in width. The rounded surfaces are studded with great teeth; the rolls run within eighteen inches of each other. These revolve with a surface speed of a mile a minute and weigh 237,000 pounds. Beneath them is another set of rollers, nearer together, with a serrated surface. These rolls will receive and grind up five and six ton rocks as fast as they can be unloaded from the skips. A skip load of rock every forty-five seconds was the ratio at which the plant was operated for the purpose of testing the capacity of the rolls, but an average of 300 tons an hour is considered a fair running capacity.

The great Corliss engine which operates the rolls takes no direct part in the crushing process. It is the momentum of the seventy tons of metal contained in the moving parts of the rolls which does the crushing. The engine supplies just power enough to run the rolls at a very high speed. If anything drops in between the rolls so as in any way to impede their progress, a clutch by which the rolls are connected to the engine allows the latter to let go its hold. After the momentum of the rolls does its work, the engine immediately catches hold again. Only the fastest train travels with the velocity of these rolls, and it is seventy tons of metal against five or six tons of rock. Again, the rock is dropped over ten feet before it strikes the rolls, and the impact on the rapidly moving rolls is often enough to break the boulder in two. From the large rolls the rock is mechanically conveyed to one set after another until the last turns it out in dust. The friction of ordinary crushing rolls at the high efficiency and pressure necessary for this work amounts, under ordinary conditions, to about 80 per cent of the horse power applied, leaving only 20 per cent to do the actual work on the rock. On the three high rolls invented by Edison the friction is only 10 per cent, leaving 80 per cent of the energy applied for the work of crushing. The principle involved means the beginning of a new era in crushing machinery. This principle can be applied in every industry where crushing is a feature—from gold extracting to sugar refining.

One of the features of the place is the great number of endless chain elevators which connect the buildings with one another. As the ore passes through each building, it is carried on to the next, automatically, in these endless elevators. After it leaves the crushing plant it is carried to the top of the magnet house and dumped through many sieves of varying meshes and past many magnet faces of varying strength before it ultimately falls in the cellar of the building and into another elevator, which carries the greatly changed product to the next department. There is over a mile of magnet faces in

the magnet house. The ore drops down through long chutes. On the way down, it passes the magnet faces. Directly under each magnet face is a side chute leading off in a direction of its own, and directly above each magnet face is a sieve. As the ore comes down, if fine enough to pass through the sieve, it continues its course; if not, it rolls off the sieve into a chute, at the bottom of which there is a conveyor which carries it back to the rolls to be re-crushed. If the product goes through the sieve, the magnet draws the ore from the sand, the sand passing straight down to an elevator, which carries it out of the building and dumps it onto a huge sand pile, which is not a useless accumulation; it is sold for various purposes to builders and manufacturers, who seek it more eagerly than they do the sand of the seashore or of the bank. Seashore or bank sand has, in the course of centuries, lost its edges, because the particles have constantly rubbed against one another. Broken rock sand, however, is very sharp, and for cement and lime-work is very desirable.

The pure ore is now allowed to drop downward and pass through a room where blowers rid it of any dust which may have accompanied it on its travel. After leaving the blower room it is a stream of pure, finely divided iron ore, which drops into conveyors and is carried to a storehouse, which holds 5000 tons. Here it may rest temporarily or it may pass on by means of other conveyors to the mixing house. It cannot be smelted in the form of iron dust. The force of the blast would blow it from the furnaces. It must be made into briquettes, and to do this it must be mixed with some adhesive substance which will prevent it from disintegrating when brought under the action of the furnace. The mixing machines are huge cylinders in which operate great iron paddles. The ore is fed into the cylinder from the top, the adhesive material drops from above, and the whole mass is churned together until every particle of the ore has come in contact with a due proportion of the adhesive substance. It becomes a sticky mass, which is pushed out of one end of the cylinder and conveyed away to the bricking house to be made into little briquettes.

The ore drops into a small orifice in the cylinder. The cylinder then turns so that the hole comes forward and exerts thousands of pounds pressure on the ore; the cylinder then turns downward and the newly made briquette drops out from the hole and falls into another endless conveyor, and is carried forward into a large oven, to be baked. There are thirty bricking machines and fifteen ovens in the plant, and a continual stream of briquettes are circulated through the hot air chambers of these ovens. The conveyors travel five times around the interior of the oven before the briquettes reappear. When they come out they have undergone a change which makes them a commercial product. For instance, they will now absorb gases in the furnace, which they are required to do; but they will not absorb water. This condition is necessary so that they may be shipped to the furnaces in open cars. If a stream of water were allowed to flow on a brick the water would simply run off; on the other hand, if alcohol were dropped on it, it would instantly be absorbed by the brick.

From the oven the bricks are conveyed to the railroad, where long trains of freight cars await them. The conveyor at this point extends out over the track, and the engineer of a train has simply to back his cars underneath the mouth of the conveyor. The bricks drop out and the cars load themselves. From the time the ore is blasted with its native rock out of the mountain side until it is loaded in the form of commercially pure iron briquettes on the cars it is not touched by human hands. The never ending and never resting stream of material constantly circulates through the various buildings, crushed by the stored momentum of gigantic rolls; hoisted skyward by steam; pulled earthward by gravity; deflected by magnetism; dried, sifted, weighed, gauged, conveyed; changed from rock into dust, and from dust into comprehensive lumps, mixed with a due proportion of adhesive material; churned, baked, counted and sent flying to the furnaces by fast freight; and not once in its course is it arrested or jogged onward by human agency.

Only 145 attendants are required to operate the plant, and these men are after all merely watchers, to see that the machinery does not get out of order. Edison says that the crushing capacity of the plant is more than 20 per cent greater than the combined crushing capacity of all the stamp mills of California. The long mile of magnet faces have enough pulling power to tear a modern cannon from its stanchions, and the great steam shovel can clean out more rock from the mountain side in a given time than any other like piece of mechanism in the world. Yet all these great affairs seem as nothing to the masterful control of the man who planned it all. Edison moves about among his men with not the slightest consciousness of having done anything great. He says it will be but a question of time when the little plant on the hill top will be the center of the great iron industry of the East. The pockets of ore from which the United States has drawn its chief supply are rapidly becoming exhausted. There is, it must be understood, plenty of iron ore in the country, but it is not the kind of ore from which steel can be made. Steel can only be made from ores in which the per cent of phosphorus is very small. Edison, with his crushing process, has entirely eliminated the phosphorus element from the ore. It therefore remains inevitable that this must ultimately become the only serious method of producing ores from which steel will be made. It would seem from the prospect that Edison will become the head of a vast industry, as great as that brought into existence by the invention of the incande scent light, and in a measure more imposing, as it embraces the production of what in commercial circ les is after all the most valuable metal on earth.

Brief Description of the Calumet & Hecla Mine, Lake Superior, Michigan.

Written for the MINING AND SCIENTIFIC PRESS by E. MCCORMICK.

Mining on a large scale and most instructive in every respect has been carried out by the Calumet & Hecla Mining Co., with the best of professional advice and the experience of thirty years. The administration of its affairs has produced such good results that its stockholders are not very inquisitive as to the details of it, for they know its officers are keenly alive to every improvement elsewhere effecting their own work, and are ever seeking to accomplish better results by incorporating in their workings whatever is proved to be good.

The population of Calumet and its suburbs is in the neighborhood of 20,000, of which number about 4500 are employed by the Calumet & Hecla Mining Co. During the thirty years the mine has been running the stockholders have received $44,800,000 in dividends, and the company has erected one of the greatest, if not the greatest, mining plant in the country.

During 1895, alone, the mine produced 77,337,922 pounds of refined copper.

The surface plant of the mine is very extensive, their being at least fifty steam engines doing service ranging from 4700 H. P. down, and of mine buildings, such as shafts, engine, carpenter, blacksmith, machine shops, etc., there are at least forty.

In the line of hoisting machinery, there is the finest here to be seen in the world, one of which is shown on the first page of this issue, and named Graliot, Houghton and Seneca. It is of the triple-expansion type, with cylinders 18, 27⅜ and 48 by 90-inch, and fitted with conical hoisting drums of 14 and 26-foot end diameters, having 8 ft. 3 in. face and a rope capacity of 5500 feet. The horse-power of each is 2000. This plant is said to have cost $750,000.

The other engines worthy of mention are:

NAME.	Kind.	Cylinders.	H. P.
Superior	Compnd.	70 by 72	4700
Rockland	Corliss.	30 by 48	600
Baraga	Deavitt.	40 by 60	2000
Frontenac	Compound.	48 by 72	2000
Lasalle	Corliss.	30 by 72	900
Perot	Corliss.	30 by 48	600
Hancock & Pewabic	Triple Expansion.	20⅛, 31¾ and 50 by 48	4000

The compressor plant consists of:

1 pair Rand, size 30 by 48, capacity 26 drills.
1 " " " 36 by 60, " 41 "
1 " " " 24 by 48, " 31 "
2 " Water Plunger, size 42x60, capacity 72 drills.

The vein is known as the Calumet & Hecla conglomerate—that is, it is made up of water-worn pebbles, boulders, bunches of sand, etc., having a length of 4200 feet, with a trend N. 33° E., dipping into the ground toward the N.W. at an angle of 37½°, and averaging in thickness 12 feet. In some places it carries epidote, this being an indication of rich ground. The copper occurs in endless forms, and is designated under three heads: stamp, barrel and mass.

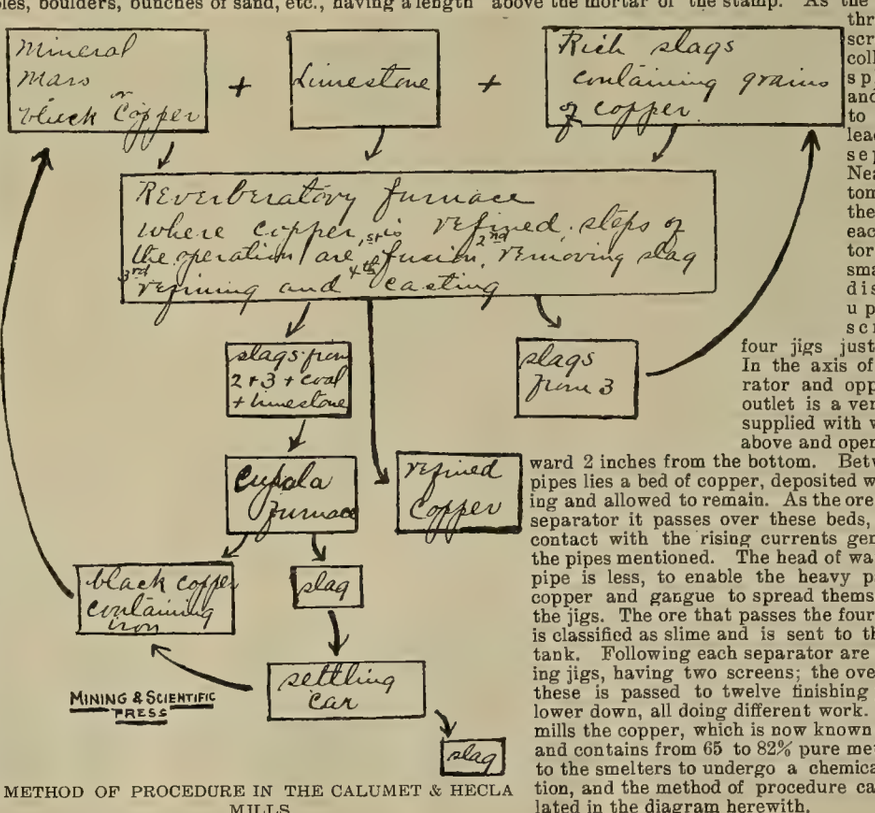
This company started its shafts, of which they have twelve, from the surface in the outcrop, and have continued down in it, keeping in the lode. They vary in depth from 2500 to 5000 feet, it having been found that the increase in depth makes no difference in the character of the ore. The shafts (with the exception of the Red Jacket, or new vertical, which does not enter into this description), are sunk in the footwall of the vein as near as can be, and have as a covering blue trap containing serpentine.

Since the introduction of power drills and high explosives, the methods of mining have necessarily altered and the facilities for breaking ground have very greatly increased; but, nevertheless, the rock undergoes an enormous amount of handling. It has to be broken, trammed, hoisted, crushed, transported to the mill, stamped, and the resulting concentrates dressed, shipped to smelters, smelted, and the refined copper shipped to market. According to statistics for '92, the total expenditure per ton of rock treated was $6.62.

The general method of opening consists in sinking a shaft, drifting and stoping in opposite directions and raising or uplifting in such a manner as to form the other shafts, leaving pillars for their protection.

The method of mining is to drive a drift along the footwall as far as they intend to tram the ore to a particular shaft, this being followed by the cutting-out stage, which is merely an enlargement of the stope to its full size, and is commenced at the farthest end of the territory and worked towards the shaft, as high on the vein as it will stand without timbering. A raise is then run up the center of this block and the ground removed from both ends. The timber used for most of the distance between levels is composed of a battery of three sticks 12 by 12 inches known as drift stulls, and to these the sets are framed; two-thirds of the distance up these sets are discontinued and heavy timbers used instead, all being coated with zinc chloride and whitewashed, to prevent any possible danger of fire.

Upon reaching the surface, the ore begins to undergo the first step of the dressing process. It is dumped upon cast iron gratings raised slightly from the horizontal. All material passing through goes directly to the underlying ore bins, while that which is too large to pass through is drawn out on the floor and thrown into a large breaker 24x36 inches, which feeds to two smaller ones, 17x24 inches, beneath. Pieces too large for the breakers are broken under a drop-hammer and passed through the breakers. From the bins the ore passes through chutes into cars holding about five tons each and taken in trains of sixty to eighty cars to the mill at Lake Linden, a distance of five miles, by a locomotive weighing nearly 100 tons; eight such trips are made per day the year round, with the exception of Sundays and legal holidays. At the mills the cars are dumped into bins located in the upper part of the mill; from here the ore discharges into a shaking tray, the lip of which is above the mortar of the stamp. As the ore passes through the screens, it is collected by a splash-box and drops into a launder leading to the separators. Near the bottom and at the front of each separator are four small pipes discharging upon the screens of four jigs just opposite. In the axis of the separator and opposite each outlet is a vertical pipe, supplied with water from above and opening downward 2 inches from the bottom. Between these pipes lies a bed of copper, deposited when working and allowed to remain. As the ore enters the separator it passes over these beds, coming in contact with the rising currents generated by the pipes mentioned. The head of water in each pipe is less, to enable the heavy particles of copper and gangue to spread themselves upon the jigs. The ore that passes the fourth division is classified as slime and is sent to the settling tank. Following each separator are the roughing jigs, having two screens; the overflow from these is passed to twelve finishing jigs placed lower down, all doing different work. From the mills the copper, which is now known as mineral and contains from 65 to 82% pure metal, is sent to the smelters to undergo a chemical purification, and the method of procedure can be tabulated in the diagram herewith.


Mineral Mass or Black Copper
+
Limestone
+
Rich slags containing grains of copper
Reverbratory furnace where copper, 1st refined, steps of the operation are 2nd Fusion, Removing slag 3rd refining and 4th casting
slags from 2+3 + coal + limestone
slags from 3
Cupola furnace
refined Copper
black copper containing iron
slag
settling Car
slag
MINING & SCIENTIFIC PRESS

METHOD OF PROCEDURE IN THE CALUMET & HECLA MILLS.

Mechanical Progress.

Importance of the Boiler.

It is too frequently the case that the engine is looked after sharply and trimmed and plumed as though it was the only part of the steam plant that needed attention, while the boiler plant is left to care for itself. One may derive satisfaction from an engine that works quietly and feel he is getting the most out of it, and those in charge are generally powerless to obtain a higher standard because mistakes in construction cannot be afterwards modified. Too often the engine may be said to have the defects of its qualities, and though one may know the faults he is not in the position to remedy them. Great fascination is experienced, however, in endeavoring to find out errors of omission and commission, and the fewer there are the greater is the credit to the maker. As a long period is required for some of these errors to develop themselves, watchful care goes on continually. The engine favors this solicitude, as it is in the nature of an exact science in almost every part. If one is not sure of making up for deficiencies he can put his finger on the weak spots, and that sufficiently or accurately enough to leave no doubt as to their locality. He can trace the steam as it leaves the boiler and account for it in its passage through the pipes, valves, cylinders and so on to the condenser.

The effects of excessive lengths and sizes of connections from boiler to engine, undue clearance the correct setting of valves, due proportioning of cylinders and receivers, are all well known and understood. A capable engineer therefore finds that his interest increases with the lessons every day brings forth. The motion itself is the cause of many of the demands upon him from the wear and tear produced thereby, adjustments have continually to be made to keep even an engine that runs well up to its proper standard, and if from any ill design attention is constantly required then very little opportunity is left for outside matters. These remarks generally apply where any high-class installation is fitted, whatever it be, for electric lighting, mill work, marine, pumping or similar work, if the machine is to be kept running for long stretches at a time, and give the best torsional effect with least expenditure of steam.

Hence it can be well understood why the boiler often suffers for want of recognition. The conditions ruling with it are quite different. It cannot be set down in place just as it leaves the factory, fully ready for work, as the engines can. There are its brick work casings and chimney to be put up, and these very often have a great deal to do with the economical question. The engine only requires erecting just as it was in the shop, but the boiler must be complete with its settings before it can be steamed, and this is where some of the otherwise good qualities of the generating apparatus may be nullified. The course of the flues, or the distance of the chimney from them may not be correct so that the height of the chimney does not have its full effect on the draft.

The brickwork may not be of a character to prevent leakages and keep the boiler what it should be—a good reservoir of heat, ready for all demands of the engine upon it. On the other hand, when once started there are no risks of break down. There are no parts which, by reason of their motion, have a tendency to get out of order or come to a sudden stop. Thus the steady-going servant is left pretty much to take care of itself, and mountings have to be of a kind requiring no attention of any sort, or they will certainly get into disuse. In a word, they must be automatic in their action or duplicated. Valves are arranged so that if one should stick, there is a second one on which to rely, gauge glasses to avoid giving false indications, fusible plugs for emergencies in case of low water. These and other contrivances are made to meet every possible contingency from want of oversight, and that such few accidents happen proves that they come up to expectations.

Taking a boiler plant as a whole, unlike the engine as it is in every respect, details of improvement may be applied at any time. The engine is constructed, and no fault in principle admits of amelioration afterwards. One can but attend to trifles, but with the boiler, though the structure itself cannot be modified much, he finds that there are several fittings which may be applied both to the boiler and to the flues, at any period; therefore, though an engineer must of necessity never leave his engine, it is much more likely to repay him to give what spare time he has to the source of his power. Varying according to the class of engine, there should be an efficient water heater fixed, and no impurity admitted thereto. If the form of the boiler is any way detrimental, aids to circulation are required, so that there is no stagnant water anywhere. Dry steam is such a desideratum that any good means for its provision is always sure to be of advantage.

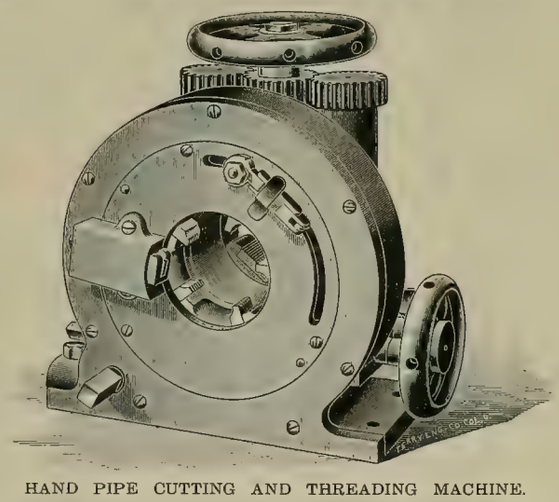
Prominence has been given in recent years to heating the air before it reaches the fire, and to exhausting to a minimum what remains is the gasses from the flues. There is certain prejudice against mechanical firing and grate fittings, but there can be no question as to the economical results obtained from them, and that is why this class of apparatus has made its way in recent years. The same is the case as regards forced draft for getting large powers in emergency or burning inferior coal. The whole subject of economical firing and smoke consumption is but imperfectly understood, but if instead of the old standard of coal in terms of water evaporated, the cost of the steam were taken in money value, then the interest on the relative prices of the different apparatus would recive their proper measure. What may be very good when tested on coal saving alone, would not come out always so well if the amount paid for it, and any after repairs, were strictly considered. Again, if great care is not taken, the adoption of an otherwise important improvement may lessen the advantage of something equally good already in use before. There is no settled consensus of opinion possible on this matter, because no two sets of conditions are alike. Not only do the different types of boilers require to be looked at from different standpoints, but even two exactly similar ones may be perfectly at variance in their steaming powers by reason of the surroundings with which each is erected in place.

A boiler maker can well plead that his responsibility finishes with test on delivery, but this can never be so with the engine maker, and it is customary to retain a portion of the purchase money for a time to insure due performance of the contract entered into. This is not too much to ask, because though an engine may appear in every respect satisfactory in the shop, when it comes to steady daily running, if there are any flaws in manufacture they are certain to be discovered. With the boiler itself, however, the double water pressure to which it is subjected represents sufficiently all the strains it will have to undergo under steam.

To what extent the difference in the conditions pertaining to the two component parts of a steam plant may have had to do with the general separation of the trades from each other it is not the present province to enter upon, but where an engine maker formerly produced his own boilers he now finds it more profitable to buy from regular factories turning out only the one class of work. There is no risk run, because boilers seldom fail to come up to the standard expected from them, but where the engineer can rest satisfied in purchasing a boiler it would not be possible for a boiler maker to do the same with an engine. The latter, therefore, starts in life with an importance that is denied to its fellow, and this continues throughout its existence. The boiler should not be despised because it does not start with the lead, but rather that it admits of improvements after location that are well worthy the attention of all engineers in charge who have economy in view.

Portable Hand Pipe Cutting and Threading Machine.

The accompanying illustration represents a portable hand pipe cutting and threading machine. In operation, the pipe is held stationary, the die head traversing the space to be threaded. The chasers have cam movement controlled by knee joint lever, adjustably secured to size graduation, by which the chasers are instantly opened and positively closed. Five chasers are used to a set which insures truer threads than sets of less number, they are readily interchangeable and can be resharpened by grinding.



HAND PIPE CUTTING AND THREADING MACHINE.

Nothing Impossible to the Inventor.

All obstacles seem to fade away before the versatile inventor, and seeming impossibilities become subjective and are rendered inane before the superiority of his mind over matter. To the layman the feat of making connection with a water main without disturbing the flow of water would seem impossible, but the feat has been successfully accomplished through the ingenuity of M. R. Sherrerd, of Newark, N. J., and the device used was patented by him. A double pipe cutter was on the main inside of a water-tight casting chamber through which the main passed. The cutter was operated by a miter gear worked from the outside by a steel rod passing through a stuffing-box in the chamber, and cut out a 10-inch section in the main. This, with the cutters, was raised through a diaphragm into the upper part of the chamber, and the hole in the diaphragm being closed by a slidegate, the two cut ends of the main communicated through the chamber, which was full of water under pressure. The top of the chamber was then opened, the section of pipe removed and the required special valve put in its place. The chamber was then closed, the gate in the diaphragm opened and the valve lowered and forced into position by means of a sleeve around the pipe that passed through the stuffing-box in the chamber and was operated by jackscrews. Preliminary tightness of the connections was effected by rubber gaskets, and after the removal of the chamber both ends of the main were caulked into the new connection.

THE Philadelphia *Item* prints a description of a trial of the Holman engine between Winslow Junction and Cape May, N. J. The results sound revolutionary in engine construction, as the extraordinary speed of two miles a minute was attained. The trainmaster's record says a mile was reeled off in thirty seconds, "beating the world's record by seven and a half miles." The inventor occupied a place in the cab with the trainmaster. This is not a case of a single mile spurt, for the trainmaster says that the test convinced him that this engine can run 120 miles an hour as regular duty.

Scientific Progress.

Length of a Thought.

How long does it take a man to think? Prof. Richet, at the recent meeting of the British Association, gave the results of his investigations into this subject. He found that by mentally running up the notes of the musical scale for one or more octaves and then dividing the total time by the number of notes thought of, the time taken for each note was one-eleventh of a second. There are various ways of arriving at conclusions as to the amount of time necessary for realizing any physical sensation or mental impression. If the skin be touched repeatedly with light blows from a small hammer, one may, according to Professor Richet, distinguish the fact that the blows are separate and not continuous pressure when they follow one another as frequently as 1000 a second. The smallest intervals of sound can be much better distinguished with one ear than with both. Thus the separateness of the clicks of a revolving-toothed wheel was noted by one observer when they did not exceed sixty to the second, but, using both ears, he could not distinguish them when they occurred oftener than fifteen times a second.

The sharp sound of the electric spark of an inductive coil was distinguished with one ear when the rate was as high as 500 to the second. Sight is much less keen than hearing in distinguishing differences. If a disc half white and half black be revolved, it will appear gray when its revolutions exceed twenty-four per second.

It has been found that we can hear far more rapidly than we can count, so that if a clock-clicking movement runs faster than ten to the second we can count four clicks, while with twenty to the second we can count two of them.

A SCOTCH professor writes: "After the most painstaking investigation and experiment, I believe myself justified in saying that I have discovered an absolute antidote for the bite of the most deadly serpent. I have also found that the substance from which the antidote is secured is strongest and best in the serpent whose bite is the most deadly. The antidote is found in the bile of the serpent. To secure it, it is necessary to isolate or separate the antidotal constituent of the bile from the remainder of the substance found in a serpent's gall bladder. The method of the administration of the antidote is that known as injection beneath the skin, so that the antidote may not mingle directly with the blood of the victim of snake bite, but rather be absorbed. I have made a number of experiments with the biliary secretion of the Indian and African cobras, than which no more poisonous snakes exist. The result of these tests showed that the bile of venomous serpents is able, when mixed with the venom of the

same serpents, to prevent what have heretofore been deadly doses of the latter from producing death; and that the bile is indeed so powerful an agent in doing this that a quantity actually smaller than the quantity of venom will be sufficient for the purpose."

Condensing Food Supplies.

Reports from those who are engaged in condensing food make interesting "scientific" reading.

To speak of carrying enough food in a small valise to last a healthy man a year seems fictitious. Capsules, pills, buttons, packages not larger than a pocket-book—are all receptacles for nourishing food. These are for the delectation of those who are suffering from Klondicitis, the new malady caused by the rush to the Yukon, and in whose interest the different chemists are now working so industriously. The present scheme is to furnish Klondike voyagers with condensed foods adapted to peculiar needs. Anything or everything in the way of food can now be put up in compressed form. A cup of good coffee or tea, already sweetened, is crowded into a button. One of these, dropped into a cup of hot water, is all that is needed to convert it into liquid form. All kinds of soups are prepared in the same way. The buttons contain a mixture of meat and vegetables properly seasoned and ready for the hot water. The button craze has evidently taken a new and entirely different aspect from that which prevailed during the last Presidential campaign. Now all you need do is to buy the button, and it may be said you have the rest. Another essential for the Klondike will be desiccated beef, an ounce of which is equivalent to five ounces of fresh meat. It is put up in such hard little chunks that an ordinary knife makes little headway in cutting it. Fine shavings of this make nice filling for sandwiches or can be used for making nutritious soup.

A loaf of bread can be compressed until it is not larger than a cracker. When soaked in water it swells up like a sponge, and when dried out makes very fair eating. A loaf can be prepared in the same way of flour, beef, fat and salt, and contains all the elements of a plain meal. Ten pounds of onions, carrots, potatoes, turnips, cabbage, or any other vegetable, are by the condensing process crowded into one-pound cans, and are said to be excellent for soup-making.

It is to be regretted that the men who expect to make their millions through this scheme will not be ready to launch these projects until next spring. At the present time food cannot be got there as fast as needed, and gaunt hunger shows its fangs, lurks like a wolf about every camp, and can scarcely be appeased.

Doubtless there are many interested in packing food for the Yukon, and it is to be hoped they will send it to them in its best form.

PROFESSOR ROBERTS-AUSTEN claims to have made some recent discoveries on the subject of the interdiffusibility of metals, showing that solid metals may be made to mix themselves as if the atoms were living creatures. He says he has, in fact, discovered pieces of metal engaged in the act of mixing themselves up one with the other. Of course the interest of this is that the interdiffusion of which we speak has been found to take place when the metals were cold, and, though this property in metals, to be capable of attaching themselves one to the other when cold, has been talked about before, nothing so clearly proved has hitherto been at the service of the metallurgists and chemists as the facts adduced by Professor Roberts-Austen. He shows that when clean surfaces of lead and gold are held together in the absence of air at a temperature of 40 degrees for four days they unite firmly and can only be separated by a force equal to one-third of the breaking strain of the lead. The professor has also proved that if a plate of gold be laid under one of lead about three-tenths of an inch thick in three days gold will have risen and diffused itself to the top of the other metal in appreciable quantity.

IN the Transactions of the Society of German Engineers, Professor C. Schnabel discusses the recent progress in the metallurgy of gold. He begins with an interesting summary of Bodlander's researches on the chemical reactions taking place when gold is dissolved in cyanide of potassium. These researches show that the presence of air or oxygen is necessary, for no gold is dissolved in vacuo. Expressed chemically, the gold is dissolved according to the two equations:

(1) $2Au+4KCN+2H_2O+O_2=2KAu(CN)_2+2KOH+H_2O_2$

(2) $2Au + 4KCN + H_2O_2 = 2KAu(CN)_2+2KOH.$

The rapidity with which gold is dissolved in potassium cyanide solution is dependent on the state of division of the gold, and in a secondary degree on the concentration of the solution. Thus granular and laminated gold dissolves very slowly, whilst spongy gold dissolves rapidly. Gold leaf dissolves most rapidly of all. The rapidity of solution increases with the concentration up to a certain degree, and then further increases only very slowly. A piece of gold leaf of given weight dissolved in a given volume of solution containing 0.1 per cent of cyanide in twelve minutes, in a 0.25 per cent solution in five minutes, in a 1.0 per cent solution in four minutes, and in a 3 per cent solution in three minutes. The limit up to which the solution of the gold rapidly increases is thus with 0.25 per cent of potassium cyanide in the solution.

THAT "little drops of water make a mighty ocean" is true, but that they calm the mighty ocean is equally true. When drops of rain fall on the ocean they have been noticed to calm it, although the wind was high. This fact often puzzled observers, until an English scientist found that each drop forces some water below the surface in the shape of rings, which gradually decrease in speed and increase in size, until, 18 inches below, the same motion is caused as above, but in slower time, and, as these two waters exchange places again and again, it forces the wave out and causes a calm sea.

Electrical Progress.

Blue Lakes, Cal., Plant.

IN an article in the October number of the *Journal of Electricity* on the electrical transmission plant of the Blue Lakes Water Co. of San Francisco in Alpine and Amador counties, California, in discussing the hydraulic apparatus and pipe line is said:

"Another interesting feature of the hydraulic equipment lies in the use of strainers for the jets of the exciter wheels. These strainers, which are of solid cast iron construction and located on the fronts of the concrete piers immediately below the wheels, may be compared in action to that of a two-way valve, in that the water for driving the wheel may be instantly made to flow through either one of two courses. These courses are each provided with a strainer of brass gauze so mounted in cartridge form as to be easily removable, and the principle of operation of the apparatus lies in the feature it embodies for permitting the removal and cleaning of one strainer cartridge while the other strainer is in use. Some such arrangement is necessary for the protection of small nozzles using water under high heads in plants where the water may possibly contain twigs or leaves or bits of wood that might cause a shut down because of closing the small orifice in the jet of the exciter wheel. The jets of the large wheels, having greater orifices than the area of the screen openings, are not liable to clogging from this cause.

"From a strictly hydraulic standpoint, the most novel feature in the Blue Lakes plant is the absence of both receiver and air chamber on the pipe line. Accidents that have occurred to pipe lines have been due to water ram caused by the almost instantaneous opening and closing of gates or by collapse due to the formation of a vacuum caused by a choking at the intake or the using or escape of water at the lower end faster than it can possibly enter from the forebay. The gates in the Blue Lakes plant are so constructed that it is a physical impossibility to open or close the main gate in less than ten minutes, nor can either of the quadruple nozzles be closed or opened in less than three minutes, which arrangement, it is believed, allows sufficient time interval to elapse to prevent any possibility of water ram. The pipe line is without air valves in any portion, but the factor of safety in the materials used is so great and the pipe line is so deeply buried throughout its entire length, and so rigidly cemented to bedrock by concrete, and as all parts before installation were subjected to a hydrostatic test of not less than double the working pressure, it is believed that breakage and the draining of the pipe sufficient to cause collapse from atmospheric shock is an impossibility. At present the water wheels are running by hand regulation, but governors will be installed shortly and so arranged that two nozzles of each water wheel will be hooded by the governor and the remaining two will be throttled by hand should occasion require. From the wheel pits the discharged water is carried in individual courses to the tail race, whence it continues underground through an arched tunnel under the grounds of the power house, emptying into the Mokelumne river."

THE *Electrical Review* tells of an intelligent-looking individual who walked into an electrical supply store recently and asked to see the manager. Upon being asked the nature of his business he replied that he had a new form of primary battery which he wished to show. He was promptly referred to the company's electrical expert, who has a faculty of very quickly arriving at the correct conclusions regarding the merits or demerits of any so-called electrical discovery. The inventor(?) calmly informed the expert that he had perfected a battery, a sigle cell of which would have an electromotive force of 40 volts and run a 16-candle-power lamp for five or six hours. After having recovered from his astonishment, the expert, who at heart feels kindly disposed to all struggling "geniuses," invited the inventor to bring around a cell of his wonderful battery and have it undergo a few simple operations, in which a voltmeter, as well as an ammeter, were to play important parts. The inventor said he would be only too glad to do so, as he had a cell all ready in an office a few doors away. He went out and shortly returned, carrying a half-gallon stone jar nearly filled with water, and having a plate of carbon and one of aluminum suspended in it. Taking from his pocket a small flask, he poured about an ounce of a brownish-red liquid into the water and announced that the battery was ready for action. A voltmeter connected to the terminals showed a potential difference of 38 volts. An ammeter connected to the battery (short circuiting it) indicated 2.5 amperes, which, within half a minute, fell to 1.25 amperes, where it remained for several minutes. By this time quite a crowd of interested spectators had asssembled, and the inventor, probably afraid that his secret would be discovered, gathered up his battery and hurried away.

EVERY week now brings news of new electrical enterprises inaugurated or successfully completed in California. The general significance of this new step forward in the application of water power to industrial purposes is startling. On the one hand it signifies that man has at last learned how to effectually master and utilize one of the mightiest natural forces of the earth. Coal is an exhaustible possession, and the day must come when the coal fields of the earth will be worked out. Our rivers and falls offer, on the other hand, an inexhaustible supply of energy; for so long as the heat of the sun evaporates the water of the sea and causes it to fall again as rain upon the hills, or as snow upon the mountains, this source will be available for the supply of man's wants, and the arrival of the time when the earth's coal fields will be exhausted need no longer be awaited with misgivings.

What is Electricity?

The *American Electrician* condenses from the London *Engineering's* review of Prof. Trowbridge's new book, "What is Electricity?" as follows: The writer says that in spite of the all-round progress made during the last thirty years, we know no more about the essential nature of electricity than did Benjamin Franklin 150 years ago. The several explanations offered, based upon the ether, or ether and matter associated, merely substitute one unknown for another. "After all, what is matter? What is the ether? How is matter associated with the ether? To such fundamental questions we can return no other answer than the now famous ignoramus. They make, or tend to make, us painfully conscious of the infinitude of our nescience." The writer of the review adds that Lord Kelvin must have been brooding over these provoking unknowns when he wrote to him in 1892: "Tell me what electricity is, and I'll tell you all the rest." This inability to detect electricity in its primordial form need, however, exert no distrustful, no depressing effects on the mind of the student of physical science. "Let him remember that a ray of light is an unexplained phenomenon; yet what wonderful truths are revealed to Fresnel, what knowledge has been wrested from it by means of the spectroscope, and what marvels is it not every day recording on photographic plates! If he feels himself morosely affected by this agnosticism, let him recall the astronomical phenomena which are accurately calculated years in advance without any knowledge whatever of the nature of gravitation; or let him think of that masterly bit of analysis which led to the discovery of argon without any knowledge on the part of Lord Rayleigh or Prof. Ramsay, of what chemical affinity is. If he is a practical man, let him reflect that the engineer lives amid stresses and strains, and though ignoring the intimate nature of the forces which he uses, builds up powerful engines and dynamos, and as successfully tunnels a Mont Cenis as he throws a bridge across the Hudson or the Firth of Forth."

AS NOTED elsewhere, a water right has been filed in Redding, Cal., for 85,000 inches of the water of the McCloud river. According to local statements, the water claimed under this right is to be flumed from the McCloud river one and a half miles to Pit river, where an electrical and mechanical power station is to be installed. To carry this will require a flume 30 feet wide and 25 feet deep, which seems a large statement. It is further stated that from this station power and light are to be transmitted to the iron mines on Pit river, but the main light and power wires will lead to Keswick and Redding. It is also proposed to supply the towns mentioned with water from the McCloud river. The main leading to the Mountain Copper Company's smelting plant will be 5 feet in diameter and the one leading to Redding 4 feet in diameter. Keswick is the point at which are located the principal works of the Mountain Copper Company, an English syndicate, which has in its employ at present over 700 men.

Electricity reports that in an examination that was made of some "electric belts" sold by a street fakir, it was found that beneath a strip of gauze was a layer of dry mustard. When the wearer perspired a little, the mustard was moistened and set up a burning sensation, and the deluded victim believed a current of electricity was passing through him.

Mining Summary.

CALIFORNIA.

Amador.

The Gover mine is closed down.

The old Douglas mine at Volcano has recently been started up. Fourteen men are employed.

In Plymouth district Supt. Dillon will repair the 350 shaft in the Centennial mine and sink 650 feet farther before running any levels.

Butte.

H. P. Stow is again locally credited with intention to erect a 100-stamp mill at his mine at Forbestown.

Register: R. Andrews has been tracing the outlet of the Cherokee channel of gold gravel, and is certain that he has struck it.

Calaveras.

Chronicle: Assessment work done on the Esperanza gravel claim, in the Banner district, has developed a channel over 40 feet in width, with a depth of 6½ feet of picking gravel going $2 and over.

The Banner blue gravel mine, near the Banner mill, on the Table Mountain channel, was bonded to Colorado parties last week for $28,000, development work to begin immediately,

The Martin, or Table Mountain, gravel mine, near Sheep Ranch, is to resume operations on the 15th of the month.

The Page Cutting gravel mine, near El Dorado, has been sold, and a force of men are now at work thereon.

The 5-stamp mill at Maccaroni Flat, formerly owned by the Fairplay & Shawmut Mining Company, was dismantled last week by M. McNicholas and has been moved by C. Bund to the Phœnix gravel mine in San Andreas. Supt. Jennings expects to have it in operation soon.

The Live Oak mine, in El Dorado district, owned by W. B. Swank, now has a 2-stamp prospect mill operating under 75 feet head of water. One hundred tons of ore are on the dump, averaging $8 in free gold and 1½ per cent sulphurets.

Twenty men are at work at the Lone Star mine, in West Point district, bonded by the Farrington Gold Mining Company, A. Pugh, superintendent. The shaft will be sunk to 500 feet.

The Paragon mine, in West Point district, is to have five more stamps. Under the superintence of P. L. Shuman, an electric plant has been installed, there being 600 feet head available from the Harris ditch, which is also used to run the mill. About twenty men are employed.

The mill on the Innes mine, near Mokelumne Hill, has started.

Del Norte.

A Cres cent City report is to the effect that in the completion of a contract with the Ora Anna Gold Quartz Mining Company there for the sinking of a shaft upon its lead to a depth of 100 feet, the final blast showed ore containing free gold. The Ora Anna was discovered many years past when the adjacent grounds were being worked for placer gold. In 1888 a company organized under the title of the Bald Hills Quartz Mining Company located and commenced operations upon the mine, doing considerable work, but with no positive results as to the determination of its richness or extent. The present company was organized three years ago.

El Dorado.

H. Sexton is at work on the Utah mine in the Kelsey mining district. A tunnel will be run and a shaft sunk.

At the Diamond mine, or Limpinsel, work on a 200-foot shaft has begun.

Work of sinking from the 300 to the 400-foot level at the Gentle Annie is completed.

The Big Sandy, in the Kelsey district, is being worked under lease to Jas. Kelley.

The Larkin property, near Diamond Springs, is transferred to the Larkin and Selby Mining Company, W. Larkin, superintendent.

Inyo.

Independent: The new dry concentrator is built somewhat on the basic plan of the old-time dry washer, the gold and sulphurets being separated from the pulp by agitation, causing openings or crevices in the latter which permits the heavier particles to fall by specific gravity to the riffle board. With the dry washer the blast which separated the pulp and mineral could not be regulated, but with the concentrator this is governed altogether by the operator. The ore is dumped from the wagons into a bin, where it is fed by an automatic feeder into the crusher, and as the pulp leaves the crusher it is taken by elevators to the cupola of the mill-building, where it passes through a 100, 80 and 60-mesh rotary screen. Should any of the pulp be too coarse to pass through the 60-mesh it runs into a tube and is carried back into the crusher. Below the screen is a bin which catches the pulp as it falls, and from this pipes lead into the hoppers of the machines. An eccentric feed and automatic gate in the hopper regulates the flow into the sand chamber. This chamber must be kept full at all times. From the sand chamber the pulp drops upon the riffle board, which is made of silk bolting cloth, and across which wires are sewed on at intervals of half an inch. The riffles travel upward at almost a snail's pace towards the hopper, and below it the blast is placed in a tight-fitting compartment. The blast is variable, and can be regulated by the operator from naught to nine, according to the character of the ore treated, that carrying heavy gold and sulphurets requiring a light blast, and vice versa. As the pulp passes over the riffles interstices are caused by the blast, through which the gold and sulphurets are carried by gravity to the bottom and are held by the cross wires, while the pulp, which now becomes tailings, except for the chlorides and light gold, passes downward to the back of the machine, where another blast forces these lighter particles into two pipes arranged on each side of the machine, and carries them into the chloride house, an airtight building erected outside of the mill. So far the percentage of chlorides and light gold has been so small that it could scarcely be treated. The gold and sulphurets, after being deposited against the riffles, are carried over the front of the machine and deposited in a box set for the purpose. The small amount of concentrates which may cling to the riffles is carried under the machine and is knocked off onto a blanket by a "knocker" automatically arranged. The concentrating power of the machine is governed altogether by the operator, who, by raising or lowering the tables on which the riffles are arranged, can reduce the concentrates to a minimum or permit them to carry a large percentage of pulp. With rich ore the reduction may be only five, ten or twenty into one, while with low-grade ore it may be run from forty to 800 into one. During a test run this week a reduction of 800 to 1 was made on some $1.25 rock, and the concentrates assayed $879 to the ton, while an assay of the tailings in one instance showed nothing, and in another a trace of gold. The machines cover a floor space of 3x6 feet. Each machine is claimed to be capable of handling ten tons of ore in twenty-four hours, and a 2 H. P. gasoline engine furnishes power enough to run four of them. During the mill tests the lowest percentage saved was 71⅓ and the highest 98. On the desert the success of the concentrator opens up, it is believed, a new chapter in mining there, for in the past ores that ran less than $20 per ton were consigned to the waste dump. The Alameda plant consists of four machines, and thus far has cost about $12,000. Two shifts of three men each will be able to handle forty tons of ore every twenty-four hours.

Kern.

The *Times* has an encouraging account of Soledad Mountain, in the Mojave mining district. Soledad Mountain is located about four miles south and one mile west of Mojave. It rises prominently out of the desert to 5000 feet above sea level. There are eighteen hills in the Soledad group, all of which are staked out into mining claims, and on a majority of them the assessment work has been done. From some of these claims a considerable amount of ore has been shipped to the smelter in San Francisco. With reduction works on the grounds, there are hundreds of thousands of tons which might be worked at a profit. A company known as the Double Standard Mining Company has been organized, which will work half a dozen claims that make a big showing on the surface. An offer has been made for the ore on the dumps of two claims at this camp at the rate of $50 a ton.

Teams are hauling ore from the Aitken antimony mines in Lone Pine canyon, seventeen miles northeast of Mojave. A carload of the ore will be shipped this week to New York City, and regular monthly shipments will be made hereafter. The ore from these mines is of high grade, and free from all impurities, which makes it a very desirable ore for the antimony smelters. The mines are owned and operated by George Aitken, who is developing the property. About one-half of the mineral taken out of the mines is considered sufficiently clear to sack and ship without careful sorting, and the balance, which will run 25 or 30 per cent of antimony, is piled on the dump until enough has accumulated to warrant putting up a concentrating plant. There is wood and water in the vicinity of the mines.

F. O. Wilkenson says in the *Times*, of the Piute mining country: "The mines are on the top of a table mountain fifty miles northeast of Mojave in a basin 6600 feet above the sea. I bought the old abandoned Wheel of Fortune mine; went to the bottom of the 50-foot shaft; commenced sinking deeper; struck sulphide ores; have gone down 55 feet. About eighty of us are in camp now, and we are preparing for the winter. We have lots of snow upon the mountain, but we have as well any quantity of water and timber."

At Randsburg labor troubles which have been brewing for some time culminated on the 9th, when about 100 members of the Miners' Union went in a body to the Roxie mine and peremptorily ordered the superintendent and men out of the camp for working below the schedule of the Union, which is $3 per day for eight hours' work. The men were C. N. Clark, superintendent and part owner, C. Couch, L. Richardson, F. B. Nutting and L. Butler. A. Dailey joined the Union in preference to taking a moonlight walk, but the others all started with their blankets on their backs.

Mariposa.

(Special Correspondence).—E. C. Loftus of San Francisco has a force of men at work on the Flyaway group of mines, situated on a spur of the mother lode about five miles southeast from Coulterville. About three years ago Philip Corcoran, Darling and others induced the owners of the six claims comprised in the group to sign a bond for these properties, which bond, with the sole provision that the parties bonding should "begin" work before a specified time, ran forever. As a result the property has been tied up ever since. It is presumed that Mr. Loftus has found means to arrange the difficulty.

The Merced Company has begun the work of enlarging the present two-compartment shaft on the Mary Harrison to a three-compartment. As soon as the enlargement reaches the present bottom of the shaft (175 feet) the work of sinking the main shaft will be begun. With the present size of the shaft it is not practicable to sink without shutting down the mill. Another body of high-grade ore has been opened on the 600 level of this mine.

A strike of considerable promise has lately been made by the Shafe brothers, about six miles northeast from town. They have been sinking on a large east and west vein which has generally been accounted barren, and at a depth of 30 feet have cut through 8 feet of ore running between $20 and $30 per ton. A number of locations have since been made in the vicinity of the Shafe claim.

Coulterville, Nov. 10th, '97.

The opening up of low-grade mining properties in some portions of Mariposa county has been made possible by the construction of the San Joaquin Valley Railway. Heretofore the Southern Pacific had charged $7 a ton on $100 sulphurets, which, in numerous cases, was prohibitive. By the competition of the new road, the rate from Merced to San Francisco has been reduced to $2.75 a ton in carload lots. In the case of several mines the difference represents the profit on mining, milling, transportation and smelting.

Nevada.

Telegraph: Supt. Deasy of the Diamond mine, acting for A. C. Widbur of San Francisco, has contracted for the purchase of the Pine Nut claims, eleven miles from Grass Valley. Suitable machinery will be erected, and in all likelihood a 20-stamp mill will soon be on the ground.

Tidings: At the Reddik mine the drift is in 70 feet from the foot of the 500-foot incline. The prospects are favorable.

At the Stanford mine, near Nevada City, Supt. Jos. Thomas reports that the drain tunnel, 600 feet long, is cleaned out; also, the 300-foot shaft. Sinking was begun on Wednesday. Drifts will be run north and south to exploit the mine. The Stanford is under bond to Edward Coleman, Jacob Neff and others.

Union: A clean-up of $1940 is reported at the Unity mine, the result of a three weeks' run. The ore paid $18.50 per ton. A new ledge was also struck yesterday in the main 200 level.

San Bernardino.

Large loads of supplies have been going to Virginia Dale from San Bernardino during the past few weeks. There are quartz claims and placer mines, and some good specimens of gold are shown. The gold is coarse, pieces running as high as a dollar in value. Some of those who are dry-washing are said to be making from $1.50 to $5 a day to the man.

At Victor considerable activity is reported. The Sidewinder has men at work on the 400-foot level.

The Boston Mining and Milling Company has begun the wall for a 10-stamp mill, with concentrator. It is proposed to handle all qualities and grades of ore.

The Old Judge mine, twelve miles from the river, has men at work at 150 feet, with a 6-inch ledge of good ore.

The Rose mine continues shipping ore.

San Diego.

The Signal Hill Mining Company was incorporated under the laws of Arizona, October 29, 1897. Capital $1,000,000. A stamp mill is to be erected at once.

Shasta.

A new strike is reported from the Whiskytown district, near the Iron Mountain road, about five miles north of Shasta. Robt. Small is the locator. The ledge shows a width of 6 to 7 feet near the surface and carries free gold.

The *Mountain Miner* says that the smoke has been very dense around Keswick the past few mornings, 89,000 tons of ore being lit up on Tuesday last in one heap. The new roaster beds that are being built on the hill will be still larger. It is estimated that 125,000 tons will be burning there at one time.

A. G. Annis has a machine he calls a monitor, which is sunk in the river through the center of a boat 20 feet long. A cylinder of iron, 3 feet in diameter at the top, 5 feet at the bottom, with two windows at the top, is lowered through the hole in the center of the boat to the bottom of the river. A man enters, descends, the cylinder is closed at the top, air is forced into it, and the workman descends to a dry surface at the bottom of the river to work the gravel. The compressed air, which clears the cylinder of water, is also applied in elevating the gravel through a pipe inside to the deck of the boat, where it is deposited in sluices and washed. Mr. Annis says that he has given it a thorough test, and has worked three men in shifts of four hours each, and that the returns in gold are entirely satisfactory. His patent is on that part of the machine which forces the water out of the cylinders and the gravel up to the top through the pipe inside.

Free Press: One of the largest water locations ever filed in this county is filed for record by B. C. Hall. The location claims 85,900 inches of the waters of the McCloud river. He proposes to divert the waters from the stream at a point on the east bank in the north ⅛ of section 12, and to convey them in a flume 30 feet wide and 25 feet deep a distance of 1½ miles to a point in the northwest ¼ of section 14 and southwest ¼ of section 11, where he proposes to generate electrical and mechanical power. The electrical power will be used for mining purposes in sections 23, 26, 34 and 35, and will also be conveyed to Keswick and Redding. The former town will also be supplied with water from a pipe 4 feet in diameter and the latter with a 3-foot pipe. All of the sections of land enumerated are in township 34 north, range 4 west, M. D. M.

The small smelting plant at the old Afterthought mill near Furnaceville on Cow Cow creek, F. R. Enright manager, will shortly resume operations after an idleness of about a year. During the long period of idleness at the smelter, work was continued somewhat irregularly at the mine. The supply of roasted ore on hand exceeds 900 tons.

Sierra and Mariposa.

The Sierra Buttes G. M. Co., held its 55th general meeting in London on the 23rd ult. Chairman F. Tendron said: "Our expenditure on the Mammoth must for the present come to an end. I think Mr. Johns holds the same opinion himself. We are very loth to give up a property. The money we hope to make out of the Whitlock will have to be spent in developing the old Buttes mine. The small 10-stamp mill that we put up in 1890, and the improvement of the flume at that time cost us £1,500; and by working the ore that was on the dumps, and the ore that was accessible on the levels, but too poor to satisfy the former owners or ourselves, we realized in the course of time a profit of £12,575. We are going now to put up a 20-stamp mill on another part of the property, using the materials of our unused Yuba mill. They are going to repair the flume, and to drive a tunnel into some of the old workings in the Buttes, and the estimate of the cost is only £1,600. We are willing to authorize the expenditure to go up to £2,000, and Mr. Johns has been instructed to push on with the work so as to get the flume repaired before the winter sets in. If the flume were destroyed we could never go to the expense of rebuilding it. It is a long flume, and it would be a very expensive work; but if it will stand the storms of the winter, then we will take our chance of getting this £2,000 back. The Buttes has absolutely nothing, for if the Buttes is charged with the full moiety of the £61,000, expended on the new mines, it can just discharge its liability, or, at all events, within £300. As we have made some little profit since June 30, with its share of the profit, it could discharge its liability, and, therefore, for the moment we may look upon the properties as entirely belonging to the Eureka. The Eureka has the money, and it has cash and investments, after paying off the creditors, who are few in number. Including the materials at the different mines—the stores that are worth money and that will be used up in making a profit—it shows a balance of £25,716, and the securities are enhanced in value £2,745, so that the Eureka commands over £28,000. Now, £28,000 is not sufficient to buy and develop a mine that is worth having. We must have the Whitlock made a success. Whether it can or cannot be made a success I am unable to say; but I only see one way in which it may be made a success, and that is for Mr. Johns to leave everything else and to confine himself almost entirely to the superintendence of the Whitlock. He may pay an occasional visit to the other mines, and he may see that things go on properly at the Buttes in regard to the expenditure of the £2,000 we have authorized; but if he has that deep regard for the company that he has always professed, I think it is his duty—and it is the only thing he can do to give the board satisfaction—to devote himself entirely to the Whitlock, and if he makes the Whitlock a success, then will be the time for us to see whether we can once more take a certain amount of risk in looking out for a new property. I may tell you—for it is about the only satisfaction that I have—that we have paid you in dividends, including £63,000 from the Uncle Sam, £857,746; and, in addition to that, without preference shares, loans, bonds, or anything else, the Buttes and Eureka have between them these new properties and the Eureka has in addition its £28,000 of reverve. I now ask you to adopt the directors' report." Mr. T. continued: "The uncertainty of mining is shown clearly in a letter we have received this morning from Mr. Johns. In consequence of our having bought this Mammoth mine, some friends of mine, in connection with another company, rich Americans—Messrs. Rosenfeld & Sons—thought that they would look into the neighborhood, too, because we were very sanguine about this Mammoth on the mother vein. They bought a property which is not more than two miles from us. We saw this gigantic outcrop of dead-looking quartz that had been explored over and over again and would not pay. Well, they spent $200,000 there, and at last they reached, not the vein they had been working for, but by a crosscut they reached an eastern vein. I will read you what Mr. Johns says, for this is a matter of interest, because some day or other we will take up this Mammoth mine again. You never know in mining what may happen. The chairman then read an extract from the latter referred to, which stated that the Eagle mine, now owned by Messrs. Rosenfeld, was developing into a big property, and it looked as if it would prove one of the best mines on the mother lode in the country. Mr. Louis Rosenfeld has told him (Mr. Johns) that they would spend $200,000 on it before giving it up. They had now a good property, and were likely to be amply repaid for their outlay."

Siskiyou.

(Special Correspondence).—Prospecting for quartz is practically a new thing in the neighborhood of Callahan Ranch. G. A. Warder is operating a 2-stamp prospect mill on a porphyry dike 70 feet in width between two slate walls.

From Hornbrook to Orleans Bar, a distance of 140 miles on the Klamath river, the wing-damming of the streams is almost exclusively in the possession of Chinese. It is thought that 95 per cent of their product never becomes known to the statistician. The same is said to hold for Scott river and the branch creeks on both streams.

W. C. Stanley, superintendent, is hydraulicking in the Happy Camp district, fifty four miles west of Yreka, running two giants. The owners are a Colorado company. They have 600 acres and 4000 inches of water. The gravel is from 18 to 20 feet and the gold is evenly distributed. This is known as the Minetta B. Hydraulic Co.

Work on the Bunker Hill mine will be resumed under the management of G. B. Templeton.

The Siskiyou Mining Co. is putting in an electric plant.

Work has been suspended until spring on the Loftus Bros. and McCauley copper mine near Fort Jones.

At the Shores ledge Major Myers has finished crushing the ore taken from tunnel No. 3 since May 1st. The yield was over $22 per ton. In addition, he cleaned up with mortar

and pestle from the same tunnel about $4000. He is now working his ledge at four different places.

A large ditch is being constructed to take water from Elliott creek, in Siskiyou county, to claims on the headwaters of Applegate, in Jackson county, Oregon.

The compressed air machinery has been taken out of the Allen Bros. quartz mine. M. Allen has bought out the late owners and will try to develop a new pay chute.

A talc vein has been opened at the south fork of the Salmon varying from 2 inches to 2 feet in thickness and yielding $200 per ton, worked in an arrastra run by horse power.

Mr. Bradley, superintendent of the Golden Star Mining Co.'s work on the Spencer mine, has had a survey of the property made and will drive an 880-foot crosscut to tap the vein 550 feet deep.

The affairs of the Belcher Placer Mining Co. have been arranged satisfactorily to the stockholders. It is understood that San Francisco capitalists have secured a controlling interest and will immediately put the property in shape to work.

The Minetta B. mine has been shut down pending the putting in of a hydraulic elevator and electric light plant, which is now on the road.

The Spencer mine, operated by the Morning Star Mining Co., is working three shifts of [illegible].

Work on the Klamath Chief group of mines, below Happy Camp, is progressing. The Chicago Mining Co., who own this mine, expect to have everything in shape to begin piping by January 1st.

C. B. Poole's quartz mine, west of Cole's, has been sold for $30,000. The first payment of $5000 has been made and the purchasers are preparing to give it a thorough development this winter.

Journal: The best strike which has been made lately is that at the Commodore mine on Barkhouse creek. This ledge is owned by Messrs. Humphreys & Quigley, who have been doing a great deal of development work during the past year. Last week they ran onto some exceedingly rich ore, taking out over $500 in a very short time, with a quantity of the same character of ore in sight. The Commodore mine is situated at the head of Barkhouse creek, about thirteen miles from Scott Bar.

The Klamath river dredger is still at work on the Klamath river, below Oak Bar, where it has been handling good pay gravel for some time past. The dredger is kept in operation most of the time.

The Blue Gravel mine, just south of Yreka, is said to be paying better than ever at present, and a large force is kept busy night and day taking out gravel.

The mines in the vicinity of Oro Fino will probably be started up by holiday time. The Eastlick Brothers' mine, as well as the Gardiner and Wright & Fletcher mines, are all being put in readiness to commence operation as soon as there is sufficient water. They hope for a longer season this year than they enjoyed last year. This group of mines is among the richest hydraulic claims in the county.

Journal: R. S. Lenhart, after eight months' perseverance, has finally secured the Gold Ball quartz mining property, near Sawyer's Bar, by settling up the outstanding claims. He is now fitting up the mine and mill for active operations, and expects to have everything in readiness by Dec. 1st. This is one of the richest quartz ledges in Siskiyou.

The Allen 5-stamp quartz mill, in Quartz valley, is taken down. The stamps and boiler will go to Henley, and the remainder of the mill will be shipped to Harrison Gulch, in Shasta county.

The hydraulic mines along the Klamath river will soon be enabled to start up again, especially if it storms a few days longer. Most of them are kept in operation most of the time, but this year the water supply has been unusually short, causing them to close down for a much longer period than usual.

The Morrison quartz mill is now crushing ore from the David Jones ledge in that vicinity.

P. W. Pyne has discovered a promising ledge of free gold ore six miles west of Delta.

Trinity.

(Special Correspondence).—J. R. Stoddard & Co. are developing a property on Castle creek, six miles N.E. of Cinnabar. A tunnel is 35 feet on a 6-foot blanket ledge; the ore at 52 feet depth assays $182.57 in gold.

The Altoona Quicksilver Mining Company is placing pumping machinery, and meanwhile the furnace is idle. Steam power is used. At a depth of 550 feet the ledge averages 10 feet. The product is about 500 flasks per month. The mine is said to produce the finest specimens of ore in the world.

Cinnabar, Nov. 3rd, '97.

(Special Correspondence).—The Compagnie Francaise des Placers Hydraulic has just completed a new pipe line which is of considerable magnitude. Water is brought from Canyon creek, a distance of nine miles, and is 3000 inches in volume. The flume across Canyon creek is 2000 feet, and the entire amount of flume in the canal is 1½ miles. Across a divide of 2200 feet, 200 feet in depth, is a syphon 34 inches in diameter. From the top of the bluff the water is dropped through a 36-inch No. 6 iron pipe for 552 feet at an angle of 42°. It is then carried across the river through three pipe lines on a suspension bridge 5700 feet. From the bridge the pipe line is 4000 feet up hill to a ditch one mile in length, from which it empties into a reservoir that supplies two giants.

The method of laying the pipe across the bridge and up the steep bluff was by means of a cable and trolley operated by a 3-foot Pelton wheel. Instead of cogs, a compressed paper wheel on the friction process was used. The cable and 4-wheel trolley, together with paper wheel, is Mr. Saladin's invention. He uses this same method for moving boulders in the mine. It carries boulders weighing three tons.

The joints of pipe across the river to the top of the bluff are riveted so as to make the entire 5700 feet one continuous piece. On the bluff it is bolted in bedrock by steel bands.

The company owns 700 acres, of which 500 are hydraulic ground. They operate a sawmill, telephone line and an electric light plant. Mr. E. Saladin is the superintendent. He operates from seven to ten months of the year and employs fifty men.

Junction City, Nov. 4th, '97.

(Special Correspondence).—Geo. L. Carr is doing development work on the Boulder property, six miles from Carrville. A crosscut tunnel is in 125 feet at a depth of 250 feet. The property comprises eight claims.

Out of 500 locations made during this summer's rush into the Coffee creek section, I am told that the assessment work has been recorded on 300 claims.

On the Forget-Me-Not, one mile from town, G. L. Carr took fifty tons of rock at a depth of 175 feet, which he ran through an arrastra, and he claims it netted him $115 per ton. He intends running another tunnel at greater depth.

Peterson & Ruggles have three claims on Scorpion creek, seven miles N.W. of Trinity Center. They have run an 80-foot tunnel on the vein, which they call decomposed quartz silicate. They are now completing an arrastra.

F. L. Dimock and others of Trinity Center have run a 150-foot tunnel, expecting to tap the ledge within 20 additional feet. The property comprises seven claims. The croppings are said to average 160 feet in width, and fifteen assays yielded an average of $15. The ore is gold and copper, similar to that of the Iron Mountain product.

At the Strode mill, six miles above Trinity Center, a 5-stamp mill is operated during the summer and autumn by water brought from Trinity river. The lowest tunnel is 580 feet on the vein and 900 feet from the apex. The hanging wall is porphyry and the foot is slate. The vein matter is 9 feet wide and is a fine sand-like substance, which, when washed, shows fine grains of white quartz. They call it here a decomposed schistose. It averages $16 per ton. From the surface to a depth of 340 feet the ore paid $225 per ton. J. S. and J. C. Strode of San Francisco are the owners.

The Bonanza King, nine miles N.E. of Trinity Center, comprising eight claims, owned by Wm. Vollmers & Co., has 700 feet of tunnels on a ledge running from 4 to 25 feet. They have three chutes. The formation is porphyry and schist. The sulphurets run $300 per ton. A 5-stamp mill run by water is operated nine months of the year.

P. Holland is ground sluicing sixteen miles N.E. of here. He owns 400 acres, and uses 20,000 inches of water at intervals, after large blasts. His reservoir covers an acre of ground and averages 7 feet in depth. He works about eight months of the year.

Trinity Center, Nov. 6th, '97.

According to the Trinity *Journal* the great siphon put in by the La Grange Company on the line of the Stuart's Fork ditch was successfully tested last week. Water was turned in and it was found that there had not been a flaw in the engineering work. The trestle on which the pipe rests in crossing the gulch also stood the test. It was a large and an expensive undertaking, and the officials of the La Grange Company express great satisfaction at the successful result.

Tuolumne.

The Sonora *Democrat* reports a strike in the Kanaka mine. The last two mill runs of about fifteen days have each yielded over $4000, so that, estimating the crushing capacity at one and a half tons per twenty-four hours to the stamp, the rock is averaging from $17 to $18. I. G. Moodey is superintendent.

Men are unwatering the App mine preparatory to resuming operations.

The shaft in the Dutch mine is down 500 feet. A station is now being cut out at the sixth level. The company is putting in a Gates canvas plant for the catching of slimes, just below the mill.

The Dreisam Mining Company, a San Francisco corporation, has purchased the Easton group of mines, near Arrastraville. C. P. Grimwood, one of the owners in the Dutch mine, will be the superintendent.

Mr. W. B. Buckminster, general manager of the Santa Ysabel Gold Mining Company, says: "No ore has been stoped from the richest deposit, the Knox & Boyle chute, on account of the breaking of an armature connected with the hoist in that shaft. Just as the mill was ready to run continuously, a sudden and unexpected failure in the supply of water for the plates and batteries occurred through the exhaustion of the reservoir of the Tuolumne Ditch Company, causing a complete shutdown at the mill. We have ample steam power to run the same, as well as the hoists, but need water for the plates and batteries. The rains are due any day now. The debts of the company are less than $80,000, and this includes the cost of the mill and development expenses for about a year." Supt. Newcomb says he is confident that as soon as the rains come to furnish water for the plates and batteries, the ores now in sight will pay expenses of operating and ordinary development, and a profit. He advises pushing the work of sinking to a lower depth to reach the richer bodies of ore, which the experience of other neighboring mines shows will undoubtedly be found there, from the chutes already developed.

In the Alameda the drifts north and south on the 500 level are being advanced. The south drift is now in 75 feet and the north drift 130 feet. The ore shows free gold.

At the Alabama sinking in the shaft is resumed. The rock is very hard and progress slow. Some good ore is being found in the drifts on the 300 level.

The App force has been increased. Much development work will be done during the winter.

The Omega Mining Company has bonded the Longfellow mine at Groveland and put men to work.

The Jumper mill is running full time. The company expects to start sinking the vertical, two-compartment shaft next spring.

Independent: At the New Year's mine, on the North Fork of the Tuolumne river, developments are being vigorously pushed and machinery is almost daily hauled in.

J. P. Kerrigan of San Francisco has bought the Lost Fox. There are two tunnels. Recent assays show $54 to the ton.

The Modoc has started up and machinery put in.

Yuba.

The Con. Nugget and Coranado M. and M. Co., at Smartsville, propose to furnish electricity for power and lighting.

Several bids are being received for dredging the Sacramento under the direction of the Board of Public Works, which is acting under authorization of the Legislature, $800,000 having been appropriated for the work. Calls for specifications are coming in from contractors from all directions.

NEVADA.

Turquoise has been discovered recently in Lincoln county, at the foot of Sugar Loaf Peak. The country rock is mica schist. The zone in which the turquoise is found is about half a mile long. In this zone there has apparently been no fissuring, with the exception of the intrusion of one large dike, which is about 250 feet wide, and shows clearly for 4500 feet in length. The largest and purest specimens of turquoise are found in this dike, sometimes showing on the surface, in nodules which vary from the size of a pinhead to an average walnut. Two crosscuts have been driven to open the turquoise bearing rock, one at a depth of 35 feet and the other at about 25 feet. A shaft 25 feet has also been sunk, besides several 10-foot holes. The largest of the stones, up to date, weighed 64 carats, with others ranging from 10 to 20 carats.

Lyon Co. *Times*: The cyanide plant being erected in Six-mile canyon by Harris, Blood & Co. is nearly completed, and will probably be running next week sometime. Thirty men are now at work on the plant, and the company hopes to make a test run before bad weather sets in.

White Pine *News*: The McEllin mine, near Hamilton, in the last two weeks have shipped over the E. & P. line about 75 tons of ore which goes from 60 to 75 per cent lead and about 25 ounces in silver.

At Bullionville, Lincoln Co., preparations are being made to work the Godbe tailings—200,000 tons—by the Pecks, whose concentrator has worked a revolution in many localities.

Austin *Reveille*: General Manager Farnsworth has closed down the coal mine at Crum canyon for the winter, and all the men have been discharged. Operations will be resumed in the mine next spring.

OREGON.

It is reported that negotiations are pending with New York capitalists for the sale of Wimer Bros.' hydraulic mines in Waldo district, Josephine Co.

The annual meeting of the Southern Oregon Mining Association is called for Nov. 17th, at 7:30 P. M., at Grants Pass, at the office of the secretary.

The *Democrat* says that the Con. Virginia mine at Baker City is an extension of the Virtue, and when the ledge is struck stamps will be put in. Over $100,000 has been already expended, and there is every prospect of its being as good a property as the Virtue. The property is owned by David Keith of Park City, Utah, who is now crosscutting to the vein from the 600-foot level.

BRITISH COLUMBIA.

Camp Fairview, Okanogan District.—(Special Correspondence)—The mill for the Tin Horn mine is complete and will no doubt be in operation before this is in print. The statement in an Ottawa paper that water would have to be pumped three miles up hill from Okanogan river is incorrect. Pipes have been laid from two creeks which, it is said, will provide ample water the year around. The mill has a capacity of seventy tons a day, and at present there is enough ore on the dumps to last three months. There are 1300 feet of tunnels on the Tin Horn mine. It is said that if this company can save $10 on the plates a dozen more mills will be erected in the camp.

The Winchester Company are arranging for the erection of a mill near their properties, the Winchester and Stemwinder claims. Tin Horn stock is being transferred at 90 cents, Winchester at 30 cents.

Cayoose Creek Camp, Lillooet.—(Special Correspondence)—The Golden Cache mill is running night and day. It commenced Nov. 3 and will be continued for thirty days. The company have announced that this will be a test run. Golden Cache stock is being transferred at $1.60, 20 cents below the price paid for 100,000 shares by M. Oldroyd and others.

The Excelsior mine, next to the Golden Cache, has two tunnels driven in on the main ledge. The vein showed little value on the surface, but rapidly increased in width and richness as depth was attained. No. 1 tunnel is now in 145 feet. The vein is 20 feet wide between walls. Rock on the face of the tunnel assays $177. This was a random test, but, of course, not an average one. The decomposed quartz, 6 inches thick on the foot wall, assayed $856 in gold. This stock has been put on at 30 cents, but is to be taken off on the 15th of November.

Howison Lake District, Five Mountain Camp.—(Special Correspondence)—The entire attention of the camp is still centered on the Money Spinner claim, and the prosperity of this camp will depend on this claim. The mill of this free milling property is covered in and the approach of winter will not prevent the machinery being established. The company claim they will be ready for crushing on Dec. 1st. The work on this mine, besides the surface tests for 1500 feet, is a tunnel 140 feet in and a winze 80 feet deep. The tunnel is 6 feet wide at 140 feet and the winze 9 feet wide. What makes the property so valuable is the fact that the assays of comparatively large blocks of ore have been so satisfactory—the company not being content with more than half a ton test at a time. This stock jumped this week from 50 cents to $1.

The Coast.—The Channe Company, having sold their claims at Phillips Arm for $10,000 and 30,000 shares (£1 shares) of the Gold Fields of B. C. Company, are buying new claims in Kootenay. The stock of the Channe Company fell from 23 to 5 cents some months ago, owing to internal dissensions in the company. New officers have been elected and the 30,000 shares mentioned are being sold in England, the first proceeds ($10,000) having arrived this week. In a short time, according to an official statement, the Channe Company expect the entire $150,000. Dividends are to be paid, according to the statement of one of the company, on the arrival of every $50,000. Channe stock is now quoted at 8 cents.

The Wonderful property, near Sandon, has always been considered a phenomenon in silver mining, the pay ore having been taken from a blanket vein lying practically on the surface, by ground sluicing and hydraulic work and the property is known throughout the Slocan as the only silver placer mine in the world. While the pay ore has been taken from the surface, every effort has been made to locate the main vein, which mining men firmly believe to exist at a greater or less depth. Much money has been spent in opening tunnels in the vain attempt to find the lead.

Rossland has eighty-nine mining claims located within the city limits, seventeen running. It is a rich city for a new one, as its wealth is set down at $23,000,000, which gives a per capita of $3,000. Among the mines within the limits of the city and in operation are the Le Roi, War Eagle, Center Star, Nickel Plate, Iron Horse, Iron Colt, Kootenay, Columbia, White Bear. The Le Roi has paid $575,000 in dividends.

At Sandon, the difficulties in which the Noble Five mine is involved are still the subject of much discussion. The property is idle, and must remain so until after the adjourned meeting of the stockholders, Nov. 25th. The proposition was to borrow $150,000, out of which the indebtedness of the company was first to be settled, and the balance, about $115,000, was to be used in pushing further development work, setting aside a sum to meet current expenses. Much local dissatisfaction is expressed with the management of the property. It is asserted that sufficient treasury stock was sold to develop the mine and pay for the plant, and as the mine shipped steadily, the stockholders are at a loss to know why the business has become so heavily involved. The belief is freely expressed that under judicious management the mine would become a profitable investment. Apparently, however, the only solution of the difficulties will be the appointment of a liquidator and the sale of the mine.

There have been sold 300,000 shares of the capital stock of the Virginia Gold Mining Company at Rossland to Geo. Pfunder, who is understood to represent the Monte Cristo interests, at 12½ cents per share. The remaining 200,000 shares are largely owned by the Corbins, Herricks, Roberts and their associates. Mr. Pfunder says that his principals are prepared to expend $100,000 in the development of the property.

At Nelson the Hall mines stockholders have been notified that a dividend will be paid on the preference shares for the year ending September 30th at 7 cents per annum. The smelter shipped for the week ending Nov. 6th 1100 pounds of copper, 81 ounces of bullion and 80 tons of matte, all valued at $79,253.08. For the period of thirty-two days 6210 tons of ore were treated, turning out 522 tons of matte, containing 98 ounces of gold, 249 tons of copper and 141,860 ounces of silver.

ALASKA.

The Bald Eagle Mining Company has temporarily shut down the mill at Sumdum. Work progresses on the upraise from the lower level to the upper one. A distance of 125 feet has been driven, leaving 100 feet yet to go to connect the two points of the mine. The tunnel runs in on the vein for 110 feet; the ore in the face is 8 feet wide. A shaft has been sunk from the tunnel level down to a depth of 35 feet right on the vein, but at the end of the ore chute. Sixty feet up in the upraise the sulphurets went $1,500 to the ton. From the upper works to the mill was a flume 4,000 feet long and 6 inches wide, lined with sheet iron. Down this flume the ore was run. Recently it was taken up, to be put in a more convenient position; after sweeping it down, the concentrates which had accumulated in and about it were gathered together, and amounted to $6,000, or equal in value to $1.50 a foot. The flume, together with the rock breaker, have been moved to the mouth of the tunnel. It is in contemplation to build a mill on the beach, a distance of 9,400 feet from the mouth of the big tunnel, and make connection by tramway. The average mill returns of the ore from this mine for three years has been $27 a ton.

THE KLONDIKE.

The steamer Homer, from Juneau, brings the latest news from the Klondike. Among her passengers was C. C. Burns, who left Dawson City Sept. 23d. He poled up the Yukon and came out over the Chilcoot trail. Burns stated that when he left Dawson no one had started down the Yukon for provisions. The people were daily expecting boats from St. Michael. He said that there will be no starvation at Dawson this winter, though rations would be limited with some. According to Burns the only new gold discov-

eries made this year were on Sulphur creek, and that field was not proving as rich as El Dorado or Bonanza creeks. Burns brought down with him about $6000 in nuggets and dust, the result of two years' work.

UTAH.

At Silver Reef the Barbee mill is being operated by Woolley, Lund & Judd on ores from the Christy and Stormont mines. During October 8678 ounces of fine silver were produced. The plant is operating on custom ores only and will continue throughout the winter at forty tons a day.

The *Tribune* announces that in the Mercur mine the third of the auriferous ore chutes has been encountered, and what was long cherished by Manager Dern as a theory has crystallized as an absolute condition. His contention was that nature had not created two strata with an intercurring stratum of limestone. The confidence he had in the theory that a third stratum of ore would be encountered made him drive a winze 90 feet through limestone to chute No. 3, 300 feet below the surface on a perpendicular line. With the discovery of a third ore chute in the Mercur the company practically adds a new mine to its possessions. Concerning the values of the ore, nothing definite has been learned at the offices of the company, but the assumption is reasonable that they are at least as good as those that exist in chute No. 2.

About two weeks ago, at a depth of 300 feet in the Gladstone, at Mercur, water made its appearance in the shaft. It continued to increase in volume as depth was attained. Recognizing the commercial value of the water, says the *Tribune*, Manager Cory, who was then paying tribute to the water company, began to provide means for utilizing it, and it was made to supply the needs of the machinery. It continued to increase in volume, however, until pumps were necessary that the search for gold might continue. Pumps were thereupon put in and the sinking of the shaft went ahead. On Saturday last, says Col. Heffron, a shot was put off that carried them through the shale and into an altered limestone resembling that found in the older diggings of the camp. It was declared by some to be the vein. Col. Heffron views it as the capping to the vein. This change was not of so much importance, however, as the change which unbridled a small-sized Niagara 320 feet below the collar of the shaft, the water coming in with a hiss and roar that drove the miners momentarily to the surface. The stroke of the pumps was increased, a measurement of the water was made, and it developed that 40,000 gallons a day were coming in, an analysis made when the water first made its appearance in the shaft showing it to be fit for all purposes, domestic included. With a flow of 40,000 gallons a day, the domestic requirements of Mercur could be supplied, says Col. Heffron, while solution could be provided for 800 tons of ore daily. Basing his calculations on the present prices of water in Mercur, he estimates that the flow in the Gladstone can be made to earn nearly $100 a day at an expense of $10, and says the company will at once take steps to pipe the water into the market. It should, he adds, be made to earn at least $20,000 a year. Meanwhile the change which occurred in the rock when the big flow was encountered is being inquired into, and samples of it are now in the furnace

Bulletins obtained by the Salt Lake *Tribune* from the freight departments of the Oregon Short Line and Rio Grande Western Railway show that during the month of October there was handled by them ores and bullion as follows:

	Pounds.
Germania, Hanauer and Mingo bullion	6,861,103
Copper bullion	46,436
Pascoe slag	24,000
Ores	8,705,555

In addition to the items on which a check is kept in the freight departments, over 5000 pounds of cyanides of gold were expressed through the sampling rooms of the Consolidated Kansas City Smelting & Refining Company. In the production of this lot of cyanides it would be difficult to arrive at an intelligent estimate of the amount of crude ore that was required. It is known that the Mercur is handling 300 tons daily, the Geyser-Marion 150 tons, the Sacramento 100 tons, the Northern Light over 100 tons and other plants according to their tankage and crushing capacity. To compute the valuation of the cyanides is also difficult, the product varying, according to records kept by the various companies whose output is marketed in that form, from $6 to $38 per pound, this being governed very largely by the work of which the mill is capable, the character of the ore and the effectiveness with which the mass is handled. To reach a basis of calculation the controls on the last twelve lots that have been shipped were taken. Some of these lots ran very high, but the average for the dozen was $17.08 a pound, or a total of $85,400 which passed through the sampler at this point.

Bingham, in the matter of tonnage, led all all other camps, with Tintic next.

Park City *Record*: J. J. Daly superintendent Daly-West mill says: "Neither the mine nor mill will start so long as silver and lead do not advance. We have no thought of doing anything at present. I would like to be able to make a statement that would carry encouragement to the idle men in this camp, but until silver advances to a figure that will allow the mine to be worked at a profit, nothing will be done. The work on the mill is completed and everything in good shape for handling the product when prices warranted."

Notwithstanding assertions that the Ontario mill would close down Nov. 1st, it is still running, and the *Record* is justified in saying that enough milling ore is either at the mill, or at the mine ready to haul down, to keep the mill running at its present capacity for two months yet.

IDAHO.

A gold strike is reported from a placer deposit near Elk City, where some Montana men recently made locations. It is stated that, after a brief run, a clean-up of $1700 had been made.

At Burke, after experimenting to ascertain the relative values of coal and wood as fuel the Tiger and Poorman Consolidated Mining Company has decided to use the former and mammoth coal bunkers are being built extending nearly the whole length of the boiler house to hold a supply to last several weeks.

Avalanche: November closes the company year at the Trade Dollar mines, the output will be over half a million of dollars. The payroll for October shows 142 names. The expenses for the present season have been unusually large, on account of installing machinery and development work by shaft. All chutes which have been in use for four years were also retimbered, necessitating, with new work, the use of 200,000 feet of lumber during the past six months. Sixteen hundred cords of wood have been laid in for winter at the mill. Coal is used for fuel at the compressor plant. The Trade Dollar smelting ore runs from $50,000 to $80,000 per carload.

Free Press: W. H. Hill is back from Warren, where he has been doing some mine surveying and engineering work for some of the companies operating there, and reports that the camp is very prosperous and shipping bullion at the rate of $11,000 per month. The mill on the Goodenough is running steadily and giving results beyond expectations, and the big dredge outfits have also made some great cleanups.

MONTANA.

A quartz strike is reported on Gage creek near Utica, in the Ferguson country, and has "set the whole eastern part of the State wild. The rock runs over $100 to the ton."

On Grasshopper creek the work of the three dredging boats which are operating successfully on the old diggings will soon be supplemented with that of another of larger capacity than either of those now in operation. The three which are working are the F. L. Graves, which is running at Bannack by electric power; the A. E. Gaeter, operating at Marysville, one mile below, with steam as motive power, and the Maggie Gibson, also a steam machine, which is excavating on Jimmy's Bar, still another mile or so below. The fourth will be set up at the mouth of the canyon, four miles below Bannack, and will also be run by steam.

A working interest in the mine and mill of the McCauley Company of Crevasse has been bought by Clark & Westbrook of New York City. The terms of the sale provide for the payment of $20,000—$6000 Dec. 4, '97, $4000 March 15, '98, and the balance on or before August 1, '98. The working lease provides for immediate possession of the mine and mill, consisting of thirty stamps, and this will be put in operation at once for a testing run on the ores from the mine. Mr. Jones, as representative of the purchasers, has secured water rights and mill site near the mouth of Bear creek, at which point it is proposed to erect mills with a capacity of 100 stamps, and to which ores from the mines will be conveyed by a tramway to be erected, if the test is satisfactory.

Last Saturday, H. N. Blake, Master in Chancery at Phillipsburg, Granite county, sold all the property of the Golden Scepter Mining Company at Quigley, including 100-stamp mill, electric tramway, water rights and townsite, to J. A. Keyes, of Missoula, as trustee for the Reorganization Committee, for $549,529. The property will be operated by a new company recently incorporated, composed principally of creditors of the old corporation. Grover Cleveland, William G. Whitney and ex-United States Senator Higgins, of Delaware, were interested in the old company.

Inter-Mountain: The big St. Lawrence engine, which was installed a few weeks ago, was started up last week and it is said works very satisfactorily. A new six-drill air compressor of the Rand pattern is at the Little Mina mine upon which the Parrot Company began work a few weeks ago. The shaft will be developed from the 400 level to a much greater depth.

SOUTH DAKOTA.

The report of the Surveyor General of South Dakota, recently made to the Secretary of the Interior, says that no surveys were made in that State during the year. The Surveyor General devotes considerable space to the urgent need for the survey of the Black Hills, where mineral locations are being made rapidly. He says there is great need for an examination of the mineral surveys in the State and for connecting mineral monuments with regular surveys. He urges an increase in the allotment for surveys on this account.

COLORADO.

The Dives-Pelican at Silver Plume probably employs more men than any silver mine in northern Colorado. They number about 265, of which 225 are lease holders. The others are contractors and men on day's wages.

The Emma, noted for years past as the richest gold producer in Dolores county, has been sold to a Boston syndicate for $150,000.

The Smuggler-Union mill, at Telluride, is being enlarged to 230 tons daily, and the capacity of the tramway increased one-third. The Japan mine is producing two cars of concentrates daily from its mill, said to run $100 a ton. In addition, two or three cars a week of smelting ore are shipped.

Colorado Springs *Telegraph*: The output for October passed the million-dollar mark, an increase of over $100,000 over the month of September and swelling the approximate output for the present year to nearly $10,500,000, with every prospect of increasing the total to $15,000,000 with the closing day of 1897.

The actual figures direct from the management of the various treatment processes engaged in the handling of Cripple Creek ores places the gross tonnage for the month of October at 20,821 tons, with a bullion value of $1,095,366.36, as against 26,161 tons in September, of a value of $966,464.51, an increase of 3660 tons and $128,900.85.

The increase is clearly traceable to the additional capacity of the mills for the treating of ores, the chlorination and cyanide plants alone handling 3658 tons more than in the preceding month; the smelting grades show an increase, while the stamp mill treatment has been reduced.

In November, with the Gillett reduction works' improvements and additions completed, the capacity of the plant will be increased from forty tons to seventy tons daily, and the Kilton Ore Purchasing Company, whose large works at Goldfield, with a daily capacity of 400 tons and storage bins for 800 tons, start up on Monday, will be in the market for ore, increased treatment facilities will be added, and with the present daily increasing output of higher grade mineral the production for the month of November should not fall short of $1,500,000.

Following are the figures obtained from the chlorination, and cyanide plants handling Cripple Creek ores:

Brodie mill, at Mound City, cyanide process, 3048 tons of an average value of $24.82. Total value, $75,651.36.

Colorado Ore Sampling and Reduction Company, at Arequa, cyanide and chlorination, treated 1073 tons of an average value of $23.50; total $25,215.

The Gillett reduction works at Gillett, which have been busily engaged increasing their capacity, chlorination, 1100 tons of $35 ore, with a value of $38,500.

The El Paso reduction works at Florence, chlorination, doubled their treatment during the month, treating 2800 tons, as against 1400 in September, of an average value of $27; total $75,600.

The Metallic Extraction Company, also at Florence, a cyanide plant, handled 8000 tons, 2000 more than the preceding month, but owing to a large tonnage of dump ore the average value was reduced to $22 a ton, making a total of $176,000.

The Colorado-Philadelphia Reduction Company at Colorado City, chlorination, treated 4800 tons of $28 ore with a bullion value of $134,000.

The s amp mills of the district, running light during the month, were responsible for 1000 tons of an average value of $10 to the ton, or $10,000 for this grade of ore. Smelting ore, as aforesaid, shows a remarkable increase, mainly from the heavy producers, and from old mines like the Moose, Zenobia, and others that are once more ranking with the best in the camp. Eight thousand tons of smelting ore were handled between the two roads giving egress from the camp of an average value of $70 to the ton, or $560,000 for that grade of ore.

Summarized, the output as treated is as follows:

	Tons.	*Aver.*	*Amount.*
Smelters	8,000	$70 00	$ 560,000 00
Reduction works	20 821	25 23	525,366 30
Stamp mills	1,000	10 00	10,000 00
Total	29,821		$1,995,366 36

NEW MEXICO.

The Santa Fe *New Mexican* reports the probable sale by O. P. Posey and W. Cartan of Denver of the Albemarle group of mines in the Cochiti district for $240,000. If the sale goes through, a cyanide mill of 400 tons capacity daily will be erected.

ARIZONA.

Lewis Williams, of the Copper Queen Mining Company, Bisbee, writes that "the Grand Lodge F. & A. M. of Arizona, will meet here on the 9th, 10th and 11th of November. They will hold their sessions in the cave 500 feet below the surface of the earth. It will present a novel and beautiful sight. Electrical lights will be arranged in groups amongst the stalactites in the roof and sides."

The longest application for mining patents ever made has been received at the Prescott land office. It covers seventy mining claims and millsites in Mohave county, owned by D. H. Moffatt. The law allows the register of the land office a fee of $10 for each application filed, so that the applicant, in this case, makes a saving of almost $700 by grouping all the claims in one application.

The only native copper discovered in northern Arizona comes from the Buster mine, in the Bradshaw mountains. The native copper is taken from the ground in solid nuggets and leaf-like sheets, the latter from 4 to 6 inches wide, from 6 to 14 inches in length, and from the thickness of a knife-blade to one-quarter of an inch. These leaf-like layers run in veins through seams in the ore, which is more in the nature of a deposit than a vein, and crops out on top of the mountain. A tunnel driven in the side of the mountain 350 feet below the apex struck the ledge, and it is from this tunnel that the richest specimens come. Another tunnel will be run in 700 feet lower down, and if the deposit is struck at that point a smelter will be erected.

C. M. Smith, superintendent Mohawk Mining Co., reports that the Mohawk is running thirty stamps to their full capacity.

Correspondence *Republican*: Yuma is the supply depot for the Mesquite district, seven miles south of the thirty-five mile point west of Yuma on the S. P. The Bay Horse gold mine is operated by Los Angeles parties, L. A. Morlan superintendent. Twenty men are working. A dry roller mill is working at the mine.

Nearly eight miles southeast of Yuma, and fifteen miles southeast of Blaisdell station is the La Fortuna Gold Mining and Milling Company, which has been operating two years. The company has cleaned up from $35 to $96 per ton. A 20-stamp mill is run. One hundred and fifty men are employed. C. D. Lane is owner, F. J. Martin superintendent. The postoffice is Fortuna. A number of shafts are down, one 550 feet. But few men are employed at present. Big profits are made monthly by the owners. The output is a very complete one. Large ledges are apparent, a good body having been opened recently. Drifts will be made at once.

Six miles north of Ogilby, seventeen miles west of Yuma, is the Gold Rock. One of the biggest mills in the southwest is to be operated. Two hundred and fifty men are employed.

Probably 500 men, many of whom are Mexicans and Indians, have been placer mining north of and near Yuma, but no figures have been made as to the monthly pick-up. These operators sell the gold in large and small quantities in Yuma.

MEXICO.

There are two different formations in Mexico. In the eastern part of the State of Chihuahua is the lime and prophyry contact formation, the ores being carbonates carrying an excess of iron, about 15 per cent lead and 15 ounces silver. Sometimes the excess of iron increases at the expense of the silver, but the percentage of lead varies very little. This is the great smelting region, this character of ore being necessary for smelting purposes, and has caused the erection of the smelting plants throughout this part of the republic. Along the crest of the Sierras from the northern boundary to the Guatemalan frontier is a continuous succession of mineral veins, strong fissures, with granite walls, the ore being sulphides, and it is here that there is the greatest opportunity for American enterprise. The Mexicans are fair miners, but they have not the crudest idea of concentration and know nothing whatever about milling. In this belt of sulphide ores, the values are in both gold and silver. The idea has been very general that because Mexico has in the past produced great quantities of silver it is a silver country, but this is very far from the truth. Eventually Mexico will become one of the great gold producers of the world. In the northern part of the republic the metallic values of these sulphide ores run about 25 per cent in gold, but farther south gold forms about 75 per cent of the metallic values, and the ore is so refractory that even the patio system is ineffective in extracting the values. All of this vast belt of sulphides is practically virgin ground ready for intelligent, modern methods of operation. In Chihuahua there are twelve large milling plants in operation, and a greater or less number in Sonora, but south of Chihuahua there is not a single mill and the natives do not seem to understand how to take advantage of the mill system. Regarding the wealth of these deposits of sulphides, one instance will give some idea. A mine in the southern part of the republic has to pay such heavy freight rates and such high smelting charges that nothing less than $100 ore can be shipped, and yet this mine is shipping ten carloads of ore per week. The amount of sorting necessary and the quantity of second and third-class ore lying on the dump that could be utilized by concentration can be imagined. It is in the southern part of the republic that the greatest rewards await American enterprise in the establishment of mills. Another thing to be considered is the question of transportation as it exists all over the republic. The railroads all run on the elevated plateau at a distance of from 100 to 200 miles from the mountains, necessitating wagon or burro transportation for that distance, so that it is practically impossible to ship anything except bullion from the mines. It is equally impossible to ship in heavy machinery for any distance over 100 miles, and it becomes important to devise methods of treatment which require the lightest machinery possible, and any system which can reduce the ores to oxide and put them in condition for amalgamation will find an open field in Mexico, with profits beyond anything that they can hope for in this country, for it costs a great deal more to treat ores in Mexico than in the United States. Eventually concentrating plants will be established all along the Sierras, but the best field now is for such processes of preparing the ore for amalgamation, as can be erected without serious expense, and of course that means light machinery. It is to be regretted that the United States does not secure more of the Mexican trade, which is mainly in the hands of the Germans, but the Americans do not seem to get hold as the Germans do. American goods are vastly superior to German manufactures, but the latter sell and seem to defy competition. One thing that operates against Americans is the customs system of the country. One duty is levied on the gross weight of the package and the other on its contents. The Germans import everything in bales and the Americans in boxes, which makes a very material difference in the amount of duty paid. But in mining and milling appliances the United States beats the world, and in Mexico is a ripe field awaiting American energy and enterprise.

CENTRAL AMERICA.

The schooner Vine is billed to leave this city to-day with an expedition to look for gold in Central America. The Spanish-American Developing & Mining Company say they have concessions from San Salvador, Costa Rica and Guatemala for 6000 acres of territory which lies at the points of contact of the countries, covering the mineral development of the tracts. The claim is made that the company has a capital stock of $2,000,000, with one-half of it paid up. The stock of the company is owned, according to the statements of W. Aumock, in Cleveland, Ohio, and England.

SOUTH AFRICA.

A Washington, D. C., dispatch says reliable information has been received by officials of the United States Geological Survey to the effect that great diamond mines had been discovered in the Transvaal country that from surface indications will prove fully as rich as the famous Kimberley mines. A powerful syndicate, of which Cecil Rhodes is the head, is now negotiating for the purchase of the property. Ever since the discovery of the Kimberley mines the search for new diamond mines has been in progress, but, until the

Transvaal discovery was made, without success. The geological formation at Kimberley is peculiar, and similar formation could not be found. The search has been continued unsuccessfully for so many years that the announcement now of a discovery of great richness comes as a surprise.

The reports of the Witwatersrand Chamber of Mines and the Association of Mines give the product of the Rand district, South Africa, for August as £908,681. The stamp mills treated 449,511 tons, each stamp averaging 4 5 tons per twenty-four hours. The number of stamps running was 3560. There are about 6000 now in operation in California.

NEW ZEALAND.

The export of gold from New Zealand during the quarter ending September amounted to 60,220 ounces, of the value of £232,743, as against 76,051 ounces of the value of £302,974 for the corresponding quarter of 1896.

The Yukon District.

Dr. Sidebotham writes from Rampart City that he is about 300 miles below Fort Yukon and a few miles above Tanana; distances are very vague. In order to hold a staked claim it is necessary to do assessment work, which consists of $200 worth of work, and as labor is valued at $10 a day, that means twenty days of work, which must be done between January and May for winter diggings, and April and August for summer. The former are thawed out as you descend, the latter sluiced out on the bar when the creeks commence flowing. There are good wild cranberries there, which go on ripening under the snow. A tuft of rabbit skin protects the nose from freezing. The miners have to make their own laws, which are very strict. Any one caught stealing is hanged first and tried afterward, and there are no appeal courts. It is hard to get the Indians to do anything; "they are the most maddening and independent creatures I ever met with, also most extortionate." Rampart City is a boom town, with values much inflated. Claims are going up in value constantly. Three have been sold for $5000 each and several half interests for from $2000 to $3000.

Juneau *Record:* Those who intended to reach the diggings on the Klondike by the St. Michael and up-river route made a great mistake, and those who intend to sail from below early next spring by the same route will make the same mistake. The only practicable spring route to Dawson City is via Juneau and over one of the passes to the lakes.

On the Yukon, as on every other river that freezes, it is easy to trace the deep water in winter time by watching the ice. In the places where the water is only 5 or 6 feet deep the river freezes solid, and the ice remains on a level; but in the deeper places the ice will sag down something like a segment of a circle, and when the tide comes in this portion of the frozen river will be covered. In the spring, when the ice breaks up, the cakes in the current will float out to sea, while those in the shallow places will become stranded. Continued observations extending over a number of years has convinced Father Barnum, missionary at St. Michael, that the Yukon is navigable to ocean vessels for a distance of at least 600 miles from the mouth. The Yukon is sixty miles wide at the mouth, and it is quite evident that there is a channel on the south side deep enough to float the largest ship.

Increased Threefold.

The present mining activity is illustrated by a statement by S. J. Hendy, which is typical of the reports by all established manufacturers and dealers in mining machinery in San Francisco. Mr. Hendy says that the business in this line now being done is three times as great as a year ago. Seven-eighths of the number of orders are for development machinery, which is highly significant of what is going on all over the State in the way of opening up mines. Small stamp mills, hoists, boilers, engines, water wheels, etc., innumerable are being shipped from the city constantly. The demand for material for hydraulic plants shows a very great increase.—Colfax, Cal., Sentinel.

Amendment of Federal Mining Law.

TO THE EDITOR:—In your issue of 30th ult. Mr. Keyes makes some strictures on my notes on Federal mining law amendment in an earlier number. Disclaiming any desire to prolong a controversy, I would yet ask a little space for explanation.

It is very possible that, as he says, I am misinformed as to the occurrence of the Lake copper deposits, but as this information was gained in my daily tramps through the workings for a number of months, I have only myself to blame for any errors. 'Tis true I never tested experimentally the relative applicability of the square claim, or the law of the apex, to these bodies (Mr. Keyes should know they are not locally called "lodes") by his method of subterranean artillery practice, nor do I yet quite understand what his cannon-ball story is expected to prove. The point I was trying to make clear was that on large bodies of mineral-bearing rock, extending over large areas and lying at but slight angle with the horizon, the square claim or acreage basis was less objectionable than when applied to what we term lodes, with a much steeper dip.

In those bodies the owner lower down on the dip is at but a relatively slight disadvantage.

Mr. Keyes proves (?) his assertion that "the ability to purchase large tracts does not tend to concentrate property" by citing the Quincy Company at the Lake, which owns 10,000 acres, and that, too, of land so poor that, to quote his authority, "they would gladly sell the land for less than the taxes levied on it." The choice of the illustration seems to have been an unfortunate one and it would be interesting to learn just what is Mr. Keyes' idea of "concentration," and to speculate on about how much land the managers of Quincy would have accumulated had it been worth the taxes.

With the rest of his letter I have no quarrel. He merely cites several dissenting opinions and it is no news to any of us that we are not all agreed upon this point. He quotes a delegate to the San Francisco convention as saying that there are "vast numbers of locations in his district which have been held for more than twenty years with not a stroke of work done on them since the original location," and a delegate to the Denver meeting as saying "whole districts have been held for years in my neighborhood without any work." Then these delegates folded their hands and said "some means ought to be found to make these men work or let go." Did it ever occur to him or to them that the annual representation law they are seeking to repeal not only provides those "means" for which they sigh, but that under its provisions the "let go" occurred some eighteen years ago—only these delegates have not found out about it yet. It is probably too much to expect that people who let "whole neighborhoods" and "vast numbers of locations" lie unrepresented for a generation will, in a short space of two decades, catch on to the fact that the ground has become jumpable.

Speculation as to the value of those districts would be unkind. If it was not a case of mighty poor quartz, then either they are a sleepy people up there or their delegates were, in the vernacular, talking through their hat. There is no excuse for demanding new laws so long as they fail to use the means already provided to their hands by the existing statutes. Our laws are not so very bad when they are lived up to, and we should at least exhaust the remedies they provide before we venture to condemn them as inefficient. The blame for the abuses of non-representation and perjured proofs of labor lies not in the law that penalizes such things, but in the sentiment of the community which knowingly tolerates them. R.

November 8th, '97.

Recently Declared Mining Dividends.

Morning Star, Placer Co, Cal., $6 per share; payable Nov. 1.

Le Roi, B. C., M. Co., $50,000; payable Nov. 10—a total to date of $675,000.

Hall Mines, B. C., 7 cents on preferred stock; payable Nov. 15.

Portland G. M. Co., Colorado, 1 cent per share, $30,000; payable Nov. 15.

Anchoria-Leland M. & M. Co., Colorado, 1 cent per share, $6000; payable Nov. 15.

Broken Hill Proprietary Block 10 Co, Limited, Australia, No. 55, 75 cents per share; payable Nov. 17.

Silver King, Utah, $37,500—a total of $1,275,000; payable Nov. 10.

Swansea, Utah, 5 cents per share, $5000; payable Nov. 11.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING NOVEMBER 2, 1897.

593,040.—CLOD PULVERIZER—Adel & Leib, San Jose, Cal.
593,159.—GATE LOCK—C. B. Johnson, Los Angeles, Cal.
592,786.—AWNING SUPPORT—W. Johnson, Mott, Cal.
593,183.—CAR COUPLING—J. J. Malloy, Portland, Or.
572,873.—SASH FASTENER—E. E. Masters, Sacramento, Cal.
592,994.—REIN HOLDER—W. C Nelson, Santa Rosa, Cal.
593,028.—FILE OR RASP—O. Olson, Redding, Cal.
592,882.—FIRE LIGHTER—W. S. Overlin, Portland, Or.
593,036.—PHOTOGRAPHIC MOUNT—P. J. Stuparich, S. F.
592,945.—CAN OPENER—J. E. Youngblood, Union City, Wash.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

PHOTOGRAPHIC MOUNT.—Paul J. Stuparich, San Francisco, Cal. No. 593,036. Dated Nov. 2, 1896. This invention relates to photographic card mounts, art panels, and analogous articles, and a process for producing the same. In this art it is common to make photographic card mounts and similar art panels, with a tinted surface, and afterwards applying to such tinted surface letters or words giving the name and address of the user of the card in a different color. This has usually been done in two operations, first, consisting of tinting the card, and the other, in applying upon the tinted surface the tinted letters or other matter in French chalk or any substance which can be used for the purpose. In this invention the desired tint is applied to certain parts of a white-surfaced card and simultaneously the other portions of the card are raised directly above the surface without applying the tint, the whole being done in a single operation.

CLOD PULVERIZER.—W. T. Adel, San Jose, Cal. No. 593,040. Dated Nov. 2, 1897. This invention relates to a machine which is especially designed for the crushing and pulverizing of clods of earth. It consists essentially in the novel construction of a roller or rollers mounted upon a shaft, with a means for propelling the apparatus over the ground. The object of the device is to pulverize the hardened clods which are formed by drying after wet soil has been plowed. These clods accumulate in large quantities on adobe or clayey soil, and it is difficult to break them sufficiently to make the land valuable for use. The rollers consist of heads forming each end, one or more being mounted to turn in line with each other upon a single shaft. The heads or disks have continuous annular channels made near the peripheries and bars are fitted into the channels with ribs which abut against the disks and bolts extending from one head to the other are provided with nuts whereby the heads may be drawn together to lock the bars in place and form the roller surface. A suitable weight-carrying box and driver's seat are supported directly from the axle so that any desired pressure or weight can be brought upon the apparatus. The steel T-shaped bars form a very satisfactory crushing device and very easily removed and replaced by loosening the nuts upon the binding bolts.

British Columbia.

E. S. TOPPING, TRAIL, B. C.,

Has prospects for sale in Trail Creek and the whole of the Columbia basin. Will buy legitimate stock and mines for investors. Will examine mines. Has lots for sale in Trail and Deer Park.

HEALD'S

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Coast Industrial Notes.

—The Tahoe, Cal., Lumber and Flume Company got out 8,000,000 feet of lumber and 15,000 cords of wood this season.

—The Alcatraz Asphalt Company is putting $2,000,000 in improvements and development work in Santa Barbara county, Cal.

—Salmon are becoming scarce in Alaskan waters, and unless hatcheries are immediately established the species may soon be extinct.

—The Butte County, Cal., Electric Light & Power Company has elected directors: R. A. Friedrich, S. J. Hendy, O. T. Weber, J. Simonson, R. White.

—The Safford Milling Company has an estimate of the grain raised in the Gila valley, Arizona, this year, 5,300,000 pounds of wheat and 2,600,000 pounds of barley. Wheat is now selling at $1.25 per cental and barley at $1.

—The Bisbee, Arizona, *Lyre* reports that W. C. Land shipped 1300 head of cattle to Bakersfield, Cal., last week, drove over the trail 1000 head to the Animas valley in New Mexico, and will start 800 head more to that valley.

—Last Tuesday 31,141 barrels of flour, 1000 tons railroad rails, 400 kegs spikes and 75 kegs bolts were shipped to China and Japan from Portland, Or. The cargo was valued at $150,000. The railroad materials are for Chemulco, Corea.

—The San Francisco *Call* claims to have information that the equipment and operation of the Market Street Railway Company's system with compressed air power is now only a question of time, and that the new system will entirely supplant the use of electricity and cable on Market street.

—The improvement of Humboldt bar, at Eureka, Cal., has cost the Government $1,199,115 since the present contractor began active operations in the summer of 1893. The amount of rock dumped since then is 715,396 long tons. There is now from 22 to 28 feet of water on the bar, where the depth before the improvement commenced was from 9 to 14 feet.

—The Northern Pacific increase for three months over the same months last year is $950,000. The gross earnings from July 1 to October 1 are $6,179,760, and the operating expenses $3,233,448, leaving the net earnings $2,946,292. The gross earnings in September were $2,510,839, and the operating expenses $1,094,855, leaving the net earnings for the month $1,415,983.

—More than 200 wells resumed pumping operations in Los Angeles, Cal., on the morning of the 1st inst., after having remained closed down for two weeks. During this time the Los Angeles field has been emptied of 40,000 barrels of surplus oil, and the managers of the Oil Producers' Trustees express the opinion that another shutdown will not be necessary to maintain a dollar-a-barrel market.

—The first engine using crude oil as fuel arrived in Yuma, Arizona, last week. The engine consumed 238 gallons of oil in making the trip from Indio there, which cost a little more than half as much as coal required for the same service. The tank for storing oil here is now complete, and as soon as the necessary change in machinery can be made all engines running between Yuma and Los Angeles will burn oil instead of coal.

—The Yukon Company of Seattle, Wash., has a contract with the Roach Shipbuilding Company at Chester, Pa., for two 5000-ton steamships to ply between Seattle and St. Michaels, to connect with Yukon river steamers. The two ships are to be each 418 feet long, 48 feet beam and 27 feet deep, with a carrying capacity of 4200 tons and 1000 passengers. The ships are designed to make a speed of sixteen knots an hour. They will cost $1,000,000.

—The Mexican *Herald* reports that H. J. Langdon, who has just arrived in Mexico City from a trip to the Isthmus of Tehuantepec, is the representative of a company that has been formed in San Francisco to buy and work a coffee, sugar and rubber ranch in the tierra caliente. Owing to the situation of the country, between the Atlantic and the Pacific oceans, there is no really dry season, for even in the dryest season a little rain often falls.

—Japan is importing cheap labor from Korea, to work in her coal mines. Five years ago the wages of carpenters were 33 cents a day. Now they advertise that their wages have risen to 80 cents a day. The cost of living has nearly doubled in five years, and the cost of labor has risen in proportion. Rice, in 1890, was $4.90 a koku; to-day it is $8 90 to $9 10. The bogie of Japanese cheap labor, which many writers are so fond of calling up from the vasty depths of the unknown East, is as illusory as any other phantom.

—Eureka, Cal., has a proposition from T. S. Bullock and his associates, who built the Sierra railroad into the mines from Oakdale, to build a railroad about 150 miles long from Eureka to Grants Pass, in Josephine county, Or. Eighty miles of the road would pass redwood. Bullock and his associates ask for rights of way and terminal grounds, purchasers for $375,000 of their first mortgage bonds, limited to $20,000 per mile, and payable in installments of $75,000 on completion of each ten miles of the road until the amount is paid.

—A proposition has been submitted by the Oxnards to the people of Ventura county, Cal., to erect a beet-sugar factory to cost $2,000,000, in that county, with a capacity of 2000 tons of beets per day, to be ready for operation by July 1, 1898, on condition that they shall be given 100 acres of land for a factory site, and right of way from the Southern Pacific railway for a spur to the factory, and that the growers will pledge 20,000 acres of land to beets for five years. For the beets grown the Oxnards agree to pay $3.25 per ton for beets of 12 per cent sugar, and 25 cents per ton for each per cent of saccharine matter above that, and at the end of five years they reserve the option of contracting for the 20,000 another two years at $3.60 a ton for 12 per cent beets, with 24 cents per ton for each per cent over that. The Oxnards propose to spend $1,000,000 upon the factory the first year, and will get the plant in shape to handle 1000 tons of next season's beets per day, doubling the plant and its capacity the succeeding year.

—It is expected that by Aug. 1st, '98, a telegraph line will be in working order to Dawson City. The Canadian Government is to build the line at an expense of $400,000. It will start from Ashcroft, a point on the Canadian Pacific railroad 200 miles east of Vancouver, and go via Quesnelle to Dawson. The length of the line will be about 1400 miles, and it will be operated as part of the service of the Canadian Pacific Telegraph Company. It is at Ashcroft that the company's line will connect with the proposed telegraphic service to the Klondike country. Later on branch lines will be run to Juneau and Sitka.

—Under date of Nov. 6th our Vancouver, B. C., correspondent writes: "The Hon. Clifford Sefton, M. P., Minister of the Interior, just returned from the Yukon country, has been lecturing before public bodies in the Province. He warns coast cities that unless goods are properly packed and there are plenty to supply the demand, irreparable harm will be done the Province. Mr. Sefton's remarks have spurred wholesalers to action. All the goods that can possibly be stored are being ordered. An agent of Cook, the excursion manager, has arranged for 4000 beds in Vancouver and 4000 in Victoria to date."

Personal.

MR. DOERR is at Everett, Wash., to install an arsenic plant at the smelter.

W. A. CLARK of Montana is examining copper properties near Hermosillo, Mexico.

D. B. HUNTLEY has returned to De Lamar, Idaho, from a trip through Utah and Montana.

BEN STANLEY REVETT is in San Francisco en route to Colorado to examine mining property.

HERBERT LANG is about to build a smelter at Minneola, twenty miles east of Barstow, Cal.

W. C. RALSTON is in Boston arranging for operating the Melones mine in Calaveras county, Cal.

C. E. UREN of Grass Valley, Cal., has accepted the superintendency of the Allison Ranch mine.

THOS. COUCH, formerly of Butte and Mariposa, Cal., is now interested in dredging operations near Oroville, Cal.

W. T. MENDENHALL, consulting engineer of the California Gold Mines Association, is examining mines at Maybert, Nevada Co., Cal.

C. H. HAND of Butte, Mont., will superintend the operations of the dredge of the Western Mine Enterprise Company at Oroville, Cal.

V. G. BOGUE, formerly chief engineer of the U. P. R. Co., is in San Francisco, securing data regarding proposed electric power for the mines of Tintic, Utah.

D. A. BENDER, for many years with the V. & T. road, Nevada, is now the general manager of the S. F. & San Joaquin Coal Company, operating the Corral Hollow mines and the Alameda & San Joaquin Railroad.

C. M. ROLKER of London, who has bsen studying the Mercur, Utah, gold deposits, is in San Francisco and contemplates returning to England next week.

"JACK" MCQUESTEN, "the father of the Yukon," who came down from there recently, has sold in this city a claim on Minook creek for $50,000, and one on El Dorado creek for $150,000, and left for New York City this week to organize a mining company to work in Alaska next season.

EDWARD BOYCE, president Western Federation of Miners, has arrived here and says he will spend the winter in California, organizing. He thinks the western labor organizations should quit sending money to Eastern labor unions, which, he says, never help the Western organizations.

J. E. DOOLITTLE of Placer county; W. S. Keyes, T. B. Bishop, A. Morrison of San Francisco; J. F. Parks of Amador county have been appointed trustees of the State Mining Bureau. The trustees met on the 9th inst. and organized, electing Col. W. S. Keyes president and Mr. Thos. B. Bishop vice-president.

H. S. SHERARD, formerly superintendent Grand Victory mine, El Dorado Co., Cal., has returned from Dawson City via St. Michaels. He is credited with possession of $192,000. He located claim 7 on El Dorado creek. A few weeks ago, he states, he sold it to Henry Bratnober, representing the London Exploration Company, for $175,000, of which amount $71,000 was paid down and the remainder is payable in six months. He brought down considerable gold dust, and at the Selby Smelting Works got $17,000 for it, the gold going $14 to the ounce. He also says: "Bratnober came to Dawson this past summer and bought eleven other claims besides mine on El Dorado creek. I was told the aggregate amount he paid for these claims was $2,200,000. He paid either $275,000 or $250,000 for one claim. He could not get claim 4 on El Dorado creek and offered $500,000 apiece for claims 1, 2 and 3 on the same creek. Their owners declined to sell for less than $1,000,000 each. The first four claims on El Dorado creek are phenomenally rich and their gold will run fully $16 to the ounce. Bratnober's twelve claims lie between claims 4 and 17." The authenticity of all these statements is in dispute and may be successfully contradicted.

HENRY S. PRITCHETT, the new superintendent of the Coast and Geodetic Survey, was five years in the Naval Observatory and for fifteen years has been connected with the Washington University. He is only forty years old and is the youngest man ever appointed to the head of the survey. He has been connected with the work of the Coast Survey and spent a year in Japan and China conducting experiments for determining the figure of the earth. Prof. Pritchett has received a number of scientific degrees from American institutions and holds the degree of doctor of philosophy from the University of Munich.

Commercial Paragraphs.

THE pipe-threading machine illustrated and described on page 460 is made and supplied by the Columbus Machine Works, 223 W. Broad St., Columbus, Ohio.

THE Edward P. Allis Co., Milwaukee, Wis., D. B. Hanson manager, 9 Fremont St., San Francisco, have an order from the Anaconda Copper Mining Company of Anaconda, Mont., for four 100x12 feet two-hearth Holthoff-Wethey calcining furnaces.

Recent California Mining Incorporations.

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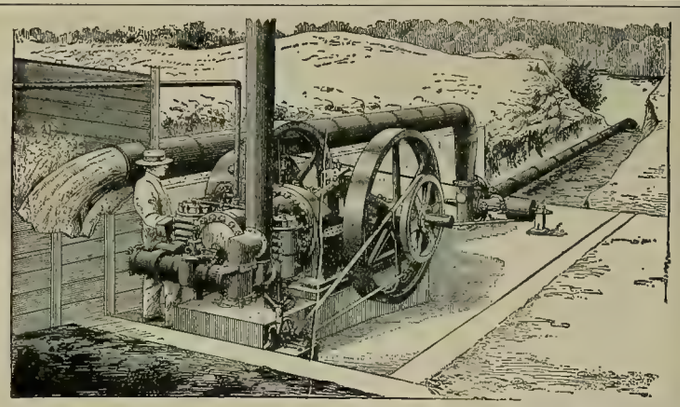

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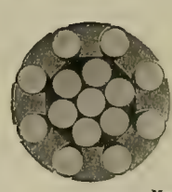

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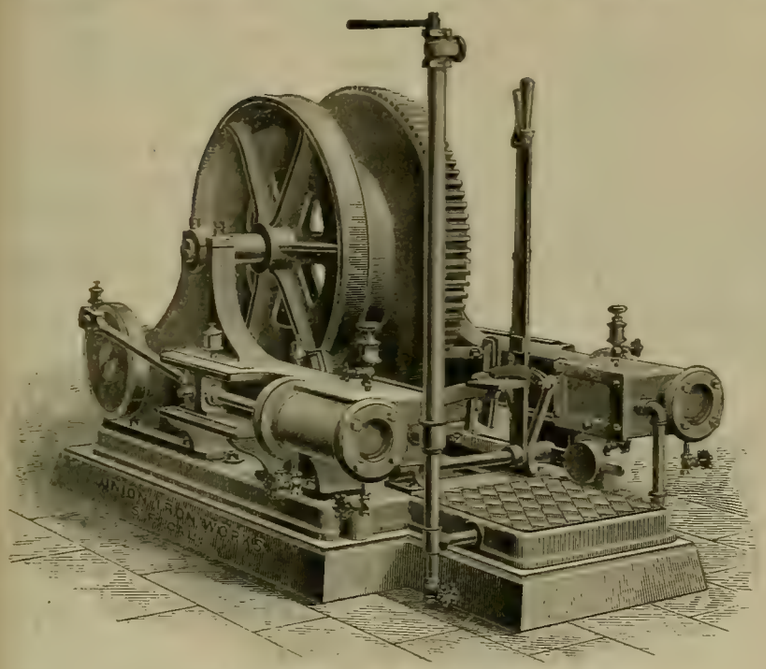

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The size herewith illustrated is the 4 in. x 10 in., rated at 15 horse power. The larger sizes, 8 in. x 12 in. and upwards are provided with post brakes.

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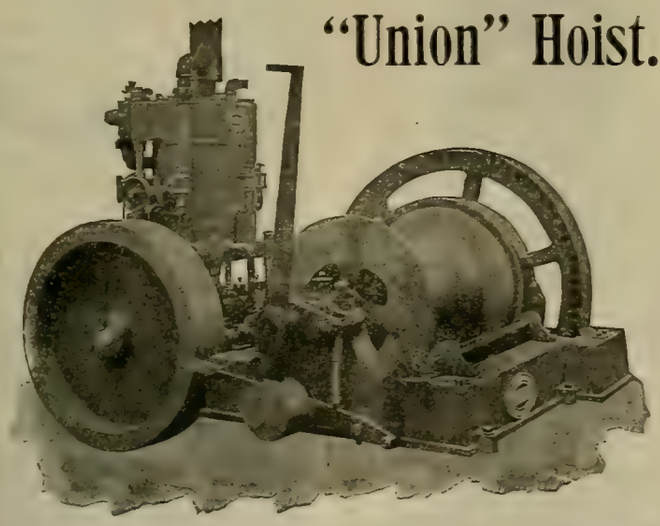

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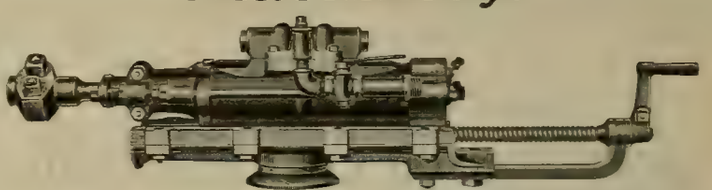

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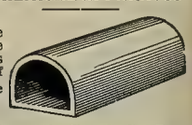

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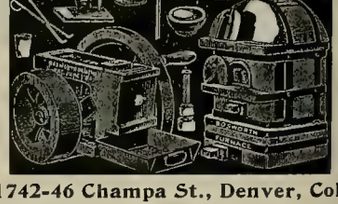

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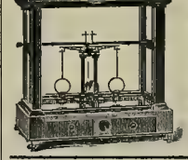

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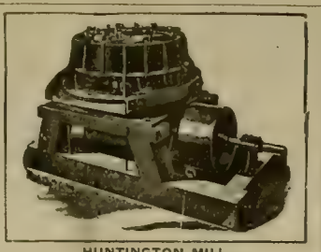

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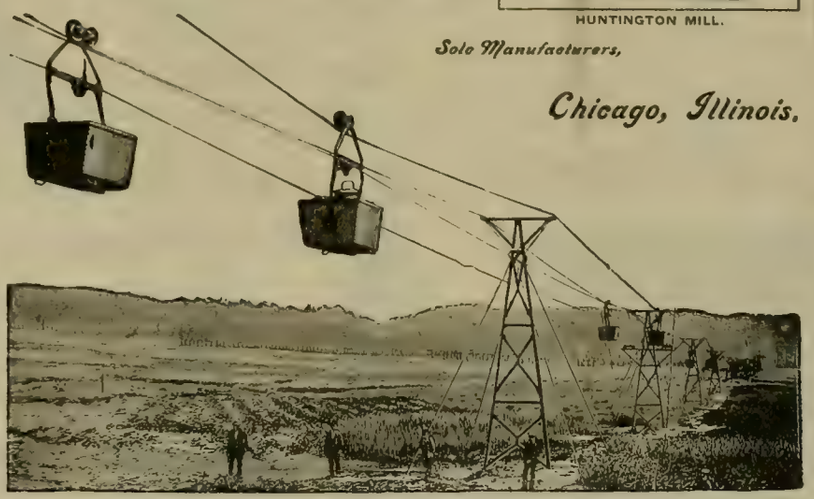

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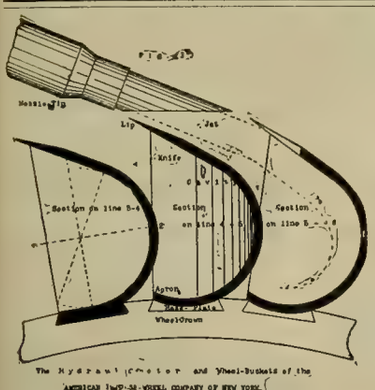

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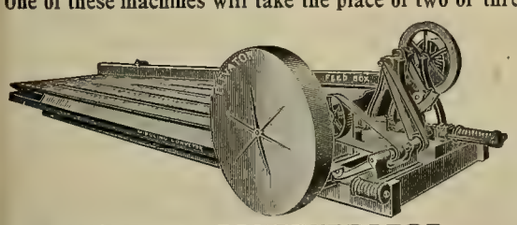

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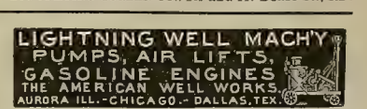

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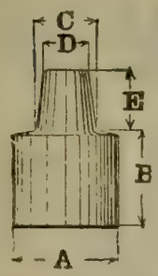

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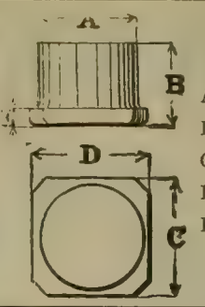

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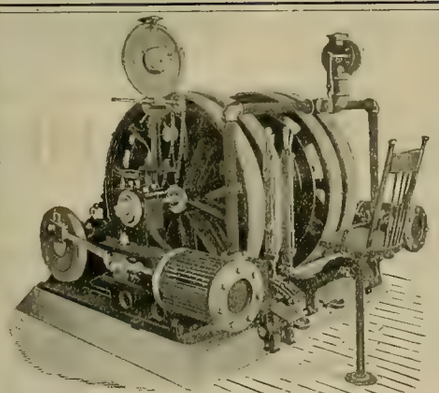

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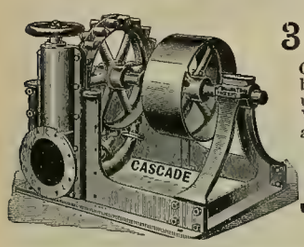

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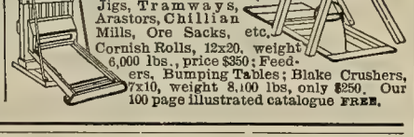

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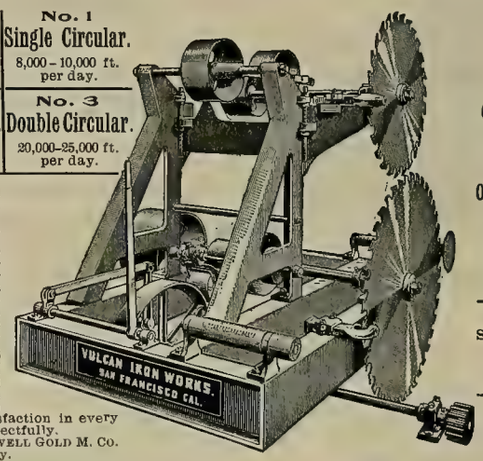

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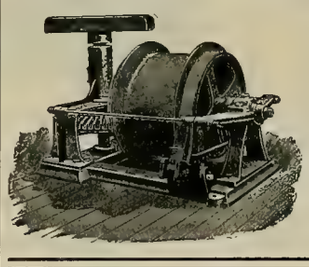

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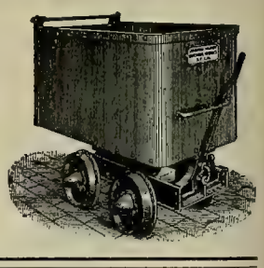

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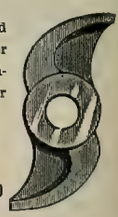
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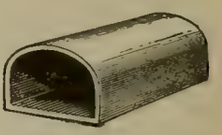

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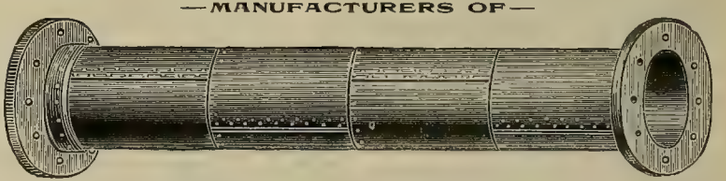

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Market Reports.

The Markets.

SAN FRANCISCO, Nov. 11, 1897.

While business is reported quiet yet it shows a large increase over the like time in 1896 and on a much healthier basis. Then the retail distributive trade were largely in debt, but since then the weak firms have been weeded out and those continuing have either paid up in full or else are in easy circumstances. Traveling salesmen say that interior merchants are not carrying free stocks, which will necessitate buying to a greater extent this winter than heretofore. A tour among foundrymen and iron works in general reveals the fact that there is a confident feeling business with them in 1898 will be the largest and most prosperous year ever enjoyed by them.

The local money continues to work on easy lines with idle money in banks steadily increasing. The demand is very light with no improvement looked for this side of next spring. High prices for farm products and farmers large sellers have put merchants in easy position. So far as we can learn they are not in want of accommodations as the big majority have idle funds in bank. Exchange on New York is easy at a slight decline. The Eastern money markets are easy.

New York Silver Prices.

NEW YORK, Nov. 11.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	26¾	56¾
Saturday	26½	57¼
Monday	26¾	57½
Tuesday	26¾	57⅞
Wednesday	26¾	57⅝
Thursday	26⅝	57⅝

	Copper.	Lead.	Iron.	Tin.
Fri.	10 80 @11 00	3 92½	10 00@12 25	13 65
Sat.	10 80 @11 10	3 90	10 00@12 25	13 65
Mon.	10 80 @11 00	3 85	10 00@12 25	13 67½
Tue.	10 80 @11 00	3 83¾	10 00@12 25	13 70
Wed.	10 80 @11 00	3 82½	10 00@12 25	13 70
Thur.	10 80 @11 00	3 82½	10 00@12 25	13 70

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	12½c Prem
New York Telegraphic Transfer	15c Prem
London Bankers' 60 days	$4.83¾
London Merchants	$4.82½
London Sight Bankers	$4.86½
Refined Silver, per oz., 1000 fine	.57
Mexican Dollars nominal	.46

The steamer Peru for China took out treasure valued at $943,529, of which $802,929 were in Mexican dollars, $132,000 in silver bullion and $8600 in gold coin.

SILVER. — The market strengthened slightly, only to shade off towards the close. The ups and downs in prices show that silver is very sensitive to the least demand, which ought to indicate that it is in stock. Late advices from Russia state that it is in contemplation to retire paper money and coin silver to take its place. This is a good move, for that country can make by it owing to the low price of the white metal.

MEXICAN DOLLARS.—The shipments to the Orient are very large, but they do not have much effect on prices, as the supply appears to equal the demand.

COPPER.—The market has held steady throughout the week. The East reports a light call, with no improvement looked for this year. The export demand has also fallen off. This is due somewhat to the holiday season being near at hand, although India is said to be still drawing. The continent is taking fair quantities.

Our market is quoted as follows:

Ingot casting, jobbing	13 @—
Ingot " wholesale	12½@—
Sheet copper	—@16¼
Bolts, ¾ and 5-16, 20c; ¾ and larger,	16½

QUICKSILVER.—The market is steady. Exports the past week aggregate 100 flasks to Mexico.

Our market is quoted at $39 for domestic consumption and $35@36 for export to the west coast of Mexico.

LEAD.—The market is quiet and in buyers' favor both here and at the East.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	4 75	@	5 00
Sheet	6 30	@	6 80
Pipe	5 60	@	6 10

TIN. — The market is quiet, with some shading reported.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

SHOT.—The market is easy, with some shading reported.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 40
Drop, B and larger sizes, " "	1 65
Buck, Balls and Chilled, do, " "	1 65

POWDER.—There is a good demand, with the companies behind in deliveries, notwithstanding working overtime.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9 to 11c, according to strength and quantity.

IRON.—There is a steady tone to the market. The East reports a good demand at fairly steady prices.

NAILS. —The market is steady at full prices.

We quote the following basis: 20d to 60d inclusive, wire $2.45, cut $2.35.

COAL.—The market is practically unchanged. The efforts that are being made to break the combine have not, as yet, had any visible effect. Receipts of coal for the week were as follows in tons: Departure Bay, 5,050; Puget Sound, 18,711; Comox, 7,150; Coos Bay, 600; Newcastle, N. S. W., 5,465; Nanaimo, 10,708; North Shields, 1,102; Baltimore, 3,002. Total, 51,787.

COKE.—The market is steady, with a fair demand reported.

The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	— —	@	— —
" spot, in bulk	11 00	@	— —
" in sacks	12 00	@	— —
Cumberland	10 00	@	— —

PLATINUM.—The market is steady.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

ZINC.—The market is firm.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

ANTIMONY.—The market is firm.

Our market is quoted at 8½c in a jobbing way. New York mail advices quote 8c for Cookson's, 7½c for Hallett's and 7c for Japanese.

BORAX.—The market is active, with free shipments being made to the East.

The market is quoted as follows:

Refined, in carload lots, in barrels	5½
Refined, in carload lots in sacks	5¼
Powdered, in car lots	5½
Concentrated, "	5

Chemicals.

Business is practically unchanged. The demand is slow from first hands, although it is said that stocks in second hands are running down. The New York market is reported by latest mail dates as follows: Nitrate soda was more freely offered, to arrive, at 1.60c, and rumor had it that business was effected at 1.57½c, if indeed not at a shade less. On other chemicals sellers quite generally repeated the prices that have been in force for several days, and nothing more than ordinary business was effected in any line.

SULPHURIC ACID.—The demand is fair.

We quote in a jobbing way at 1½c per lb for 66%.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported steadier from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is steady.

We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is steady.

Our market is quoted in a jobbing way at $1.40 a pound.

BONEASH.—The demand is only fair.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is easier.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is steady at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is steady at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—The market is quiet at 2½c a pound from stores.

NITRATE OF SODA.—The market is reported steady for spot but weak for shipment.

Our market is quoted from store at 4c for 95%.

Mining Share Market.

SAN FRANCISCO, Nov. 11, 1897.

The market sold lower the past week under manipulations by a strong moneyed pool. This has been done largely through points of lower prices put out by the manipulator generally through tools. Of course the chipping brigade in both boards recognize the situation and generally sell the market down. At the declining prices margins are uncovered and considerable cash shares come out—thrown on the market by disgusted and nervous holders. It is a recognized fact that at the decline the manipulator succeeded in buying large lines of shares, particularly those booked for a deal when the general situation becomes more favorable. There is no question that the late skyrocket moves have been for the purpose of attracting the public from shares desired by the inside. Aside from this the very rapid declines in the shares which made the highest move were not down to sell, but to rake in everything in sight at the lower prices to which they were sent. The declines, combined with assessments, have done the work expected, viz., disgusted all outsiders. When prices were advancing the writer warned dealers that they were going up beyond the safety lines and that they would not be maintained. The end has proven the statement correct, but now prices have been forced to lower figures than the general situation in the mines justifies, and it is only a question of a short time before better figures rule for several than are now ruling on the two exchanges, yet if the manipulator sees his way clear he will get the market to slightly lower figures before starting in on the up grade. It is reported that when John W. Mackay was on the Comstock he suggested some work in the mines which report says the Mackay-Flood combination control. This probably explains why the shares in these mines have not done anything except go down under assessments. Occidental sold down the past week, selling at $1.05 yesterday, when it moved up to $1.70 in the afternoon. It is stated that there is a line of shorts on these shares, and it is only natural, when this occurs, an ore development is reported. This takes place in every mine whose shares are dealt in on the exchanges.

From the Comstock mines, the news continues unimportant, but this can be, and some day will be, changed so as to excite the cupidity of outsiders. There is no denying that the work in several mines which the public think is of consequence is developing them for future operations. Several levels continue to be blocked out which, in the due course of time, will show the wisdom of it, but it is not at all likely that when that time comes the assessment-ridden public will hold very few shares. In Utah the work is still westward, with nothing new reported. In Sierra Nevada west cross drift No. 4 got into very favorable formation, with the material encountered indicating that they were nearing an important point, when the work was stopped, as it was in the other cross drifts, and work resumed in the north lateral drift. When the latter is extended a sufficient distance, another cross drift will be started. In Union the work is the same as heretofore reported.

In Mexican the work is confined to the 1000-foot level and does not indicate any desire to strike ore at least for the present. The work in Ophir is still on the 1000-foot and Central Tunnel levels. Nothing new is reported from it either officially or privately. Active work is the order in Con. Virginia on the 1350-foot, 1650-foot and 1750-foot levels. The official letters are far from discouraging, although more time will be required to show results expected. There is nothing new to report from the Best & Belcher and Gould & Curry joint work. In the latter mine they are raising low grade ore. It assays mostly silver. No work in Hale & Norcross. In Cholar they are still repairing the main incline below the 1100-foot station. In Potosi on the tunnel level the official letter reports active work with the grade of ore lower on some of the stopes, while it varies in the south drift. On the 100-foot level prospecting work is being done; it looks quite favorable, particularly if they get some shorts on the shares. Nothing is reported from Bullion and Exchequer. From Alpha nothing important is made public. In the Con. Imperial, Challenge and Confidence joint west crossdrift a large flow of water was struck; not being accustomed to it, the miners quit work until the 9th, when work was resumed again. It looks as if they are nearing the west, or gold-bearing ledge. The late flurry in the Crown Point shares has admitted of the management striking an assessment, which may cause enough selling to admit of their striking rich ore in the mine. The work is practically the same as reported last week, as it is in Belcher, Seg. Belcher and Overman. On the 175-foot level of Andes they ran into 25-foot ore, assaying from $5 to $60 a ton. This, when explored, may develop into something of importance.

From the Brunswick lode our advices are of a more encouraging character from Occidental, particularly on the 750-foot level, which was mentioned in last week's issue. They are preparing for exploiting this and also the 650-foot level. In Potosi they are running south on the Chollar 500-foot level. As stated in this paper, a joint crossdrift has been started on the boundary line by Potosi and Chollar. Unless stopped, it ought to strike ore. They are stoping ore in Chollar on the 300-foot level. On the 600-foot level active exploiting is being done. They milled 107 tons of ore. Active developing work is being done on the 300-foot, 400-foot and 600-foot levels by Con. Virginia, Best & Belcher and Gould & Curry. No change is reported in Savage work.

The following illustrates the changes of the week:

MINES.	Nov. 4.	Nov. 11.
Alpha	.....	09
Alta Consolidated	.....	08
Andes	.....	27
Belcher	46	37
Best & Belcher	49	40
Bodie	.....	.....
Bullion	15	08
Challenge	.....	30
Chollar	66	55
Confidence	1 00	.....
Consolidated California and Virginia	1 20	1 00
Consolidated New York	.....	.....
Crown Point	40	30
Exchequer	.....	.....
Gould & Curry	37	34
Hale & Norcross	1 65	1 50
Justice	27	21
Mexican	48	.....
Ophir	96	83
Overman	15	09
Potosi	71	52
Savage	49	37
Sierra Nevada	78	66
Union	45	37
Utah	11	10
Yellow Jacket	52	38

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delinq't and Sale.	Secretary.
Best & Belcher M Co, Nev	63	25c	Nov 2	Dec 7..Dec 28	M Jaffe, 309 Montgomery
Caledonia S M Co, Nev	47	10c	Oct 6	Nov 10..Dec 2	A S Groth, 414 California
Con Cal & Va M Co, Nev	10	25c	Nov 3	Dec 8..Dec 29	A W Havens, 309 Montgomery
Con Imp M Co, Nev	39	1c	Sept 27	Nov 2..Nov 23	C L McCoy, Mills Building
Crown Point G & S M Co, Nev	72	20c	Nov 10	Dec 15..Jan 5	Jas Newlands, Mills Building
E Best & Belcher S M Co, Nev	6	15c	Oct 30	Dec 3..Dec 18	E W Sichel, 337 Pine
Exchequer M Co, Nev	40	5c	Nov 1	Dec 6..Dec 30	C E Elliott, 309 Montgomery
Gold Ridge Con M & M Co, Cal	5	4c	Aug 3	Sept 18..Nov 16	H Sylvester, 43 Sixth
Gould & Curry S M Co, Nev	82	20c	Nov 2	Dec 7..Dec 29	A K Durbrow, 309 Montgomery
Hale & Norcross S M Co, Nev	11	10c	Mar 20	Dec 28..Jan 18	R R Grayson, 331 Pine
Kentuck Con M Co, Nev	14	5c	Oct 27	Dec 1..Dec 22	A Waterman, 309 Montgomery
Marguerite G M & M Co, Cal	8	10c	Nov 4	Dec 13..Jan 15	F Mettmann, 237 Twelfth
Thorpe M Co, Cal	8	2½c	Sept 28	Nov 20..Dec 13	A F Frey, Phelan Building

San Francisco Stock Board Sales.

SAN FRANCISCO, Nov. 11, 1897.

9:30 A. M. SESSION.

300 Alpha	09	200 Gould & Curry	33
200 Alta	08	550 H. & N	1 50
200 Andes	26	500 Justice	21
700 Belcher	35	200 Occidental	1 55
500 Best & Belcher	40	600 Ophir	82
200 Bullion	08	100 Savage	36
1000 Con Imperial	02	200 Sierra Nevada	65
550 Crown Point	27	200 Utah	10

SECOND SESSION—2:30 P. M.

200 Ophir	83	200 Belcher	37
200 Gould & Curry	34	100 Sierra Nevada	66
400 Best & Belcher	40	1000 Utah	10
24 Con Cal & Va	1 00	400 Overman	09
500 Savage	37	100 Justice	21
100 Chollar	55	100 Union	37
300 Potosi	52	200 Alta	07
300 H. & N	1 50	100 Challenge	30
230 Crown Point	39	100 Andes	27
200 Yellow Jacket	38		

Rainfall and Temperature.

The following data for the week ending 5 A. M., November 10, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

CALIFORNIA STATIONS.	Total Rainfall for the Week	Total Seasonal Rainfall to Date	Total Seasonal Rainfall Last Year to Same Date	Average Seasonal Rainfall to Date	Minimum Temperature for the Week	Maximum Temperature for the Week
Eureka	1.18	5.04	8.25	5.34	40	54
Red Bluff	.06	2.79	2.13	3.07	36	64
Sacramento	.01	2.14	1.06	1.74	34	65
San Francisco	.27	2.07	2.51	2.41	46	60
Fresno	.04	1.24	1.57	1.11	32	68
San Luis Obispo	T	.86	1.68	....	42	72
Los Angeles	T	2.52	1.35	1.36	44	78
San Diego	T	1.07	1.17	.78	50	70
Yuma	00	.81	1.14	1.03	42	76

WILL NEGOTIATE with owners or their duly authorized agents only.

WILL INVESTIGATE only thoroughly bonafide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

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THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from D. D. Allard et als., in the Cambridge Mine near Plymouth, Amador Co., to deposit tailings on a flat; from W. C. Corbett and A. W. Carmichael, in the McMartin Mine near Onion Valley, Plumas Co., to deposit tailings behind the dam of the Good Hope Mining Co in Onion Valley Creek; from Geo. W. Mohler, in the Mohler Mine near Pike City, Sierra Co., to deposit tailings in a ravine below the mine; from Manuel Silva and Joseph Enos, in the Manuel Silva Mining Company's Mine near Cherokee, Butte Co., to deposit tailings in Spring Valley Creek; from J. H. Kneeland, Jr., in the Colfax Gravel and Pierce claims, near Colfax, Placer Co., to deposit tailings in Long Ravine; from L. L. Sherrod et als., in the American Gravel Mining Company's Mine near Centerville, Butte Co., to deposit tailings in ravines below the mine; and from the Kate Hayes Mining Co., in the Manzanita Mine near Sweetland, Nevada Co., to deposit tailings in the impounding basin of the old Manzanita Mine, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on November 29, 1897, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from T. Larimore, in the Conrad & Wheeler mine, near Forbestown, Butte Co., to deposit tailings in a ravine, and from Edward C. Rigney, in the Round Butte mine, near San Andreas, Calaveras Co., to deposit tailings in Batista creek, gives notice that a meeting will be held at room 59, Flood building, San Francisco, Cal., on November 15, 1897, at 1:30 P. M.

Skeleton Mining Report.

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FIFTY CENTS POSTPAID.

Mining and Scientific Press, 330 Market St., S. F.

Assessment Notices.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 2d day of November, 1897, an assessment (No. 82) of 20 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of December, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 29th day of December, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURROW, Secretary.

Office—Room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

BEST & BELCHER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 2d day of November, 1897, an assessment (No. 43) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of December, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 28th day of December, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

M. JAFFE, Secretary.

Office—Room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

CONSOLIDATED CALIFORNIA & VIRGINIA Mining Company.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3d day of November, 1897, an assessment (No. 10) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of December, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 29th day of December, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office—Room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of September, 1897, an assessment (No. 8) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of November, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 29th day of November, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Thorpe Mining Company the day of delinquence in the above assessment notice has been postponed to November 20th, 1897, and the day of sale to MONDAY, December 13th, 1897.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

MARGUERITE GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 4th day of November, 1897, an assessment (No. 8) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 237 Twelfth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 13th day of December, 1897, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on SATURDAY, the 15th day of January, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

F. METTMANN, Secretary.

Office—237 Twelfth street, San Francisco, California.

The secretary will also receive payments from 12 to 3 P. M. at his business office, 225 Sansome street.

SPECIAL MEETING OF STOCKHOLDERS.

Notice is hereby given, that a Special Meeting of the Stockholders of the New El Dorado Gold Mining Company will be held at the office of the Company, No. 310 Pine Street, Rooms 15 and 17, San Francisco, Cal., on MONDAY, November 29th, 1897, at 3 o'clock P. M., for the purpose of considering the sale of the stock now in the treasury, and approving a contract for the development of the Company's property. By order of the Board of Directors. J. W. PEW, Secretary.

Office—No. 310 Pine Street, Rooms 15 and 17, San Francisco, California.

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DELINQUENT SALE NOTICE.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 5) levied on the 3rd day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
John A. Heninger	16	250	10 00
Nils Johnson	120	100	4 00
Nils Johnson	121	100	4 00
Hattie E. Gray	124	100	4 00
Wm. Westhoff	144	250	10 00
A. O. Lindstrom	148	250	10 00
Wm. Westhoff	177	500	20 00
Richard Phelan	188	5	20
Wm. Westhoff	200	100	4 00
Wm. H. Lillie	202	10,500	420 00
Mark Strouse	208	5	20
P. E. Robertson	215	250	10 00
Sarah Spalding	218	100	4 00
Abe MacCreadie	220	500	20 00
Alfred H. Hogg	221	300	12 00
Abe MacCreadie	222	250	10 00
J. W. Brown	231	4,099	163 96
C. D. MacNeill	236	200	8 00
Paul Muller	239	50	2 00
Paul Muller	240	100	4 00
Paul Muller	242	1,000	40 00
Chr. W. Heyer	243	755	30 20
Chr. W. Heyer	246	606	24 24
Abe MacCreadie	247	200	8 00
Wm. Westhoff	250	200	8 00
Mary Ann Robertson	251	250	10 00
Mary Ann Robertson	252	250	10 00
R. H. Daley	268	1,000	40 00
C. M. Howe	272	1,000	40 00
C. M. Howe	274	500	20 00
R. H. Daley	275	1,500	60 00
Francis Brady	277	700	28 00
R. H. Daley	278	100	4 00
Dr. H. Sylvester	280	51,278	1,971 12
(2,000 shares of this cert. have been paid by H. Sylvester, being part of his stock.)			
L. V. Merle	286	10	40
J. T. M. Kelly	289	500	20 00
R. H. Daley	290	100	4 00
R. H. Daley	294	750	30 00
R. H. Daley	295	185	7 40
E. Swenson	296	1,750	70 00
Mark Strouse	297	5,000	200 00
Mark Weil	299	750	30 00
C. W. Heyer	300	400	16 00
Mark Strouse	301	100	4 00
Geo. Day	302	1,000	40 00
Dr. H. Sylvester, Trustee	305	1,105	44 20
Dr. H. Sylvester, Trustee	306	5,000	200 00
R. H. Daley	307	250	10 00
R. H. Daley	308	240	9 60
F. Heard	309	125	5 00
Mark Weil	310	125	5 00

And in accordance with law, and an order from the Board of Directors, made on the 3rd day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Rooms 12 and 13, No. 43 Sixth St., San Francisco, California, on SATURDAY, the 9th day of October, 1897, at the hour of 12 o'clock M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

The day of sale of the above delinquent stock has been postponed by order of the Board of Directors to THURSDAY, October 28th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, the 4th day of November, 1897, at the same hour and place.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to TUESDAY, November 16th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

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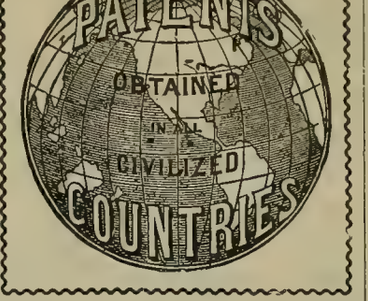
PATENTS



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Office and Works: Cor. Beale and Howard Sts., San Francisco.

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OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO.,
SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

RISDON IRON WORKS, San Francisco—Gentlemen: Our company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60 mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screens 12 tons in 24 hours; through 50-mesh, 15 tons; and through 40 mesh, 18 tons. This proportion has been continuous.

One set of dies will crush from 1500 to 1600 tons.

One set of tires will crush 1500 tons.

One ring plate will crush from 2200 to 2300 tons.

The mills require very little attention. At our mill an ordinary "peon," earning one dollar per day, has complete charge.

In regard to sliming, in comparison with stamps, by reason of the discharge surface and the continuous agitation by the scrapers, a MUCH less amount of slime is created. A three years' experience teaches me that, in every respect, the mills are a complete success, and of material benefit to the mining world. They can be set up and running in forty-eight hours and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator it is unequaled by any mill now in existence. Yours truly,

D. M. BURNS, Superintendent.

BULLION-BECK AND CHAMPION MINING COMPANY,
EUREKA, UTAH, August 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz., capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK, Pres.

SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec't'y.

BULLION-BECK AND CHAMPION MINING COMPANY,
EUREKA, UTAH, Aug. 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly, JOHN BECK, Pres.

SIMON BAMBERGER, Director. W. J. BEATIE, Sec't'y.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY,
S. BAMBERGER, President and Manager,
SALT LAKE CITY, UTAH, October 10, 1895.

B. R. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly,

[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO,
C. C. McIVER, President; D. CUSHMAN, Secretary.
MISSION SAN JOSE, CAL., Oct. 17th, 1895.

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year. CHAS. C. McIVER, President.

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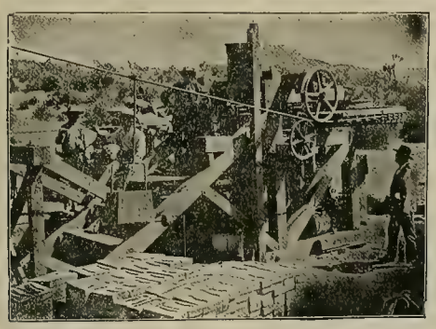

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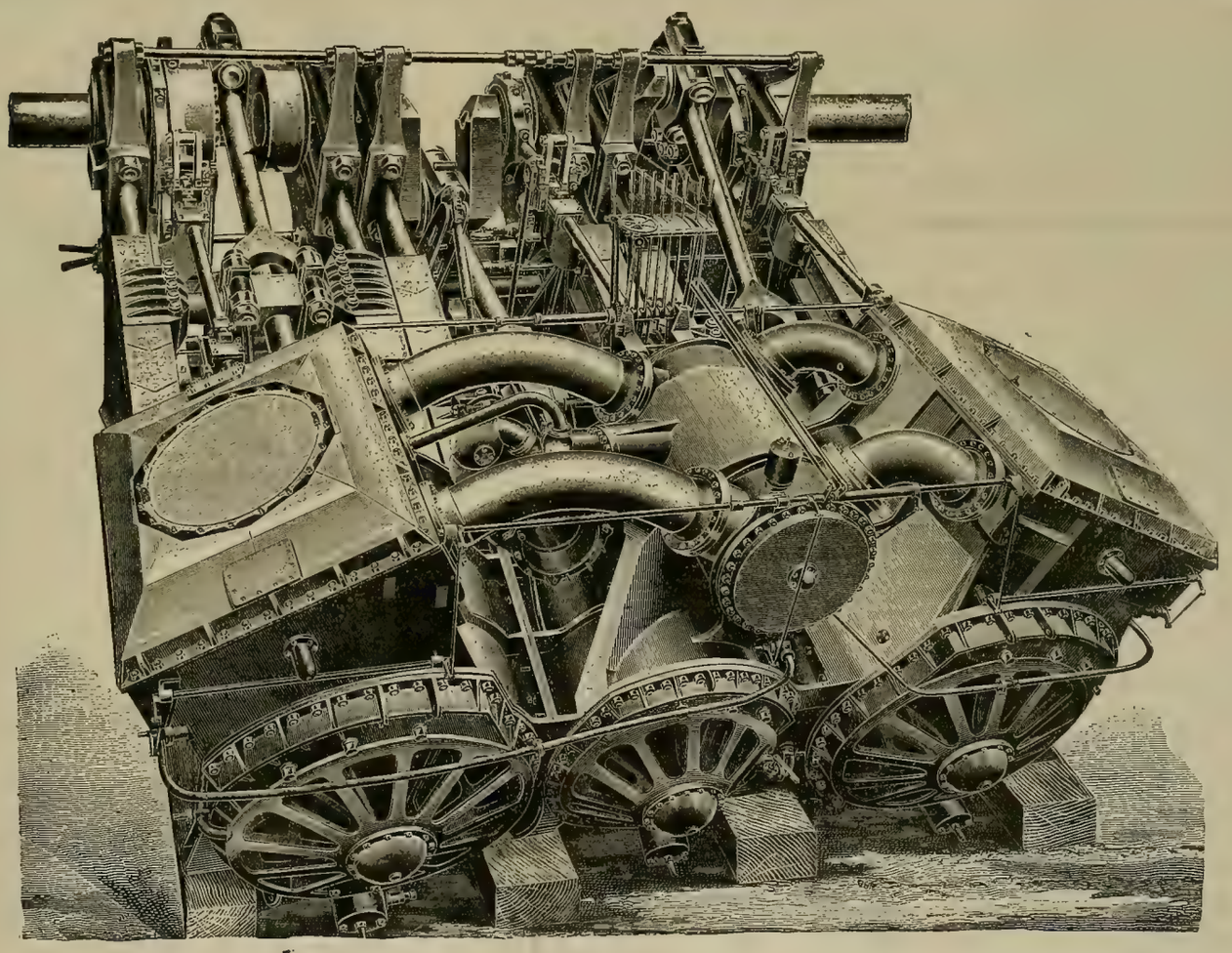
Engines of the Most Powerful Paddle Steamer Ever Built.

The illustration shows a shop photographic view of the largest engine of its type ever built. It is to develop 10,000 H. P., and will drive the excursion paddle steamer, Empress Queen, from Liverpool to the Isle of Man, the steamer being 360 feet over all. The engine is a three-cylinder compound, diagonal type, surface condensing. The high-pressure cylinder, 68 inches in diameter, is placed between two low-pressure cylinders, each of 92 inches diameter, the stroke being 84 inches in length. The high-pressure cylinder has a piston valve, while the other cylinders have flat slide valves, the double eccentric link motion controlling all three. The starting and reversing is done by means of a direct-acting steam and hydraulic engine. The condenser, cylindrical in form, is placed athwartships between the cylinders and the shafting supports. A separate centrifugal circulating pump, worked by an independent steam pump, supplies the condensing water and is arranged to be used as a bilge pump in case of necessity. The peculiar appearance of the high-pressure cylinder cover is due to foreshortening brought about by the position of the camera. The lagging casing was not in place on the cylinder covers when the photograph was taken. Two boilers are installed forward of the engine and two aft, making two compartments. The Fairfield Ship Building and Engineering Co., of Govan, Scotland, are the builders. The Empress Queen is expected to make 25 statute miles an hour.



ENGINES OF THE EMPRESS QUEEN, THE MOST POWERFUL PADDLE STEAMER EVER BUILT.

At the latest session of the Montana State Legislature a law was enacted requiring all mine owners and mine operators to case in the shaft cages used, as a measure of safety to the men. Some of the mining companies in Montana have complied with the law, others have not; and since the adjournment of the Legislature there have been six fatal accidents in the vicinity of Butte, resulting from non-compliance therewith. This fact, coupled with the additional fact that in no mine where the law has been complied with has there been such fatality, emphasizes the need of the law recently passed; and also emphasizes the negligence, to put it mildly, of those whose duty it is to comply therewith. It seems that it is the larger mines in Butte that have acted in ignorance or defiance of the recent statute passed in that State. At a coroner's inquest on the body of one of the poor fellows recently killed, the only defense of the mine managers or owners was that the old miners prefer to ride on the old-fashioned cages—which is no defense at all. The local jury, probably overawed by the influence of the companies, promptly brought in the astonishing verdict that the death of the man was the result of his own carelessness. It would appear as though a test case should be made; and if Montana mine owners cannot be compelled to comply with the law, that statute should be immediately repealed.

Where the stockholders of a mining corporation, being ignorant of the selling value of their stock, authorize the president of the company to find a purchaser and effect a sale of their shares at par, and such president, at and before such time, was in secret correspondence and negotiation for the sale of the stock, with a view to a large profit to himself, and, by affirmative acts and misrepresentations, concealed his transactions from the stockholders, and effected a sale of their stock for a sum largely in excess of par, he cannot retain such excess, but must account to the stockholders for the profits made, notwithstanding he had stated to them that he would retain for his services as agent any sum, realized above that for which he was authorized to sell.

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THE Bullion-Beck, Utah, Silver Mining Company, at a directors' meeting on the 10th inst., decided to allow the mine to remain idle until a better price for silver warranted resumption, which, in brief, is about the present status of nearly every direct silver producing property in the United States.

PROBABLY nothing more strikingly illustrates the great increase in the number of men who have made mining an avocation than the numerous inquiries weekly received at this office regarding points on which the mining world is generally supposed to be well posted, the rudimentary requirements of mining knowledge. The questions are all evidently asked in good faith, and are as faithfully answered.

THE Rossland, B. C., Miners' Union wants an inspector of mines appointed. The last provincial legislative assembly provided for such an officer, but, to date, the Government has not made the appointment. Experience elsewhere with such inspectors is unsatisfactory, the appointment being sometimes considered the political prerogative of some demagogue. The British Columbia miners will do well to unite in a demand for a competent man—some one who has practical knowledge of metal mining and is above the petty tricks of demagogy.

COLORADO now begins to lay claim to ability to mine and mill ore at a low rate. The El Plomo Co., treating free-milling ore in Costilla county, in some experimental runs mined and milled the ore at a total cost of $1.32 per ton. California, South Dakota and Alaska have a record for low figures and economical result in this regard, and there seems no reason why Colorado should not approximate it, though in the case of Alaska there are several elements that tend to make possible cheaper production than almost any other mine on this continent may hope to attain. As is well known, the mine possesses many natural advantages, being practically an open quarry with the cheapest of transportation, as the vein is within 300 yards of tide water (this vein being 400 feet wide) and the handling of the ore is almost automatic. The item of labor is somewhat dearer than elsewhere, but is fully made up in the ease with which the material is handled. Explosives at the mine cost on an average 15 cents per pound. The white men get $2.50 to $3 per day and board; machinists $4 per day and board. Very few natives are employed, those being paid $2 per day, boarding themselves. It is believed that by July 1st, '98, there will be 740 stamps at work on that vein. The Alaska-Treadwell mine has a record of total treatment of ore aggregating about $1 per ton. The Spanish mine in this State has a similar record of 85 cents.

A Mistaken Ruling.

So much has been justly and favorably said in these columns regarding the broad gauge rulings of the new general land commissioner at Washington, D. C., that with regret is noticed a recent ruling by him which, if correctly reported, is neither just nor equitable, and is likely to unfavorably affect a large number of miners.

Some time ago the owners of the Guadaloupe Quicksilver Mining Company in Santa Clara county, Cal., brought suit for judgment against the claimants of a portion of their property, setting up their prior location and the mineral character of the land. They were defeated in their case before the local land commissioner, who held that the land was more suitable for agricultural purposes than for mineral. They then appealed to General Land Commissioner Herrman, who affirmed the rulings of the local officer. In such affirmation Commissioner Herrman takes the astonishing ground that the owners of the Guadaloupe Quicksilver mining property are entitled only to that part of the land where they found cinnabar, and are not entitled to the 1500 by 600 feet which the Federal Statutes allow in each lode location. If any one point can be considered settled it is that the location of claims entitles the owner to 300 feet on each side of the vein and 1500 feet in length. Commissioner Herrman utters the following two sentences :

It has been the practice in ex parte lode claims to accept a discovery as sufficient proof that all the land covered by the location is mineral, in the absence of allegations to the contrary. Where it is alleged, however, that any portion thereof embraced within a claim under the agricultural laws is non-mineral, evidence may be submitted on that issue, and if the allegation is proved, the mineral claim will be rejected to that extent.

This is not law, nor fact, nor common sense. Ever since May 25, 1872, any individual or corporation locating a lode has been given the right to take the surrounding surface to the extent of 1500 feet in length by 600 feet in width. According to Mr. Herrman, if any of this included area can be proved to be agricultural, the miner cannot hold it.

It is hardly necessary to point out that, if Mr. Herrman is correctly reported, he comes in direct conflict with the Federal mining law, and it is of course plain that his ruling will be reversed whenever opportunity occasions it necessary to overrule such unwarranted affirmation.

Misstatements.

A good or bad example of "rot" is the statement in last Sunday's San Francisco *Examiner*, wired from Rawlins, Wyoming, regarding alleged gold discoveries at Grand Encampment. It has long been asserted that such "dispatches" are paid for at so much a line. It is such ridiculous work that tends to discredit mining. Apart from principle, but purely as a matter of business, it is manifestly a mistake to secure anywhere the publication of such stuff. An unsuccessful effort was made to have published in these columns a "letter" regarding the same "discoveries."

No good purpose can be served by such mendacity. No one whose opinion is worth anything is fooled. In these days of big "Yukon Transportation" Companies with ridiculous claims and extravagant suggestions some latitude may be allowed for wild claims, but statements soberly asserted of alleged "discoveries" should at least have some valid foundation. The surprising part of the Wyoming "news" is that one of the gentlemen who figures in the "dispatches" owns or controls a Colorado publication that is particularly severe on mining frauds and fakes, and weekly scores in just and merited criticism sundry attempts to falsify or make statements that can be successfully contradicted.

It is deemed unwise to make proclamation of statements that are untrue as to mining matters. No good can accrue, and some harm usually results. The recent scare heads in the San Francisco dailies, and wired announcements of the investment of English capital to the extent of half a million dollars in the "purchase of the Grand Victory mine, on Squaw creek, in El Dorado county, Cal., seven miles southeast of Placerville, by the Transatlantic Mines Purchasing Syndicate, Limited," is another glaring instance of such misstatements. It simply brings a few parties into temporary notoriety, who get their names in type; but it discredits everything else connected with it.

Regarding the allegations in the dailies of the sale of this mine, it may be said authoritatively that there was not one iota of truth in the published statement. The facts are that a short option was given some months since, with the right to expend a certain sum of money; no sale was made, no purchase was made, and no possession or transfer of any kind was given.

Will Probably Not Be Appealed,

In Trinity county, California, last week, Judge Jones, of the Superior Court, decided a case of some interest to miners generally. The action was brought to quiet title to the Washington quartz mine, in the Bolt's district, Trinity county. Ten years ago, the Daisy quartz mine claim was located in that county, in the usual form of a parallelogram, 600 feet in width by 1500 feet in length. From the date of its location, the mine was worked continuously by the locators, and more than the $100 worth of necessary work was done each year, including the present year. During the work three parallel ledges were uncovered, shafts sunk, upon which tunnels were run cutting two of the ledges (Nos. 1 and 2), and extending almost to ledge No. 3; and considerable work was done in general. Last July the plaintiffs in the case relocated two of the three ledges. The plaintiff did not deny that the defendants had located the claims, worked them, and spent considerable money during all these years; but brought action for possession upon the allegation that the mine was located originally upon placer ground at that time located, and that defendant could only locate and hold 25 feet upon each side of one of the ledges, where notice of location had been posted; that the other two ledges which he had attempted to occupy were 25 feet on each side of the lode line, and were liable to relocation.

The plaintiffs' case hung on the claim that a quartz location upon a placer location could only embrace 1500 by 50 feet. The defendant claimed that a regularly located quartz claim upon placer ground did not come under the provisions of Section 2333 of the Revised Statutes of the United States, which provided that the applicant for patent must pay the Government $5 an acre for a strip 1500 by 50 feet of ground in which there is a known quartz vein or lode, and $2.50 an acre for the remainder of the claim, and cited the fact that they had held possession of the property for ten years. The plaintiff testified to his relocation of the two ledges, and brought on the stand the original locator of the placer claim. The judge ruled out the latter's testimony, sustaining the objection of defendants, who cited the case of Noyes vs. Mantel (127 United States Reports, page 348), in which Justice Field of the Supreme Court held that a regularly located quartz claim is exempt from provision 2333, and takes precedence over the placer claim.

The case was left to the decision of the judge, who promptly gave judgment in favor of the defendants.

IT might be well for those people disposed to criticize speculation in mining stocks to bear in mind that it is a business which is liable to degenerate into gambling, but that it may be pursued as legitimately as anything else. Very frequently one hears the cry that mining stocks should be let alone. It comes from people who do not think, just as much of the speculation is the result of irrational action. In short, there may be in respect of such speculation an irrational inaction as well as an irrational action. Probably no one would say that the speculations of Barnato, the South African king of speculators, was irrational. He succeeded, but it may be taken for granted that there were men who would have told him he was doing a very irrational thing when he embarked upon the career of investment. They would not say so at the height of his success, however, because success then showed that he was right, from a speculative standpoint. If a man buys stock without knowing where the property represented by it is situated he, as a general proposition, does an irrational thing regardless of whether he

succeeds or not. But the man who buys after a careful examination of the whole situation and the relation of the property to mineral discoveries as a general rule does a rational thing, whether he succeeds or not. The chances are that in such a case he will succeed. In the other case if he succeeds he can claim no credit for himself on the score of business judgment. The conclusion of the whole matter is that mining is a business to be pursued according to business methods, and by such methods only.

English Purchases of California Mines.

This paper is in frequent receipt of London letters on California mining methods, being, usually, caustic criticism of local mining ways. In the issue of the 2nd ult. was published a communication which appeared desirous on the part of the writer to argue the case, or at least admit that there might be two sides to the matter. During the week the following was received from the same source:

* * * * * *

I would like in an impartial way, I trust, to offer another example of what I believe was injudicious policy on the part of Californian mine owners. In this case, and in order to distinguish it from the instances presented in my previous letter, I will designate it as C, and say that it is a large and well-known gravel mine; that I know to have been favorably reported upon on behalf of possible purchasers. About four years ago an enormous cash price was asked by the owners for this property, and at that time there were parties here prepared on certain not unreasonable conditions to raise the necessary amount of working capital, without the expenditure of which—something more than $100,000—the property was not only practically worthless but an expense to its owners, a fact that is now amplified by the following from advices dated as lately as last month: "The ——— people are ready to entertain any reasonable offer. That is all they are disposed to say. The amount of the 'cleanup' for the last three years could serve no useful purpose, even if it could be accurately given. The only work done during that time has been a constant clearing off, etc., * * * and the returns have not quite paid expenses."

Reference to this particular property is only now made with the object of making, if possible, more clear to mine owners the futility of their figuring upon foreign capital for the development of their properties so long as they are pronounced or predisposed to merely entertaining proposals that promise a large initial cash payment and, in addition, provide for an indispensable working capital, or, in other words, upon insisting that the buyer should not only run the risk of the outcome, but also pay for the doubtful privilege of assuming it.

Three years out of the four now gone might easily enough have been utilized to some purpose in this case; and the owners, in place of being out of pocket, as they now are, would, if the mines had turned out well, been in receipt of dividends had they but preferred the principles of every-day business to the off chances of arousing the cupidity of some capitalist to whom they may sell their mine right out for all cash.

Enclosed I send you copy of an option on mining claims, which may be called D for the purpose of reference in the event of your being not unwilling to express an opinion either favorable or unfavorable to the terms of the same or to the terms which have gone forward in the shape of a counter and alternative proposal. I also send copies of reports, and, if you can afford the space, you are at liberty to publish the option and proposals in any manner you please.

Following are the proposals and option referred to:

Copy or Synopsis of the Conditions of Original Option Given in California:—

1st.—The sum of three thousand dollars shall be paid not later than the 1st day of November, 1897.

2nd.—The sum of three thousand dollars shall be paid not later than the 1st day of July, 1898.

3rd.—The sum of sixty-nine thousand dollars shall be paid not latter than the 1st day of May, 1900.

4th.—Paid up non-assessable shares of the company to be formed for the working of this property, to the amount of twenty-five thousand dollars, shall be issued as soon as the company shall have been organized, in such parcels as may be desired.

5th.—Time is the essence of this option.

6th.—The obligations incurred are binding on the heirs and assigns of the parties.

7th.—Said ——— or his assigns shall have the exclusive right to enter upon these tracts of land for mining purposes during the continuance of this option.

Primary Proposal, Oct. 5th, 1897:—

1st.—The sum of fifteen hundred dollars shall be paid not later than the 15th day of December, 1897.

2nd.—Development work shall be begun not later than the 31st day of January, 1898.

3rd.—The sum of forty-five hundred dollars shall be paid not later than the 15th day of September, 1898.

4th.—The sum of fifteen thousand dollars shall be paid not later than the 28th day, 1899.

5th.—Paid up non-assessable shares of the company to be formed for the working of the property, to the amount of fifteen thousand dollars or the equivalent thereof in stg. at $5 ₱ £.

(New option to contain clauses to correspond with the original as to 5, 6 and 7.)

Secondary (or Alternative) Proposal:—

1st.—Development work shall be begun not later than the 15th day of January, 1898.

2nd.—The sum of six thousand dollars shall be paid not later than the 31st day of August, 1898.

3rd.—The sum of twenty thousand dollars shall be paid not later than the 31st day of December, 1899.

4th.—Paid up non-assessable shares of the company to be formed, etc., to the amount of fifteen thousand dollars or the equivalent in stg., etc.

(5, 6 and 7 per original option).

One is the proposition of the owner considering the value of the property as put here in figures. From some local knowledge, we would say that the owners' proposition is a fair one, saying the main value is correct. As regards the second proposition, saying the property is worth what it is, the cash payment is smaller than it ought to be. As regards the other payments: that might be as between owners and purchasers; as far as the other figures go, it is mainly a matter of agreement.

Regarding the third proposition: It is possible that the development work may be made of special value to the property, provided the English parties did not take it. That would be altogether owing to the position and present development. The cash payment, then, saying that they accepted it, is a fair guarantee, connected with the work, that the proposition would be carried out, and if not carried out, not likely to be of detriment to the present owners. The payments after that may be simply a business matter between owners and purchasers.

In further comment it may be in place to publish the following letter. It was written privately in answer to an English inquiry for California mines. The writer of the letter is thoroughly acquainted with the general facts, is a leading Californian, has charge of one of the greatest manufacturing enterprises in the United States, and is recognized in mining, manufacturing and mercantile circles as being "strictly business." As stated, the following was written solely for private use, but it so admirably states one fact concerning this much-discussed question that it is given herewith:

* * * * * *

I do not consider it difficult to get hold of good mines, provided the purchaser has the money to pay for them. There are quite a number of very good properties held by one or two people, or by close corporations, that are paying dividends; the parties are not looking for a purchaser. I feel sure, however, that they could be purchased, but the price would be practically all the mines are worth.

The mine in question is a close corporation, is paying them monthly from $20,000 to $25,000, has a —— stamp mill upon it, and the price of this mine would be somewhere between $1,250,000 and $1,500,000. Whether this mine upon investigation would show the amount of ore in sight that the purchase price would call for I do not know. The developments made on the mine are more than necessary to keep well ahead of the mill, as it is expensive to keep levels open. They expect to build another —— stamps on the property next spring, when the output will be largely increased. The property consists of —— patented surface claims, and is unquestionably one of the large mining properties of California.

It is very difficult to get hold of a good mine under a bond, as people who own good mines are not willing to tie them up and have them hawked all through the American and English markets. The time has come when purchasers must put up money in order to show that they are responsible parties. There are a few old mines still left in California that might be considered good mines—that is, mines that have a record, were shut down years ago when wages were excessively high and it was difficult to handle the water, but no good going mines can be gotten hold of without putting up the cash at once. If you know of anyone willing to pay for mines without asking for long time and accommodations, I think you can be supplied.

FORTY days remain in which to do assessment work on unpatented mining claims for the year ending Dec. 31st, '97. Holders who have not yet done this necessary work and complied with the requisite forms take the chances of having their claims "jumped" or relocated unless the $100 in work or improvement is put upon each unpatented claim. Where the owner or owners of a group of adjoining claims can show that the work done on one of these claims actually improves or develops all of them, that amount is sufficient, but the intent and the fact must be clearly shown. In all cases of annual assessment work it is to be remembered that the proper notice, record and affidavit must be made to avoid possibility of legal trouble later on.

MOST of the prevalent currency plans are based upon a proposal for retirement of the greenbacks, but one, which seems to have some present favor, holds that the silver certificates should be destroyed. This plan is that the Government shall issue 2½ per cent consol bonds, in exchange for which the silver certificates shall be retired, the inducement to the national banks to increase their circulation to the same amount as the certificates are diminished being the privilege of issuing their notes to the face value of all the 2½ consols they may purchase. This plan appears to be devoid of merit. The silver certificates now in circulation amount to $372,000,000; the plan herein briefly outlined would entail an annual loss to the Government of $9,300,000 in interest, and after such costly exchange the national bank notes proposed to be issued in place of the redeemed silver certificates, viewed from any financial standpoint, would be as onerous a burden on the currency's stability as any present condition possibly can be. This is one of the cases where change is not progress.

CYANIDE OF POTASSIUM has now assumed such importance in the mining world that, its production having become a staple article, its price is of considerable importance. It has been the subject of governmental interference and considerable legislation in other countries, the effort being to give it to the miner on as favorable terms as possible. At the meeting of the General Traffic Association, in Hot Springs, Arkansas, next month, there will be an effort made for the first time to adjust the matter of transportation charges in this country, that the burden may be lighter on the consumer. John Dern, Manager of the Mercur mine, Utah, proposes to appear before the classification committee and secure, if possible, the reclassification of cyanide under the tariff. As an instance of the burden to the consumer, it may be mentioned that the rate from New York City to Salt Lake City, Utah, under the present transportation tariff, amounts to $1200 per carload of twelve tons, to the latter city, there being, of course, local charges to other points in that State where it is used. It is probable that the railroads will give sufficient attention to this matter to satisfy the just claims of the consumer.

THE article in last week's issue on the Edison magnetic process for separating the iron from the sand in New Jersey has attracted considerable attention, and doubtless will attract more, by reason of the fact that there are such large deposits of magnetic iron sand on this coast, which, in addition to the valuable magnetic iron, contains considerable gold; and it is now expected that the process which the great electrician has made a success of in New Jersey might be applied to those deposits in California and elsewhere on this coast—the iron to be a by-product of the gold, or the gold a by-product of the iron. There is a large deposit of magnetic iron on the beach near Santa Cruz, Cal., about one mile from tide water, which has been worked at times for the gold it contains. Three years ago a separator was used, with a capacity of 1000 tons per day. It is in the nature of a drift mine, as there are 20 feet of earth above this beach sand. It can be got out, so it is said, for 15 cents per ton, and, it is believed, will average $2.50 per ton in gold. At Crescent City there is a similar deposit, and at many other places on the California coast black sand has been worked for the gold. The chief difficulty so far has been the inability to do anything with magnetic iron ore. At Gold Bluff, Cal., the storms concentrated beach sands at times to a degree that made it profitable to work them; but ordinarily there is hardly decent wages in it. If a market could be found for the iron ore, on this coast, an application of Edison's New Jersey operations should be profitable at various places in California and Oregon.

Forest Reservations in Southern California.

Southern California residents take much interest in the forest reservations already made south of the Tehachapi and are moving vigorously for additional reservations. W. M. Tisdale of Redlands has prepared the following article:

Location and Area.—The reservations are known as San Gabriel, San Bernardino and San Jacinto, and aggregate more than 2,000,000 acres. The smallest is that of San Gabriel, the most westerly. The San Bernardino and San Jacinto reservations, each of 737,280 acres, are about ninety miles from the ocean, on the slopes of the Sierras, which separate the fertile cultivated valleys of southern California from the Mojave and Colorado deserts. The longest slopes are toward these valleys, and are traversed by the numerous mountain streams which supply the whole section with water for irrigation and domestic purposes. From the bases of the mountains on the north and east stretch away broken, undulating and barren desert wastes, watered only by infrequent springs and wells.

The San Bernardino and San Jacinto reservations are almost continuous, being separated by the narrow pass of San Gorgonio. Together they form a large and immense valuable forest reserve, which includes the three highest mountains in southern California, San Bernardino, San Gorgonio (sometimes called Grayback) and San Jacinto. San Gorgonio is the highest of the three, about 11,500 feet, but they are all noble and imposing. On San Bernardino and San Jacinto there is a sparse growth of timber nearly to the summit, but the timber line of San Gorgonio is several thousand feet below the summit, and the gray appearance of its barren crest, covered with masses of broken rock, has given it its popular name. Late in September of the present year I saw on the northern slope of San Gorgonio scattered patches of snow, the remnants of last winter's falling, and a day or two later its summit was whitened by the first light snow of the coming winter season.

The Forests.—The forests of these mountains do not compare in extent and majesty with those of northern California and of Oregon. From the lumberman's point of view they are insignificant, and, at a little distance, the transient tourist who views them only from the south and west sees no forests worth mentioning, and goes away with the impression that the slopes of the mountains are all barren. But when the canyons and the valleys are penetrated that lie between the successive ranges, especially in the north and east, forests are found that are certainly beautiful, if not of great commercial value. At intervals there are stretches where the pines have crowded out all other trees, and one may ride for miles unimpeded by underbrush among their huge and towering trunks. But most of the forests are composite, principally made up of pines, firs, balsams, spruces, larches and deciduous and live oaks. The streams are bordered by willows and alders. Occasionally a puny maple is seen, very unlike the handsome maples of the East, and the bay tree flourishes at certain altitudes. The forests of this region are between the altitudes of 4000 and 8000 feet.

In places the chaparral is dense, made up of manzanita, buckthorn, wild mahogany, the madrona, greasewood, etc. Some of these bushes are covered with long, silvery, frond-like blossoms, or, as the manzanita, for example, with red or scarlet berries. Holly and mistletoe are frequently to be found, and many gay flowers, such as the golden rod, clematis and the bright blossoms of various species of cactus. Where there is moisture there are many varieties of ferns.

Animal Life.—These mountains were formerly overrun with animal life, but the too ready rifle of the hunter has changed this condition. Grizzly and cinnamon bears and wildcats are still found occasionally in the deepest recesses. Deer are comparatively plentiful and hundreds are shot every season. Gray squirrels abound, although they are by no means as numerous as in former years. Brown squirrels and chipmunks, too insignificant to tempt even the most wanton marksman, are abundant. The streams are full of trout and are kept replenished from year to year from State hatcheries. The same variety, the California brook trout, in the waters of the only lake in this region grows to enormous size. This lake also affords fine duck shooting in the winter. The mountain quail, larger and handsomer than the quail of the valleys, is found in large numbers. Doves are also plentiful. Among birds not fit for food are bluejays, woodpeckers, owls, hawks and condors. Of reptiles, the rattlesnake is the only one of importance. Theoretically, this venomous creature is a terror to many, who for this reason are unwilling to enter these regions. Practically, one may ride for days without seeing a single specimen, and the instances of injury from its bite are rare indeed.

A Forest Resort.—A resort known as Seven Oaks is the center of one of the most beautiful of the park-like districts among these mountains. This is a collection of tent houses and log cabins, whose hospitality is open-hearted and without ostentation, and where good company and good cheer may always be found. Here one may rest and study nature, or may plan and execute a great variety of fishing, hunting and camping excursions. The most convenient route to reach Seven Oaks is by wagon twelve miles from Redlands to a point near the western base of Mount San Bernardino. Thence a mountain trail, nine miles through the forest, takes the traveler to his destination under the northern base of the same mountain. It is difficult to understand, without actual experience, how completely this day's ride isolates one from the busy workaday world.

On every hand mountains rim the valley in which Seven Oaks lies, with a distance of, perhaps, twenty miles in each direction from ridge to ride. The Santa Ana river, the most important stream in this section of southern California, traverses the valley from east to west, finding its sources at the greatest elevations and fed by smaller tributary streams. From the heights above these waters one may look down, toward the east, upon the wide stretches of the deserts, broken by ranges of low hills with great variety of color and topography.

The Santa Ana River.—The Santa Ana curves to the northern side of this valley, and between it and the heights of San Bernardino and Grayback, on the south and southeast, are wooded benches where one may ride for hours in the shade of beautiful trees. Bridle paths, or trails, traverse them in different directions. Wherever there is moisture from springs or streams mountain meadows or cienegas are found, and herds of cattle are pastured on these. In spring and summer the grass is abundant and luxuriant. The slopes on the northern side of this valley are less heavily wooded than on the south. On surmounting them the range could be crossed into another valley of less extent and at a higher elevation, about 6000 feet above the sea, and here would be found Bear Valley Lake, a storage reservoir for irrigation purposes. Its outlet is Bear creek, which rushes away to a junction with the Santa Ana, and the two, united, sweep on their course to the orange groves of southern California, their waters keeping the finest of these in health and productiveness. These valleys are among the most important, and are typical, in their general characteristics, of a series which extends from the ocean to the southeastern slopes of San Jacinto, in a semicircular sweep of more than a hundred miles.

Importance of Water Protection.—There are no mills for sawing lumber in this immediate vicinity, although there are a few farther westward. There are some mines, but most or all of these are on the desert side of the range. Here and there a pioneer had acquired title to a bit of arable ground, with an appurtenant water right, before these lands were set aside as a forest reservation, and some portions have been granted to railroads. All of these vested interests will, of course, have to be protected or adjusted in whatever regulations may be made for preserving these forests, but no intelligent man who has studied the subject at all could hesitate for an instant in his opinion as to the absolute necessity for preserving them. They shelter the sources of the waters upon which depends the prosperity of all of southern California. Irrigation will depend more and more upon storage reservoirs, for the limits of available water supply under the present system of use are already in sight. If these mountain valleys were denuded of their forests the winter rains would rush down their precipitous slopes in torrents, and there would be little or no flow of summer waters. Under such conditions orange growing in southern California would be a most hazardous occupation.

The deadliest foes to these forests have been not the miners, nor even the lumbermen, but the sheep herders and careless campers, in whose wake came devastating forest fires. The sheep have now been driven away and the campers have seemingly been educated or frightened into greater care. It is certain that forest fires have been less frequent during the past summer than formerly. Appreciable efforts are being made to enforce the laws governing these reserves, and are effecting good results.

Electric Power Supply.—A new and important interest which will be useful in preserving these forests is that of the companies now being formed, and some of them at work, for establishing plants to generate electricity by the fall of the same waters which furnish irrigation. Some of these plants will each be capable of developing as high as 10,000 H. P., which will be utilized in Los Angeles and at intermediate points for purposes of lighting, manufactures and transportation. These interests will be valuable and will help on the rapid development of southern California. But they, even more than irrigation, will demand a continuous supply of water, which must not fall below a certain minimum. This flow must be maintained throughout the long dry summers, and every effort will be made to secure the volume of water and to lessen the loss from evaporation by expensive systems of tunnels cut through the solid rock. These are very fascinating projects, and so feasible that they will doubtless rapidly be pushed to completion. Thus private interests may accomplish more in the end than the fear of the law or Government patrol toward maintaining the integrity of these reservations.

Need of Roadways.—But roads will be needed in order that these plants may be constructed and maintained. By these roads these unique mountain nooks will be rendered accessible to the multitude, and their charm of isolation and primitive grandeur will be at an end. When the multitude comes into the forests the mountaineer, to whom they have been sacred, and by whom they have been loved, will have no other refuge than the desert. Progress, which is the greatest good to the greatest number, is destructive of romance and of the refined pleasures of the few to whom nature in her lonely and rugged moods is a source of constant pleasure. Comparatively few Californians know their own mountains well. They dwell within sight of them, year after year, ignorant of the beauties which so abundantly repay the slight efforts and sacrifices involved in exploring them.

The Divining Rod Finds a Champion.

The notion that one could detect the existence and position of a stream of water flowing underground at a depth of a hundred feet or more by the peculiar behavior of a hazel twig held in the fingers has been looked upon in modern times as a ridiculous superstition. And anyone who seriously maintained that there was even a little foundation in fact for such a belief exposed himself to the suspicion, if not the charge that he was a "crank." Scientific people, and particularly the geologists, have discredited all stories of this sort so long and so decidedly that other folk have been justly ashamed to evince faith in them.

Now, however, a professor of physics in the Royal College of Science, approaching the subject with a distinct prejudice antagonistic to the theory, has been led to change his mind by an extended investigation. His name is W. F. Barrett, and the subtitle of the treatise in which is embodied the result is "A scientific and historical research as to the existence and practical value of a peculiar human faculty, unrecognized by science, locally known as dowsing."

The first great step in this work was to collect all available narratives in regard to the use of the divining rod. The next one was to sift these, like testimony in court, by corresponding with disinterested witnesses and finding out how far the original statements could be substantiated. In a few instances the investigator got hold of a person who was said to possess the faculty of finding water with a twig or similar device, with the aid experimented with the "dowser."

Abundant Evidence.—In time Prof. Barrett was confronted with an amazing quantity of evidence. Scores, if not hundreds, of these tales are given in his treatise. Here are three samples: A sanitarium was to be built on high ground in Somersetshire, England. The site was apparently a dry one. Three professional "dowsers" were sent for separately, each unknown to the others, and each working under the conviction that he alone was employed. All three pointed to the same spot. A well was sunk there, and abundant water was found. William Ward Spink, a justice in British Columbia, walked about over his grounds for an hour, blindfolded and carrying a divining rod in his fingers. Every time the wand dipped an attendant drove a peg into the earth.

In many cases the justice would pass over a spot where the rod had moved before, and it would invariably give the same sign again. He dug wells at only two of the places indicated, but got water in both. The man declared that if he stood over a garden hose with a divining rod in his fingers he could tell by its conduct when the water was turned on and off. At Newport, Monmouthshire, a well was sunk to a depth of 51 feet without success. Local experts, noting the character of the soil, then pronounced the quest hopeless. A Cornishman who was present advocated a trial of the divining rod, with which his boy, aged eleven, had had some successful experience. The lad was sent for. In his hands the twig gave distinct signs. But the people who would have to pay for the excavation were skeptical and hesitated. The Cornishman offered to take the contract himself, and stipulated that he would demand no pay if no water was found. The job proceeded on that basis. At a depth of 48 feet the diggers struck a gushing vein, and were obliged to flee for their lives.

Lord Byron's Mother-in-Law.—Among the numerous amateur "dowsers" of whom Prof. Barrett has heard is Lady Milbanke, mother-in-law of Lord Byron. Having witnessed performances with the divining rod by a peasant during a visit to Provence in 1805, she took the twig into her own hands and was startled by the discovery that it behaved for her exactly as it did for the Provencal. Two years later she was staying with the wife of a nobleman in Huntingdonshire, and her hostess was bewailing the failure of efforts to find a suitable supply of water for a dairy. Thereupon Lady Milbanke obtained some hazel twigs, walked over the ground, located a well for her host and hostess in their presence, and had the satisfaction of learning that a fluent spring was struck in consequence of her advice.

The record of several professional users of the

divining rod is given in brief by the investigator. W. Scott Lawrence of Bishopston, Bristol, was for twenty-one years a church warden—a fact, presumably, affording some indication of his character for honesty and veracity. For sixty years he had a reputation as a water finder, although his regular occupation was that of a stone merchant. Over a hundred persons testified that Lawrence found wells for them.

English and American Dowsers.—John Mullins of Colerne, Chippenham, Wiltshire, practiced the art of dowsing for gain for thirty years, and made it a rule not to accept pay unless he found water by means of the divining rod. On one occasion, at Waterford, the Diamond Boring Company had gone to a depth of 1000 feet without success. Mullins was called in, agreed to find water at a depth of 90 feet or less, and reached it at 84 feet down. An American dowser, Cyrus Fuller of Plymouth, Wayne county, Michigan, who died in 1893 at the age of eighty-five, enjoyed the highest reputation for integrity and truthfulness. He is credited with having found 200 wells, and, unlike most experts of his class, is said never to have experienced a failure.

In two instances mentioned by Prof. Barrett hidden coins were found, apparently through the guidance of the forked twig. But in a later volume he will go into the matter of discovering minerals and oil in this manner more fully than was deemed advisable in this essay.

How to Divine.—The typical divining rod is shaped somewhat like a wishbone, and is about 1 foot long. The tip of one prong is held in each hand, and the hands are kept 8 or 10 inches apart. The elbows are usually in contact with one's sides, and the forearms extend straight forward, horizontally. The twig itself stands almost vertically in front of the dowser's chest. In the majority of cases reported the upper part of the rod swayed toward the operator's body; but in a few instances it moved in the other direction, namely, downward toward the earth. The violence of the movement seems to vary greatly. If the twig was so held that it could move freely it would, perhaps, revolve on an imaginary axis extending from one hand to the other. It is related that on some occasions, when the twig could not revolve, it would be badly twisted and bent, and would even be broken. Much variety is discernible in the accounts, both as to the way of grasping the rod and the latter's behavior.

Twigs from other trees than the witch hazel worked equally well in some hands, and a curious lot of substitutes have been employed. Among these are an aluminum bow, a flat steel wire bent like a horseshoe, a pair of tongs, and a long German sausage! Leicester Gataker of Bath, England, practiced the art without any of this apparatus, merely holding his open hands out in front of him, palms downward, much as one would warm his hands over a low stove. The sensations which different dowsers report are diverse. Some operators say that they feel a tingling in their hands or bodies when they find water with a divining rod. Others pretend to experience a severe shock. Discomfort, approaching nausea, affects the stomach sometimes. Several professional operators say that the work is exhausting, especially to a person advanced in years, and they have been seen to reel and totter while conducting a search.

The Man, Not the Hazel.—Although Prof. Barrett doesn't attempt fully to explain these phenomena, he has clear convictions on one point. He is confident that it is the operator, not the rod, that discovers the water. The movement is not due in genuine cases, he believes, to any attraction or repulsion exerted upon the twig (or the substitute therefor) by the hidden stream, but to muscular action, exerted unconsciously in response to some inward inspiration. Some psychologists have been accustomed of late years to assign many human sensibilities and activities to a part of the spiritual nature that lies below the level of consciouness, and which they call the "sub-conscious self." "Subliminal" is another common name for it. Prof. Barrett is inclined to think it possible that the faculty which some people seem to possess of finding water and metals in the manner described resides down in the "subliminal," but further investigation is necessary, he admits, to establish that theory.

The professor's theory is interesting, but not convincing. Meanwhile, any one claiming to possess the "gift" can find remunerative employment, if successful, in several localities in California.

BROUGH SMITH states that in the gold fields of Victoria pieces of highly mineralized fossil wood taken from the deeper workings, as well as timber used for supporting galleries, showed under the microscope patches of gold adhering to and intermixed with crystals of iron pyrites all through the central parts of the wood. This is confirmed by Mr. Ulrich, who says that in the gold drifts pyrites is often found in crushing or replacing roots and driftwood, and that samples, on assay, yielded from a few pennyweights to several ounces per ton. According to H. A. Thompson, a specimen of pyrites from the center of an old tree trunk assayed above 30 ounces of gold per ton.

English Capital in American Mines.

TO THE EDITOR:—A correspondent, over the *nom de plume* of "Argonaut," in the *Mining Journal, Railway and Commercial Gazette*, of London, gives California, Nevada and Idaho mining interests a thrust, and, taking his views, no one holding English capital should invest any money in either of these States with the expectation of ever making a dollar, and, as evidence, cites several bad ventures. The writer says: "I have often been astonished on observing the facility with which absolutely worthless mines have been sold in London." While we admit some "absolutely worthless mines" may have been sold in London, I will ask: Whose fault is it? They universally send their own English experts to report on their values before they pass out a dollar. The correspondent again says: "Since 1862 but two companies have ever received any dividends from their investments in the State of Nevada." Even admitting this—which I do not—it does not count against the State of Nevada, which since 1860 has produced over $600,000,000 and had many profitable mining ventures. I have no time for details. Among the failures enumerated by "Argonaut" is the English mill near Reno, "where," he says, "one Colonel O'Connor sold a group of mines, from which not a ton of ore was ever extracted, and where the company expended large sums of money on furnaces and mill, besides digging several miles of water canal capable of carrying the whole Truckee river." This shows great incapacity in the directors, all of whom, if I remember rightly, were English—not only that, but it was a senseless mining venture, any way—building such works for mines "from which not a ton of ore was ever extracted."

Now, the writer happens to know something about this operation, as it originated and was handled in the beginning, not by Col. O'Connor, but by "Col." Boyle, who for some time previous was my principal blacksmith (and a very satisfactory one he was). Mr. Wm. Boyle concluded to visit London, which he did, and in due time "Col." Boyle returned to Virginia, accompanied by a member of Parliament, who finally entered into the "colonel's" projects. I will simply say Col. Boyle was not an American and, further, that the operation from the first was considered a bad one by the mining men then engaged on the Comstock, among whom was your humble servant. "Argonaut" further says: "If we travel over Nevada, in each and every county, we find worthless mines with costly reduction works abandoned."

I know a number of reduction works abandoned in the State of Nevada on account of the fall of silver and exhausted mines at the same time. These mills and mines produced some $400,000,000 of gold and silver, and many were largely profitable. "Argonaut" further says: "Millions of English capital have been invested in California since 1850, and only three paid handsome dividends." "Argonaut" possibly shields his observations by the word "handsome." What a set of blockheads these English investors are, according to "Argonaut!" Well, we'll let it stand that way. Since 1850 thousands of Americans have made millions out of California mines, and California mines have made more millionaires than can be found in any State of the same population. California has produced to date about $1,315,000,000; and, according to "Argonaut," all has gone into the pockets of Americans. I only wish it were so, but I know it is not. Speaking of Capt. Johns, who has represented an English company for years, "Argonaut" says: "He has been traveling constantly through the mineral districts, and for twenty years the Utica, Kennedy and Rawhide mines could have been bought for a song."

That is a fact. Why did not Johns buy them? There is a good reason for it. Who knows of an English company anywhere in California having pluck enough to take an old abandoned mine—one they knew nothing about previously—and, on a venture, put up $100,000 to find out if representations made by Americans were likely to be correct? Capt. Johns is an experienced, first-class miner, and has judgment enough not to speak to his company of properties where he cannot see the lodes with his own eyes, measure their proportions and estimate their values. "Argonaut," for a wonder, gives a good word for Iron Mountain (now Mountain Copper Company) of Shasta county, Cal. He says: "With their skilled metallurgist in charge of mines, furnaces and mill, stockholders need not feel the least alarm for the future." I do not care to "talk out loud" respecting this institution. If I did, it would take a couple of columns. I now simply say, "Coming events cast their shadows before." Winding up the tirade against California, Nevada and Idaho, "Argonaut" says: "Englishmen should think twice before they invest a shilling in American mines. The feeling in Nevada is intensely anti-English, and it seems strange that our countrymen should fall such an easy prey to the San Francisco mining sharpers."

If the feeling in Nevada is so intensely anti-English, they have no doubt a good cause for it. There is one peculiarity with the English in *our* mining sections: they generally act as though they considered anything in sight they wanted belonged to them. As to sharpers, if the American can beat the English he has got to be very sharp. Take all the American mines put forth for sale in London by Americans. If you will look very closely, you will find several Englishmen "under the fence" somewhere. They are the fellows who "load up" values on their countrymen five to one, if not more, put the deal through, and are sure to take the "lion's share" of the profits of sale. Before "Argonaut" closes he shows the purpose of his assault on California, Nevada and Idaho mining sections by "booming" British Columbia mining localities, which I have no desire to deprecate. If we sell Englishmen our mines, we should seek to make them profitable. It is the better policy in the long run, but it is one thing to buy good properties and another thing to manage them with judgment and economy. The skill of the age in mining mechanics and systems for extraction of the metals have attained such perfection in later years that it is a wonderfully poor property and very bad management to not be a paying proposition.

If English investors allow themselves to be led into unprofitable ventures it is all their own fault, as there are any number of individuals in these latter days having a thorough knowledge of vein structure, value of ores, and of extraction of the metals, to steer clear of bad ventures. Mining of to-day and even twenty years ago is as different as is $5 from $1, and, taking California and Nevada as I know them, there is one vast area of mineral lands, with not one-twentieth part yet touched, all awaiting the incoming of capital and intelligent management to make it "handsomely" profitable.

ALMARIN B. PAUL.

San Francisco, Nov. 13, '97.

The Yuba River Gold Dredge.

TO THE EDITOR:—I noticed an article in your valuable issue of Nov. 13th written by Mr. Gray on gold dredging, in which he favorably mentions the dredge designed by me now running on the Yuba river. He seems to be in doubt as to the gross capacity of the dredge for lifting gravel, which is as follows: The dredge is lifting fifteen buckets per minute, the gross capacity of each bucket being 3.2 cubic feet; this gives a gross capacity of 2550 cubic yards per day. In fair digging ground the buckets can be kept quite full if the winchman is well up to his work and attentive. Owing to the unusual lowness of the river the dredge is not yet on the claim for which it was built, when it has got there and is doing regular work I shall be glad to give you exact working expenses, which may be of interest to your numerous readers. The dredge has for the last month been run with two men per shift and burns about three cords of wood per twenty-four hours.

R. H. POSTLETHWAITE.

San Francisco, Cal., Nov. 15, '97.

Deep Mining in California.

In Amador county the Kennedy mine is being very profitably worked at a depth of 2200 feet, the Keystone at 1400 feet, the Manoney at 1000 feet, the South Eureka at 1200 feet, the Wildman at 1300 feet, the Zeila at 1100 feet, and several others at like depths.

In Calaveras county the Gwin is being worked at 1500 feet, the Lane and Tullock at 1350, the Stanislaus (Melones) at 1000, the Utica at over 1300.

In Nevada county the Champion is down 1200 feet, the Empire 2100 feet, the Maryland 1600 feet, the North Star 2000 feet, the Omaha 1700 feet, the Providence 1700 feet.

This list could be largely extended, but is sufficient for the purpose. These are all good paying, true fissure gold mines.

Deep mining has not much more than fairly begun in California. In Australia, at Ballarat, they are down 3000 feet and still paying.

HENRY S. DURDEN.

SOME interesting statistics have been issued by the Dortmund Mining Bureau regarding the accidents with winding ropes that occurred at the collieries of the district last year, says the London *Mining Journal*. Out of the 270 ropes discarded, 5, or 1.85 per cent, broke suddenly while in use. Out of the 5405 ropes laid on one side during a period of twenty-five years—from 1872 to 1896—254, or 4.70 per cent, broke suddenly while in use. Of the above, breakages occurred in the case of 43 out of 736 flat cast-steel wire ropes, 19 out of the 147 flat-iron wire ropes, 7 out of 97 flat manila fiber ropes, 80 out of 3536 round cast-steel wire ropes and 105 out of 881 round iron wire ropes, while not one of the eight hemp ropes gave way. In 1872 the percentage of wire ropes breaking was 19.30, while in 1896 it was reduced to 1.85.

"WHERE the American engineering excels the British," says John Burns, M. P., "it is not because of the shortcomings of the British mechanics, but because of the wooden-headed and often pig-headed character of the employers, managers and foremen."

Electrical Progress.

The Design of Hoisting Magnets.

In view of the fact that the force of magnetism has been known for so long a time, it is rather surprising, says H. N. Ramsey, in the *Home Study Magazine*, that the electro-magnet has not come into more general use for lifting heavy weights. This state of affairs is occasioned partly by prejudice based upon the presumed unreliability of electricity, and partly by a lack of knowledge of the subject. Fortunately, the presumed unreliability of electricity as a force is not confirmed by practice. In fact, its patrons and users commend it as most satisfactory. There is no reason whatever for any apprehension concerning the ability of a properly designed magnet to do the work required of it.

Let us turn our attention to the practical design of a hoisting electro-magnet, for general lifting purposes,

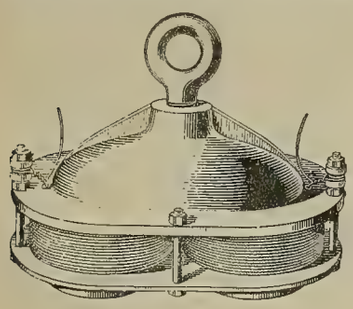


FIG. 1.

whose maximum capacity shall be five tons. We have at our disposal a direct-current supply of, say, 110 volts, and have to determine the necessary current, the length and size of the windings, and the proportions and material of the body of the magnet.

We propose a magnet of the horse-shoe type, with a winding on each leg, as shown in Fig. 1. In order to have a short length of iron or steel for the magnetism to traverse, we will make the legs of the magnet body very stumpy, which will have the additional advantage of reducing the amount of copper winding and current required.

Now, in designing a magnet we should aim at the most economical disposition of material consistent with sufficient mechanical strength. To obtain the latter, and also on account of its superior magnetic properties, we will use cast steel for the body, and will cast the yoke, rim, and poles in one piece. The coils c and c', Fig. 4, will be wound on spools, and then slipped over their respective poles N and S, the direction of the windings being as in Fig. 2, so as to create one north and one south pole. The coils are to be held in position by a $\frac{3}{16}$-inch brass plate b suspended by the rim m of the yoke by four $\frac{3}{8}$-inch brass bolts, a, a', a'', and a'''; a brass cover to protect the windings is also advisable. Brass is used for these parts because it is not influenced by magnetism and therefore will not induce leakage of lines of force, as would be the case if a magnetic metal were employed; for then some magnetism would flow from one pole to the other through the plates and bolts, instead of passing from one pole to the other through the magnet body. The two free ends x and y are connected to a 110-volt circuit, being brought up through the yoke at h and h' in porcelain or hard-rubber tubes. A suitable controller-rheostat, double-pole fuse cut-out, and switch are inserted in the circuit; their several locations depend upon the manner in which we hang our magnet, i. e., whether from the bridge of a traveling crane or from the jib of a hoisting crane.

FIG. 2.

We will now make the necessary calculations: We assume an economical magnetic density, B, of 100,000 lines for each square inch of contact surface N and S, Fig. 2. For this value of B, the number of pounds p that each square inch can raise is:

$$p=\frac{B^2}{72,134,000}, \qquad (1)$$

$$=\frac{(100,000)^2}{72,134,000}=138.62 \text{ lb. per square in.}$$

As we are to lift 10,000 lb. with the two poles, or 5,000 lb. (represented by

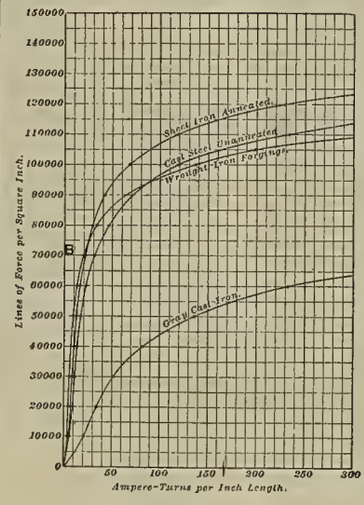


FIG. 3.

P) with one pole, the area A of each contact, N and S, is:

$$A=\frac{P}{p}, \qquad (2)$$

$$=\frac{5,000}{138.62}=36 \text{ square inches.}$$

The number of amperes multiplied by the number of turns is called the "ampere-turns." The ampere-turns required to induce, per square inch, 100,000 lines of force one inch long, is found by referring to the diagram in Fig. 3. Following the 100,000 line horizontally to the point where it intersects the curve for cast steel, we find, from the reading vertically below it, that 120 ampere-turns are required for each inch length of the magnetic circuit. We do not know the exact length of our circuit, but will assume it to be 40 inches (if this assumption is not approximately correct, we shall have to go through the calculations again). Then, the total ampere-turns should be 40×120, or 4,800 ampere-turns.

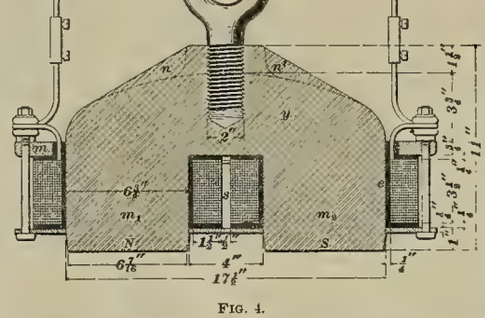


FIG. 4.

We now have to break up this factor into amperes and turns. The size of the wire will first be determined. Whether a current of 1 or of 10 amperes is used, the size of the wire will be the same. Let us see if it is not so. We require 4,800 ampere-turns. Assuming a current of one ampere, the total number of turns is 4,800. Allowing for the thickess of the spool, the average length of one turn f g h, in Fig. 2, is 2.3 feet, if the cross-section of the core is circular. This cross-section, as is readily seen, gives the least length of turn for a given area. This area we will have from formula 2. The number of turns, $4,800\times2.3$ (the average length in feet of one turn) gives 11,040 feet of wire on the two magnets. The resistance of our two windings must be such that with E=110 volts, and C=1 ampere, the wire will have the proper total resistance. Now the total resistance:

$$R=\frac{E}{C} \text{ (Ohm's Law)} \qquad (3)$$

$$=\frac{110}{1}=110 \text{ ohms.}$$

If 110 ohms is to be the resistance of L(=11,040) feet of wire, the resistance r per thousand feet is:

$$r=\frac{R}{L}\times1,000. \qquad (4)$$

$$=\frac{110}{11,040}\times1,000=9.9 \text{ ohms.}$$

This resistance corresponds most nearly with that of No. 19 B. & S. Let us now assume any other number of amperes, say 4. Then the number of turns will be $\frac{4,800}{4}=1,200$; and the total length of the wire on the two magnets when 4 amperes are used will be $1,200\times2.3=2,760$ feet. The total resistance of this wire is $110\div4=27.5$ ohms, and the resistance per 1,000 feet is $27.5\div2,760\times1,000=9.9$ ohms, which is exactly the same as obtained before. But with 1 ampere we need 11,040 feet of wire, while with 4 amperes we require only 2,460. That is, with 1 ampere we need four times the length of the same size wire as with 4 amperes.

The question naturally arises: Which is the cheaper, copper or electricity? Another question is: How many amperes can No. 19 wire carry? We ought not to allow more than 1,000 amperes per square inch cross-section of the conductor. So No. 19 will not take much more than one ampere.

Presuming that we allow for one ampere, in order that the amount of copper and iron and also the weight of the magnet may be as small as possible, we will arrange for 4,800 turns of No. 19, that is, 2,400 turns on each leg. The best cross-section of the magnet-winding will be 30 layers of 80 turns, or $3\frac{1}{2}''$ by $1\frac{1}{2}''$. This dimension, $3\frac{1}{2}''$ by $1\frac{1}{2}''$, is readily found by taking the known diameter of No. 19 single cotton-covered wire, and making due allowance for the fact that the thickness of a layer is slightly less than this diameter, because the wires lay between each other.

We will now draw, as in Fig. 4, the longitudinal section of our magnet from the data obtained. The area of cross-section of the core was found from formula (2) to be 36 inches; consequently the diameter of m_1 and m_2 is $6\frac{3}{4}$ inches. Drawing one core, we allow $\frac{1}{4}$ inch for the spool, as at e, and then put on the wiring. The other core is made similarly with a distance s of $\frac{1}{2}$ inch between the two coils. The cross-sectional area of the yoke at y should be a little larger than that of the core at m_1 or m_2 and should also be so shaped as to have sufficient mechanical strength. The thickness, then, may be $4\frac{1}{2}$ inches, with stiffening ribs n and n'. The rim m is drawn $\frac{3}{4}$ inch thick, as shown, projecting 1 inch beyond the coil. The cores must project below the bolt-heads far enough to clear them, and should be slightly tapered, as this adds to their efficiency.

We have presumed in our calculations on a density at the contact of 100,000 lines per square inch. It is found in practice that when the poles N and S are slightly tapered and the magnetism has a density of 110,000 on the contact surface, a better result is obtained. Reducing our area in this proportion, the diameter of the faces N and S will be $6\frac{7}{16}$ inches.

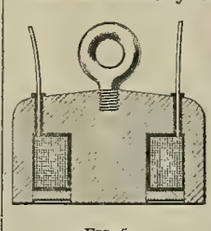


FIG. 5.

Another type is the concentric pole magnet, as shown in Fig. 5. This possesses several advantages, among which we may mention the following: There is only one coil; this coil (c, in the figure) is completely and well protected from mechanical injury or heat, and the magnetic leakage is also small. This style is much used for lifting forgings which are otherwise too hot to handle. It may be well to add that the proportions of all magnets may be obtained in the same manner as that we have calculated.

Electrical Activity at Niagara Falls.

Everybody hereabouts has gone power mad, says a letter from Niagara Falls, and no wonder, for each day as it passes but adds to the certainty that wealth far greater than any to be wrested from the Klondike's frozen sands is to be gotten out of Niagara's green waters by those who have dared to harness the world's greatest cataract. The most marvelous dream of the age is being realized in the quiet-looking, gray power house that stands a mile or two above the falls. Three enormous dynamos, each weighing many tons and whirling along at the rate of 250 revolutions a minute, are constantly transforming water power equal to that of 15,000 horses into the inexplicable thing we call electric energy. But this is only a beginning.

On both sides of the river men are steadily at work in the sunlight by day and in the mystic current's glare by night, making ready for the production of nearly forty-fold more power. By to-morrow, so to speak, enough force will be had from the rushing water to turn every wheel in every factory in every city of the Empire State, including the Greater New York itself. When the work now in progress is done, the total output will be as follows:

	Horse Power.
To be developed in the present tunnel	100,000
To be developed in the second tunnel (not yet built)	150,000
To be developed in the three Canadian tunnels	350,000
To be developed by the Hydraulic Power Company	150,000
Total	750,000

The real meaning of these figures is not clear until it is remembered that Lowell, Mass., famous the world over as a manufacturing town, came into being because it was possible to develop 11,845 H. P. from the waterfalls within its bounds; that the total water horse power available at Minneapolis, renowned wherever men eat bread because of its gigantic flouring mills, is only 25,000; that Buffalo, now a city of nearly 400,000 inhabitants, and ranking fifth or sixth among the cities of the United States, uses less than 50,000 H. P., and that all the manufactories in New York State, including those of the great aggregation of cities at the mouth of the Hudson, are operated by less than 550,000 H. P. In other words, there are now planned enough hydraulic and electric installations at Niagara Falls to furnish power for a city so vast in extent that Greater New York, Paris and Chicago would be only villages in comparison.

Some there be who predict that such a city, greater than any the world has yet seen, will grow up in the immediate vicinity of the cataract.

THERE are possibilities of an increased trade in the electrical line with Japan. Several Japanese engineers, appointed by their Government, have recently returned, and their impressions as to the methods of American electrical plants were so favorable that leading manufacturers anticipate good results in the way of business from these visitors. Almost every large locomotive builder in this country, as well as electrical machinery manufacturers, have several Japanese apprentices in their shops studying American methods. This, according to the views of a prominent dynamo builder, tends to introduce American ideas in the Far East, though some merchants claim that these Japanese obtain the benefit of a practical education in this country with a view of establishing themselves in their own country after being thoroughly versed in the way of American methods of working.

Mechanical Progress.

Calculating the Power of Water.

A writer on hydraulic and milling engineering states that although for many centuries water has been employed for motive power in all the industries in which man is engaged, there are yet many people vitally interested in its use who know but little of the natural laws governing its utility, or how to estimate and measure its power.

Most practical men know something about weir dams and are able to make a comparative estimate of the volume of water available for constant power purposes, but being unfamiliar with the laws controlling the motion of fluids, are unable to calculate the working energy that a given volume of water under a given head or fall is capable of producing. This is determined by the weight and velocity of the water. The weight is an unvarying factor, a given quantity always weighing the same, but the velocity varies according to the height of column or head. The initial velocity of spouting fluids is directly as the square roots of the heights of the columns, or of the pressure. It being known that the initial velocity under a 4-foot head is 16.2 feet per second, and that the square root of four is two, we proceed to ascertain the spouting velocity of any other height by taking its square root and dividing it by two, the square root of the 4-foot head, and multiplying it by 16.2, the spouting velocity of the 4-foot head. Take, for example, a head 16 feet high; the square root of which is four, we divide it by the square root of four, which is two, multiply by 16.2, and have as a result 32.4, which equals the spouting velocity due to a 16-foot head of water.

By the same rule we find that the spouting velocity due to a head 64 feet high is 64.8, because the square root of 64 is four times greater than the square root of four, therefore the velocity must be four times greater than the velocity due to the 4-foot head. The initial spouting velocity of any other head of water can be ascertained by the same method of calculation.

Spouting velocity presents a rather peculiar phase of the water power question when thoughtlessly viewed. Measured by spouting velocity alone, it would appear that there is a relative loss of power as the height of the column of water increases. A 64-foot head is 16 times the height of a 4-foot head, and yet the spouting velocity of the former is but four times greater than the latter. It must be remembered, however, that while the spouting velocity has been increased but four fold, the pressure has been increased sixteen fold, so that against, say, one velocity and one pressure in the 4-foot head, we have in the 64-foot head four velocities and sixteen pressures, which means a marvelous increase in power instead of a relative decrease. It means that a water wheel which would develop 2 H. P. under a 4-foot head, would develop 128 H. P. under a 64-foot head. Thus it will be seen that by raising the head sixteen times we increase the power sixty-four times, a fact which seems quite astonishing to the uninitiated. It is due, however to say that, while theoretically the power is increased sixty-four times, the efficiency of the wheel under the high head is not in so great a proportion, on account of increased friction due to its greater speed.

The speed of a wheel increases with the velocity of the water, therefore the speed of a wheel under a 64-foot head would be four times greater than it would be under a 4-foot head. This brings us to another phase of the subject that must not be overlooked by the student desiring full and correct information. While the 64-foot head develops four times as much power as the 4-foot head, four times as much water is consumed in doing it. When a given quantity of water is consumed in both cases, the power of the 64-foot head is but sixteen times that of the 4 foot head, or in exact ratio to the heights of the head. To make it plainer, a given quantity of water in a 64-foot head will develop sixteen times the power that it would in a 4-foot head, because the former head equals sixteen times the height of the water.

Cost of Oil Fuel for Steam Boilers.

The trouble occasioned by the recent strike of coal miners has caused many steam users to investigate the question of the relative cost of oil and coal as a boiler fuel. Some interesting figures from C. F. Foster, who was Mechanical Engineer of the World's Columbian Exposition, are herewith reprinted from the *Engineering Record*:

In determining equivalent costs of coal and oil for various prices paid for coal based upon the World's Fair results, we can establish a formula in which the price of the oil per gallon (A) multiplied by the number of gallons burned per H. P. hour (B) plus the cost of handling (C) is equal to the price of the coal per pound (D) multipled by the number of pounds burned per H. P. hour (E) plus the cost of the handling (F), or $AB+C=DE+F$. In this case $B=.3007$, $C=\$\ 0006$, $E=4$ and $F=\$\ 00131$. $D=\frac{3\ 007\ A-.00071}{4}=\$$ per pound.

Multiplying by 2240 to obtain the cost in dollars per long ton (T) and simplifying, we have $T = 168.30\ A - .397$.

Giving A various values from 1.5 cents, to 3.5 cents, obtaining the value of T, we have the following table as showing the equivalent cost of coal per ton for oil at various prices per gallon, the evaporation and cost of handling each being taken the same as the World's Fair results:

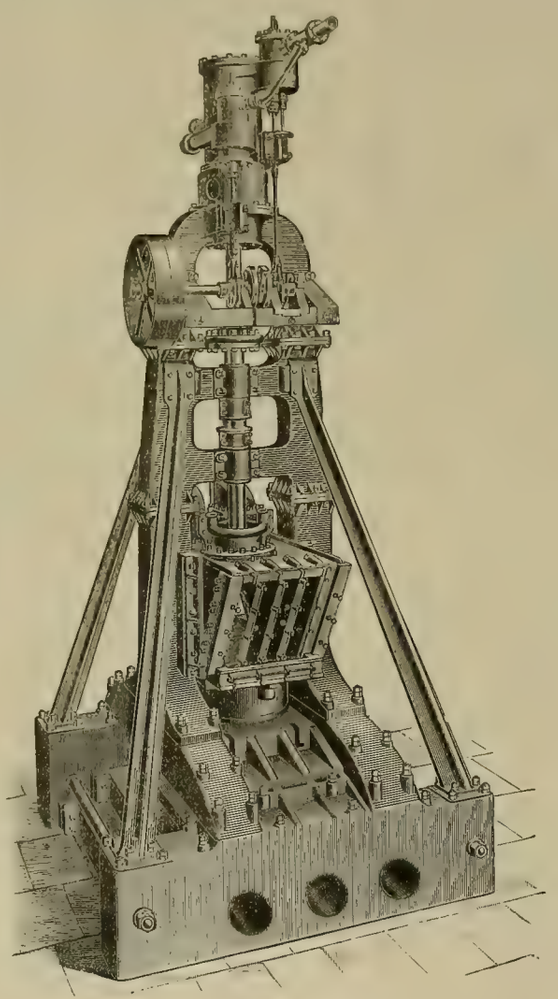
Price of Oil, Dollars per U. S. Gallon.		*Equivalent cost of coal in dollars per ton, 240 lbs., assuming the evaporation of coal to be $\frac{7.5}{14.25}$ of that of oil.*	
.015	.0275	2.12	4.23
.0175	.300	2.55	4 65
.0200	.035	2.97	5.07
.0225	.0350	3.39	5.49
.0250	....	3.81	....

From the above it would seem that in the East oil can seldom compete with coal when the question of price is concerned, but the figures cannot be considered directly applicable to California or the Pacific coast.

As far as the handling of the two are concerned, Mr. Foster found the cost of handling oil to be less than one-half the cost of handling coal. Were his figures applied to a smaller plant of, say, 500 H. P. in boilers, which would be capable of supplying a 1000 H. P. compound engine and the plant run for 300 ten-hour days, the cost of handling oil would be $900 and coal $1965.

A Steam Stamp.

Herewith is illustrated an improved steam stamp, invented by Edwin Reynolds and made by the E. P. Allis Co. There is a new form of valve gear on the steam cylinder, a complete iron frame, and the addition of a solid cast iron anvil block under the mortar bed to replace the spring timbers. The new valve motion produces a quick opening and closing of the valves, admitting steam at full boiler pressure for the down stroke, while the admission of steam for the up stroke can be regulated without stopping the machines or changing the valves. All the wearing parts are made so as to be easily removed for renewal or repairs. The machines are entirely self-contained and will always remain in line, thus avoiding excessive wear. Previous to the introduction of the Reynolds improved stamp the average output of one machine in finished material was from 150 to 200 tons of rock per day. One of these improved stamps in the stamp mill of the Tamarack Mining Co., Opechee, Mich., has crushed 1920 tons of conglomerate copper rock in six days, or 320 tons per day, through $\frac{3}{16}$ mesh screen. It is to noted that this stamp is not suitable for crushing gold ores, being designed especially for the copper ores of Anaconda, Montana, and northern Michigan.



STEAM STAMP.

THE firing of a candle through a door or pine plank need no longer excite wonder. A more striking illustration of the penetrative power of light matter at high velocity has been furnished by Capt. Cooper Key, R. A., as a result of experiments on firing gas in mines. For a borehole was employed a special gun, which was charged with high explosive, tamped by pressed cylinders of raw, dry clay 3 inches long and about 2 inches in diameter. The blasting acted in various mixtures of air, coal dust, gas, etc., and to stop the course of the plug and break it into dust a cast iron target plate 1 inch thick was placed 25 feet in front, at an angle of 45°. After three or four shots the inch iron plate was penetrated by the clay plug, weighing seven and a half ounces.

LATE experiments with aluminum show that from two to five pounds added to a ton of iron makes it grayer and softer, the slag rising rapidly and completely to the surface, and leaving the metal in a far purer and better condition than before. The iron is more fluid in the ladle and can be poured into small molds without any tendency to chill, and the formation of "waster" castings, due to blowholes, is entirely avoided. The aluminum does not reduce the melting point of cast iron or steel, but increases its fluidity by the removal of impurities. The effect of a small proportion of aluminum upon steel with medium carbon is to increase its tenacity and impair its ductility. It may also be used in the same proportion in brass manufacturing, and in larger quantities for making "aluminum brass," and as it is daily becoming cheaper the prospect is that it will in the near future be extensively used in iron and brass foundries.

Scientific Progress.

A Balloon For an Engine.

A balloon, attached to a car traveling on a single steel rail, has been found to afford ample motive power to do service on a very steep mountain side, the balloon being 65 feet in diameter and the car and contents weigh four tons. A test has been made in Bavaria. The principal feature of the new system, according to the *Scientific American*, is that the force of traction is directed vertically upward, and is derived from a balloon. A single rail is used for the only purpose of directing the course of the train and keeping the balloon with its load captive. To this end the rail is made T-shaped, and the car runs on it, gripping it from the sides and from below. The rail is anchored to the ground at distances of about 15 feet. In the descent the propelling force is gravity, and the balloon acts as a check to prevent accelerated motion. A ballast of water, taken up at the top of the mountain, provides the additional downward force required. The truck carries the water receptacle, which can be opened by the aeronauts during the journey. The truck and receptacle together weigh about 600 pounds, and when there is no wind the receptacle carries about 1100 pounds of water, making a total weight of 1760 pounds. When it is windy the strain between the balloon and the truck is diminished by letting the water out of the receptacle, thus compensating for the difference in power. The difference in weight caused by passengers entering or leaving the car is regulated by the use of separate weights, a sufficient number of which will be kept at each station.

J. J. HOLTZAPFFEL, in a paper recently read before the Society of Arts on the uses of the sand blast, alluded especially to the value of the process in sharpening files and the superiority of the process; the sand-blasted file doing twice the work of the ordinary file in the same time, this superiority being now so fully recognized that 240,000 dozen files are prepared in Sheffield yearly. They can also when worn be resharpened over and over again, without grinding out the old marks, for about 2½ per cent of their value. He also spoke of the efficacy of the blast in removing every trace of scale from iron castings so that the finest tools may be applied at once to the metal, and of its

usefulness in refacing grindstones and emery wheels, cleaning bicycle tube surface before brazing, granulating or frosting electric plate, gilding metals, gold and silversmiths' work, and jewelry, and many other purposes suggestive of a widely extended field for the sand blast in metallurgy.

PROF. MENDELOFF has advanced the theory that petroleum is of mineral origin, and that its production is going on and may continue almost indefinitely. His hypothesis is that water finds its way below the crust of the earth, and there meets with carbides of metals, particularly of iron, in a glowing state. Oil-bearing strata occur in the neighborhood of mountain regions, where it may be supposed that the dislocations of the strata afford passages for the access of water. The water is decomposed into its constituent gases; the oxygen unites with the iron, while the hydrogen takes up the carbon and ascends into higher regions, where part of it is condensed into mineral oil and part remains as natural gas, to escape where it can find an outlet, or to remain stored at great pressure until a bore-hole is put down to provide it a passage to the surface.

THE newly-discovered chemical substance, sugarine, is likely to have an important influence upon commerce in several directions. Unlike saccharine, which never became very popular, sugarine contains none of the obnoxious para acid. It is a chemically pure substance, 600 times as sweet as sugar, and yet obtainable at one-twelfth the cost. If it should prove the healthy, cheap and perfect substitute for sugar which the discoverer, E. R. Savigny, believes it to be, it will doubtless soon be utilized for domestic and industrial purposes, especially as its antiseptic properties are said to cause jams and other articles prepared with it to keep for years. The opinions of experts and the test of experience will soon show how far the inventor's expectations are realizable.

MANY of the violent changes which occur under the surface of the sea, as Prof. John Milne has recently shown, produce effects that are distinctly and sometimes disastrously felt on the land. Wherever a profound cavity exists in the bed of the ocean near the land, and wherever the border of a continent slopes off into a deep sea, great slides are apt to occur, and these often cause earthquakes. In Japan, Mr. Milne says, a large number of earthquakes came from the deep sea off the mouth of the Tonegawa, the largest of the Japanese rivers. The river brings down alluvial detritus which is deposited on the brink of a deep hollow in the ocean, and from time to time the accumulated deposit slides into the depths, shaking not only the sea-bottom, but the adjacent land.

ACCORDING to Nikola Tesla, "of all conceivable methods of generating electrical energy, nothing in the present nor in the future is likely to compare in facility and economy with the waterfall." Of all methods of generating power, the utilization of waterfall, he says, is the simplest and least wasteful. According to him, even if it were possible, by combining carbon in a battery, to convert the work of the chemical combination into electrical energy with a very high economy, such mode of obtaining power, he thinks, would be no more than a mere makeshift, bound to be replaced sooner or later by a more perfect method which requires no consumption of any material whatever.

M. ASSELOT, a French chemist, has recently compounded a celluloid that will not burn. He dissolves twenty-five grammes of ordinary celluloid in 250 grammes of acetone. He then makes a separate solution of fifty grammes of magnesium chloride and 150 grammes of alcohol and obtains a paste by mixing together the two solutions. After the volatile parts have been evaporated, he has left a celluloid that is incombustible. The discovery should be of great value, for through the inflammable qualities of celluloid it loses much of its usefulness.

Why Less Than Ten Per Cent of the Coal's Energy is Used in Developing Power.

The marvelous exhibit of boilers, engines and other machinery recently installed in some of the street railway power plants throughout the country should certainly be excellent food for thought for inventors, manufacturers and engineers and those interested in natural philosophy, affording as they do to those familiar with the subject an opportunity to judge of the progress made in steam engineering (from an economical point of view) since 1764, when James Watt completed his first perfect steam engine.

A review of the history of the steam engine from that time to the present would convince the reader that, while we have succeeded in making a beautiful and complicated piece of machinery, the engine of the day is only about 20 per cent more economical than the first engine made by Watt, and that our boilers and engines of to-day are yet very crude machines, consuming, as they do, eight pounds of coal (under the most favorable conditions) to do the work of one. With reference to the economy of Watt's engine, and quoting Lee Van's, we find: Founded on these principles the steam engines which were made by Watt, and his associates and pupils before 1830, produced a H. P. with less than two pounds of coal per hour. These engines are known as the Cornish pumping engine, and if we look into the history of these machines we will find them reported as doing one hundred millions of duty, which is a technical phrase intended to express the fact that a hundred million pounds of water were lifted a foot high for a hundred pounds of coal consumed; turning that into H. P., it means about two pounds of coal per hour per H. P. This result was produced by cutting off steam in the cylinder at one-eighth or one-tenth of the stroke, and allowing it to expand eight or ten times.

The engines of that day were, of course, very imperfectly constructed and great loss occurred from leaking pistons and from imperfectly constructed boilers.

But, notwithstanding that loss, the result was equal to two pounds of coal per hour per H. P. Reconstruct these engines, with the tools and machinery of to-day, and the result would be appreciably higher. George H. Corliss in 1858 reduced the consumption of coal per hour per indicated H. P. to 1.7 pounds coal; coal per effective H. P. was 1.8 pounds; duty, 109,979,487 foot pounds per each 100 pounds of coal. Some time later, engines and boilers built by Mr. E. D. Lewitt, Jr., consumed 1.63 pounds of coal per indicated H. P. per hour, and the duty was 11,548,925 foot pounds per 100 pounds of coal consumed.

In 1872, it appeared from a comparison of nineteen ocean steamers that the average consumption of coal was 2.1 pounds per H. P. per hour.

From data of an evaporative test made on a lately installed railway plant containing triple-expansion condensing engines and water-tube boilers, it was found to take nearly 1.4 pounds of coal to generate and maintain 1 H. P. for one hour, and this was only done under the most favorable conditions known to engineers. That any builder would install a plant under guarantee to generate and maintain 1 H. P. per hour, actual working conditions, on 1.4 pounds of coal is very doubtful, and the steam engines and boilers found in our modern power houses will cost, H. P. for H. P., ten times as much as they would in Watt's time; and so complex are these engines that should James Watt return to this earth he would know so little of steam engineering as to be unable to start them.

What percentage of the energy of coal do these engines convert into power or work? The energy of fuel or its power to do work may easily be computed by assuming a value of 14,500 heat units in one pound of coal; this is giving a somewhat high value to the coal, it being the number of heat units contained in one pound of pure carbon. (A heat unit is the energy required to raise one pound of water one degree of temperature, or the power required to raise 778 pounds one foot high.) This would give $14{,}500 \times 778 = 11{,}281{,}000$ pounds raised one foot high in one minute, as the potential energy of one pound of coal or pure carbon. A H. P. is 33,000 pounds raised one foot high in one minute, or one pound raised 33,000 feet high in one minute, or 1,980,000 pounds raised one foot high in one hour. $11{,}281{,}000 \div 1{,}980{,}000 = 5.69$ H. P. per hour, as the theoretical energy of one pound of coal; and while one pound of coal contains energy sufficient to generate and maintain 5.69 H. P. for one hour, the most economical engines in the world require at least 1.4 pounds of coal to do that work. A great part of this loss is in latent heat of the steam, which is exhausted into the atmosphere or condensed, and this loss is unavoidable as far as now known.

Latent heat of steam is the quantity of heat expressed in heat units required to vaporize or evaporate water already heated to the temperature of the steam into which it is to be converted, or one pound of water heated under atmospheric pressure from 32° to 212° F. requires 180.9 units of heat; if more heat is supplied, steam will be generated without elevating the temperature until the water is evaporated, which requires 1146.6 units of heat, and the steam volume will be 1740 times that occupied by the water at 32° F. Then $1146.6 - 180.9 = 965.7$ units of heat will be absorbed in the steam, the temperature of the latter not being raised.

This is what is called latent heat, because it does not show its temperature, but is the heat consumed in performing the work of turning water into steam. From the indicated diagram taken from a triple-expansion condensing engine where the initial pressure was 128 pounds (too low for the best economy), it was found that it was generating about 830 H. P. and exhausting into the condenser 11,900 pounds of steam at atmospheric pressure every hour. Every pound of this steam contains 965.7 heat units from which no work had been obtained, or $11{,}900 \times 965.7 = 11{,}491{,}830$ heat units lost, and, as it has been assumed that one pound of coal contains 14,500 heat units, the loss by latent heat on this engine for one hour would be $11{,}491{,}830 \div 14{,}500 = 792$ pounds of coal.—C. H. Garlick, in Scientific Machinist.

A Long-Distance Run.

A single locomotive of the Union Pacific Railroad recently covered 955 miles in twenty hours and eight minutes, exclusive of stops—an average rate of 47.44 miles per hour—and by so doing has excited the wonder of the operating departments of nearly every American railroad. J. H. McConnell, superintendent of motive power and machinery for the Union Pacific, has prepared a complete report of the performance for the *Railway World*. The train left Evanston, Wyo., at 3:50 o'clock P. M., and consisted of an engine, one baggage car and two special cars. The total weight of the engine and tender is 226,833 pounds, and of the three cars 264,775 pounds, making a total of 491,608 pounds. The whole distance of 955.2 miles was covered in exactly 23 hours and 55 minutes, or at a rate of 39.93 miles per hour. The actual running time was 20 hours and 8 minutes—an average rate of 47.44 miles an hour. What is still more remarkable about the trip is that, until the journey was about two-thirds completed, there was no attempt at fast running, the idea being to take the time of a regular train over the road. From Evanston to North Platte the special made little, if any, better time than the regular overland limited train. But just before leaving North Platte one of the directors who was on the train received a message requiring his presence in Chicago the next morning. The engineer was informed of the necessity of fast running, and was instructed to overtake the overland train at Omaha, if possible.

Omaha is 290.9 miles to the east, and it was necessary to get there by 4:45 o'clock the next afternoon if connections with an Omaha-Chicago train were to be made. The engineer "got her in there" on time—a remarkable performance when it is remembered that the same engine had previously covered nearly 700 miles. The time occupied on the Wyoming division from Evanston to Cheyenne, 438.9 miles, was 12 hours and 5 minutes, or a running time of 10 hours and 50 minutes. That division was covered therefore at an average speed of 36.32 miles an hour, or 45.51 miles per hour actual running time. Thirteen stops were made, varying from two to fifteen minutes, for water, coal, orders and meeting other trains. At Cheyenne there was a delay of 35 minutes. From Cheyenne to Omaha is 516.3 miles, and this distance was covered in 11 hours and 15 minutes, or at the rate of 45.9 miles per hour, the actual running time being 9 hours and 18 minutes, or at the rate of 55.51 miles an hour.

Just before the arrival at North Platte there remained exactly six hours in which to reach Omaha. The average rate for the distance was 59.17 miles per hour. From North Platte to Grand Island the time, exclusive of stops, averaged 61.1 miles per hour. For short distances 74 and 75 miles an hour was attained. At one point 22.1 miles were made in 19 minutes; at another 24.3 miles were covered in 21 minutes—a speed of 69.43 miles per hour. There was covered 40.4 miles in 36 minutes—an average of 67.33 miles an hour. Just before reaching Omaha 20.1 miles were made at a rate of 70.94 miles an hour. Engine 890 is an eight-wheeler and a typical Union Pacific passenger locomotive.

Some Points on Patents.

A patent may be valid for a process, and another for a mechanism for carrying on the process.

The experimental use of a machine more than two years before filing an application does not affect the right to a patent.

A *specification* should describe the patent and method of construction. A *claim* should cover the article thus constructed as a whole.

A license to a person to use an invention only "at his own establishment" does not authorize its use at an establishment owned by himself and others.

Property in inventions exists by virtue of the Federal Constitution, and no State has a right to interfere with its enjoyment or to annex conditions to the grant.

To infringe a patent it is not necessary that the thing patented should be adopted in every particular. If the patent is adopted substantially by the defendants they are guilty of infringement.

It is not sufficient to "think up" an invention, or to even perfect it mentally. The party who perfects it and puts it into practical use will be deemed the true inventor, and entitled to a patent.

A *licensee* is one who has transferred to him in writing a less or different interest than either the interest in the whole patent, an undivided part of such whole interest, or an exclusive sectional interest.

The term "useful" in the patent law is used in contradistinction to "mischievousness." A design, if not mischievous, is useful if it is attractive, and the utility consists in such a shape or configuration of a given article.

An assignee is one who has transferred to him in writing the *whole interest* in the original patent, or an undivided part of such whole interest in every portion of the United States. And no one, unless he has such an interest transferred to him, is an assignee.

When an inventor has developed his invention so far as to make a model showing clearly the workings of the invention, and some one more skilled than himself invents a machine, and thereby produces the article, he will be considered as a skilled mechanic, using

knowledge imparted to him by another, and not as the inventor of the article.

An inventor cannot safely let his invention rest in an incomplete state simply because he meets difficulties; he is not thereby excused from using all reasonable diligence in his endeavors to surmount such impediments and perfect the invention.

A grantee is one who has transferred in writing the *exclusive* right under the patent to make and use, and to grant to others to make and use, the thing patented within and throughout some specified part or portion of the United States. Such right is *exclusive* even to the patentee.

A title to a patent taken out by one of the members of a firm and never assigned to the firm will not pass with the sale of partnership property, although expenses incident to procuring the patent were paid by the firm, and the patent was used for the benefit of the firm while the partnership lasted.

THE German postoffice is experimenting with an invention—an electric typewriter apparatus, which, at a cost of $125, can be connected with a telegraph wire, which types a message off on a keyboard, and which is reproduced at the other end.

Coast Industrial Notes.

—Corral Hollow, Cal., coal is now locally offered for sale.

—A six million gallon reservoir is about to be built at Corona, formerly South Riverside, Cal.

—A road is to be built from Fresno, Cal., to King's River canyon. It is said the canyon rivals Yosemite in scenic splendors. The road is to be opened for tourists the coming summer.

—The 5 per cent bonds of the San Francisco & San Joaquin Valley Railroad, the new line, of which Claus Spreckels is president, are quoted in New York City at 101½@102. About $4,000,000 have been sold and another lot of $200,000 is shortly to be issued.

—The steamship Mariposa this week, from Auckland and Sydney, brought $1,500,000 in gold to San Francisco. Ten million dollars have been shipped from Australia to the United States in the last four months—a pretty good Klondike of its own.

—The trustees of the Los Angeles, Cal., Oil Producers' Association are considering the advisability of a shut-down of the wells. The move has become necessary on account of the lack of storage capacity and the overproduction due to prohibitive freight rates to interior points. The daily production is now about 4000 barrels and the net consumption not over 2500 barrels.

—Umatilla county, Oregon, with a population of 17,000, this year produced 5,000,000 bushels of wheat, which brought $3,750,000 in gold, or $220 for every inhabitant; and Whitman county, Wash., almost adjoining, with 25,000 population, yielded 6,000,000 bushels, worth $4,000,000, or $180 per capita. Baker county, Oregon, with but 11,000 population, is expected this year to produce $2,000,000 in gold.

—There will be twelve miles of American rails laid on the Astoria and Columbia River Railroad, beginning at Goble, Or. The English rails were not sufficient to complete the track. This new consignment is on its way from the East. The rails are of the same weight and size as those laid, seventy-five pounds to the yard, 5 inch base, 5 inches high, and 2½ inch ball. Tracklaying begins at the Goble end of the line when the new rails arrive.

—Electrical manufacturing companies of the coast have formed the Finance and Construction Company, capital stock of $500,000, the shares being divided between various electrical machine manufacturing concerns, each having equal representation in the board of directors. The principal object is the installation of electric machinery. Among the first operations of the new company will be the installation of a twenty-mile transmission plant in Shasta county.

—The annual report of the Southern Pacific Company for the year ending June 30, 1897, shows a net income of $528,505.34 in the Pacific system for the year. The gross earnings of the Pacific system were $31,274,864.68, as compared with $32,226,624.46 the year before. The railroad made that up, however, by cutting their operation expenses to $19,673,811.43, while the year before they paid $20,956,812.64 to operate the Pacific system. Number of passengers carried, earning revenue, were 19,151,558; number of passengers carried one mile, 485,207,300; number of passengers carried one mile per mile of road, 97,688.

—The sugar trust will be competed with after January 1, '98, when the five years' contract with the Hawaiian planters with the Western Sugar Refinery will expire. The trust will continue to handle that portion of the crop, from 40,000 to 50,000 tons, which Claus Spreckels can control. Of the remainder of 225,000 tons, 150,000 tons will be placed on the market by the California Beet Sugar and Refining Company. Of the 150,000 tons raw island, 90,000 tons will be sent to New York, where it has already been sold to refineries independent of the trust. The remaining 60,000 tons will be refined at the California Beet and Sugar Refining Company's works at Crockett, on the straits of Carquinez, Cal.

—Construction of a railroad line from Portland, Or., to Puget sound is now regarded as probable. The work was abandoned six years ago when the Charles Francis Adams management went out of the Union Pacific and the S. S. H. Clark management came in. In 1890, the Union Pacific, then in charge, by Adams, as president, and the Great Northern railroad, jointly undertook to build a railroad line from Portland to the Puget sound. The road was graded from Vancouver to Kalama, and most of the grading work finished between Kalama and Centralia. Comparatively little work was done north of Centralia. About $50,000 was expended on a bridge over the Columbia at Vancouver, and in all more than $2,000,000 was invested in the enterprise. It was abandoned in 1891 in a half finished condition, since when it has been sleeping.

—At Sacramento, the California Commissioner of Public Works has awarded contracts for work to be performed on the San Joaquin and the Sacramento rivers, California. The bids for dredging the Newtown shoals were thrown out by the board by reason of being too high. Dredger work on the San Joaquin for removing cut-offs 6 and 7 was awarded to J. C. Smith, of Stockton, for 4¾ cents per cubic yard; for the construction of the jetties at the Newtown shoals, Clark & Henry, of Oakland, who are to supply the piles and drive the same for $7447.97. The work of providing bags of sand and constructing brushwork which is to fill in between the piles, was awarded to Lauritzen & Hodapp for $9600. All the bids let are subject to the approval of the Secretary of War. The high bids put in for dredger work may necessitate the purchase by the board of a State dredger, which can do the work at a reduced cost.

—The Chileans, "The Yankees of South America," are moving in the matter of railways, and the Chilean government is considering an offer from a German syndicate of $35,000,000 at 4½ per cent. to be expended in building lines. This offer is a stroke of enterprise, not merely as an investment, but because of the foothold it will give Germany in South American industries. In a mountainous country like Chile, $35,000,000 will not build many miles of road, especially since the first effort will probably be to scale the Andes and establish communication with the Atlantic States, but it will build so much that more must be had in order to make the first available. In the end, it is most probable the sum will amount to $100,000,000 or more, besides which many other millions will have to be invested in equipment, and Germany will be in a favorable position to furnish all that is required. If properly conducted, the movement will be profitable to both Germany and Chile, and, though the United States may regret to see such an alliance between a South American State and a foreign nation, the United States will have nothing to say in contravention of it.

—Under date of October 20 a report is made to stockholders of the Southern California Railway Company, which was formed June 27, 1892, by consolidation of the California Southern Railroad, California Central, Redondo Beach, San Bernardino and Eastern, and Santa Fe and Santa Monica Railway Companies. These corporations had a total capital of $12,824,000 stock, $8,783,000 first mortgage six per cent bonds and $3,500,740 income bonds. This stock, in the present company, is represented by $6,752,000 common, $6,072,000 preferred; no bonds have been issued, and the property remains subject to the mortgages of the constituent companies. In the consolidation it was arranged that a part of the California Central bonds should not bear interest unless earned, making them practically an income bond. Bond issues now stand as follows: Interest bearing—California Southern, $2,056,000; California Central, $2,548,000; Redondo Beach, $108,000; total, $4,712,000; annual interest charge, $282,720. Income bonds—California Southern, $3,500,740; California Central, and Redondo Beach, $4,071,000; total, $7,571,740; additional interest charge if earned, $454,304.40; interest on both classes of bonds, $737,024.40; annual sinking funds under mortgage requirements, $92,270. No charges have been made against income on account of sinking funds since 1888. The company had a net indebtedness to the Atchison of $1,330,278. The mileage of the road is 491. For the fiscal year ended June 30, 1897, the deficiency to be provided for before payment of dividends on the stock was $818,315.23, of which $225,712.83 was deficit under fixed charges, the remainder being sinking fund and income bond interest. Physical condition of the property has been improved materially since January 1, 1896, and other necessary renewals and betterments are in progress. For the year ended June 30, 1897, a total of $149,762 was expended on improvements, and $45,027 on equipment, or $194.790 in all. Total tonnage of freight was 469,881, of which 150,964 tons, or 32 per cent, was of agricultural products; 77,360 tons, or 16½ per cent, mineral products; 74,639 tons, or 16 per cent, lumber; 90,965 tons, or 19 per cent, manufactures.

Recently Declared Mining Dividends.

Santa Rosalia M. Co., Mexico, 10 cents per share.

American G. M. Co., Colorado, 2 cents per share, $6000; Nov. 15th.

Victor G. M. Co., Colorado, 15 cents per share, $30,000; Nov. 20th.

Champion Mining Co., Nevada Co., Cal., 25 cents per share, $8300.

Elkton Con. Co., Colo., 3 cents per share, $30,000; Nov. 20,

Personal.

CAPT. THOS. MEIN is expected in San Francisco from New York City this week.

W. B. FRY has been appointed superintendent of the Hawkeye G. M. Co., Lead, S. D.

M. HODGE succeeds Benj Tibbey as superintendent of the Parrott Co.'s mimes, Butte, Montana.

P. KLINEFELTER has been appointed superintendent of the Little Butte mine, Randsburg, Cal.

T. J. NORTON of Yreka has been examining Grass Valley, Cal., properties for prospective Sacramento purchasers.

J. J. CRAWFORD, ex-State Mineralogist, on the 15th inst., moved into his new offices—1209-1210 Spreckels Bldg., S. F.

SUPT. EDDY of the Pennsylvania M. Co., Cal., has resigned. Benj. Opie was elected last Wednesday to succeed him.

GEO. A. POUNDER has resigned the presidency of the Silver Belt, B. C., Mining Co., and goes this week to the Yaqui, Sonora, Mexico.

DR. ADDISON, local manager General Electric Co., now occupies offices on the eleventh floor of the new Spreckels Bldg., 3rd & Market Sts., S. F.

A. T. HATCH, formerly California's biggest fruit grower, writes from Fort Yukon of chopping wood at $4 per cord. He expects to get to Dawson some time in '98.

R. EAMES, JR., G. M. Columbia Smelting Co, Crittenden, Arizona, has gone East for an additional smelter and to examine mining properties in North Carolina.

H. C. PERKINS, formerly superintendent of the North Bloomfield mine, Nevada Co., Cal., and who left here fifteen years ago, will return to Nevada City next month.

THOS. WITHERS has returned to Cripple Creek, Colo., where, seventy miles north of Wilcox, he put in a 100-ton mill and smelter for the Table Mountain Copper Co.

CHAS. BUTTERS says that, while a great deal of study has been given to chlorine as a dissolving agent, its use is limited as compared with cyanide, by which it is being slowly displaced in South Africa.

A. BENSON SEARLES, of Washington, D. C., is in Amador county correcting the topography of all the mining claims on the mother lode, for the use of the department at Washington. The idea is to make the topography conform to the location lines of the various claims, which now seem to be at variance, and also in the relation to the various locations to the section corners and other legal subdivisions of sections in all the counties along the mother lode. The work will take several months.

Commercial Paragraphs.

THE Colorado Iron Works reports the sale of a large reverberatory roasting furnace, to be erected in Keswick, Cal.

G. HOFFSNIDER is having a No. 3 Lightner mill, and other machinery build at Birch & Co.'s Works, San Francisco, for the Great Bear Mining and Development Co., near Redding, Shasta county.

BAKER & HAMILTON are in the market with prospectors' engines, hoists and mine working tools of all kinds. Their machinery is of the latest design and built under their own specifications and supervision.

THE Weber Gasoline Engine Co., Kansas City, Mo., report recent sales of their engines as follows: A 20 H. P. engine and pumping plant to the Texas Gold Mining Co. of Buford, Ga.; four gasoline engines, including pumping and electric light plant, to Squaw Creek mining district, near Phœnix, Ariz., for B. Reeves; one double drum geared gasoline hoisting engine, 40 H. P., and one single drum gasoline hoisting engine, 10 H. P., to the Guggenheim Smelting Co., Mexico; one 10 H. P. blowing engine to Geo. C. Updegraff, Sargent, Col.; two gasoline heavy mill engines to the M. A. Sebring Mining and Milling Co. at Benson, Ariz.; one 40 H. P. gasoline engine to operate placer mining pump to L. C. Trent & Co., Salt Lake City, Utah; two complete placer mining plants, including two gasoline engines, to W. F. Putnam of Nyssa, Oregon; two 40 H. P. gasoline hoisting engines, single drum geared, to the Consolidated Kansas City Smelting and Refining Co.; one 10 H. P. gasoline engine, hoisting, single drum geared, to the Gopher Gold Mining Co. of Chaparral, Ariz.; one 10 H. P. friction gasoline hoisting engine to J. T. McLaughlin, San Pedro, N. M.

Recent California Mining Incorporations.

Nevada County M. and D. Co., Grass Valley, Cal.; capital stock, $1,000,000; $7000 subscribed; J. P. Maleville, S. Salomon, W. L. Brown, G. Quane, E. S. Harrison, C. A. Wagner.

Midas G. M. Co., Sacramento; capital stock $800,000, all subscribed; J. H. Roberts, J. W. Roper, L. A. McIntosh, H. K. Johnson, W. F. George.

Gold Canyon M. Co., Riverside; capital stock, $500,000; subscribed, $25; G. B. Fish, D. Mitchell, C. C. Doran, E. B. Stanton, C. L. McFarland.

Alaskan G. M. and D. Co., Sacramento; capital stock, $100,000; subscribed, $3500; H. L. Look, A. E. Rudell, G. H. Clark, D. W. Carmichael.

Utica Gold Mining Company, San Francisco; capital stock, $4,000,000; subscribed, $500; Alvinza Hayward, L. W. Shinn, A. H. Winn, W. E. Sell, Thomas T. Lane, Angels Camp.

Books Received.

"*A Treatise on the American Laws Relating to Mines and Mineral Lands within the Public Land States and Territories, and Governing the Acquisition and Enjoyment of Mining Rights in Lands of the Public Domain.*" By Curtis H. Lindley, of the San Francisco Bar. In two volumes, pp. 1526; octavo; bound in calf. Published by the Bancroft-Whitney Co., San Francisco. Price $15. This work was recently reviewed herein from advanced sheets, and will doubtless meet with extensive sale as an authoritative compendium of mining law, rendered of more than ordinary value by reason of extensive annotations, references and discussion of the many questions that continually arise, and which are treated in such a way as to make this work one requisite in every mining library. It is elaborately indexed, the table of cases cited alone occupying 54 solid pages, the index occupying 130 pages, and the table of contents 15 pages. The work is admirably issued by the publishers.

"*The University Tutorial Series,*" W. B. Clive, London; Hinds & Noble, 4 Cooper Institute, New York City, previously noticed. Two books further received during the week are books I–IV, Euclid, by a teacher of twenty years experience, making the intelligent study of this geometry easy, though thorough. Tutorial Trigonometry, a working text-book on the nature and general properties of trigonometric functions, with illustrative exercises, also constitutes a valuable addition to these works on pure mathematics of practical aid to the learner. An important addition to the last-named work is a chapter on "Trigonometric Functions of a Variable Angle." These books are of unusual merit, and deserve the attention of scientific learners. Price, 70 cents and $1, respectively.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING NOVEMBER 9, 1897.

593,506.—BALING PRESS — A. Barrett, Puyallup, Wash.

593,530.—ICE CREEPER—A. R. Bradeen, Seattle, Wash.

593,511.—GAME COUNTER—Brodeur & Thayer, Portland, Or.

593,521.—BICYCLE STAND—E. Fowler, Wadsworth, Nev.

593,298.—VESSEL CLEANER—C. F. Holland, Elko, Nev.

593,299.—DUST PAN—J. Jeklin, Spokane, Wash.

593,361.—BICYCLE SUPPORT—Martha H. Mason, San Diego, Cal.

593,483.—TIRE COOLER—S. M. Mathisen, Portland, Or.

593,278.—SKATE—E. C. Moulton, San Jose, Cal.

593,542.—STEERING DEVICE—O. Olson, Gervais, Or.

593,422.—FISH CUTTING MACHINE—C. P. Overton, S. F.

593,383.—BALING PRESS—E. J. Shirley, El Modena, Cal.

593,384.—POTATO DIGGER—H. F. Thompson, Springville, Cal.

593,503.—THERMOMETER — M. L. Wilkinson, Los Angeles, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FILE OR RASP.—Otto Olson, Redding, Cal. No. 593,028. Dated Nov. 2, 1897. This invention relates to an improved tool for eroding or cutting away surfaces, and is especially applicable to the manufacture of coarse rasps and files, but can also be used for smooth cutting tools. It consists essentially of a holder having at its opposite ends upturned screw-threaded lugs and having the sides upturned with inwardly turned edges which serve as guides or holders for a series of independent bits or cutters fitted within the holder and having grooves or channels which fit the inturned edges thereof. These bits or holders are curved in cross section with beveled edges, and by means of screws passing through each end of the holder they can be locked firmly in place. Whenever the edges need sharpening, by placing the series of wedges between the bases of the bits, the upper edges will be brought into a common plane, and in this position can all be sharpened at once.

MACHINE FOR CUTTING AND TRIMMING FISH.—Charles P. Overton, San Francisco, Cal. No. 593,422. Dated Nov. 9, 1897. The object of this invention is to provide a means for rapidly cutting and trimming such fish as dried codfish, which is afterwards made up into blocks or packages of convenient form and size for retail trade. It consists essentially of a table and bed-piece, a cutter having diagonally suspending links whereby it may be correspondingly moved into and out of contact with the bed-piece, vertical guides between which the cutter is movable, said guides extending below the table, a bar guided and vertically movable between said guides, diagonal links connecting the bar with the cutter, said links extending at an angle opposite to t ose by which the cutter is suspended, a treadle connected with the movable bar so that it and the cutter may be depressed and the spring or weights to return the parts to their normal condition. In conjunction with this is a hinged extension behind the cutter in the horizontal plane of the fixed table carrying a gauge and mechanism by which the hinged portion is tilted whenever the cut has been made so as to discharge the severed portion into a space below the table. At this point are fixed guiding shoes, so that different parts of the fish may be delivered into different receptacles at one side or the other of the table by simply moving the fish so that it will be cut at either one end of the knife or the other.

Mining Summary.

CALIFORNIA.

Butte.

At New Cherokee the Gage-Wilson Company have started a raise in their incline tunnel, and expect soon to tap the "rotten boulders" at that point. The main tunnel will be run 200 feet farther, when another raise will be run and the work of drifting out pay dirt will commence.

A new mining company has been organized to develop mining property at Centerville. Fifty acres of gravel are held by the American Gravel Mining Company, which can be mined by hydraulicking. It is proposed by the new company to construct dams in the ravine for impounding debris. There is an abundance of timber at hand for that purpose.

Calaveras.

(Special Correspondence).—At Angels the Utica Company are erecting a gallows-frame on the cross shaft of the Stickle mine, and contemplate sinking an additional shaft on the Mattison Gold Cliff mines. The company are operating sixty stamps on the Utica, sixty on the Stickle, forty on the Mattison and twenty on the Gold Cliff. At the time of the late fire the Utica and Stickle were both flooded with water, which stopped the sinking of the Stickle south, or cross shaft; this will now be renewed and the shaft put down to 1500 feet. In addition to their mines, the company own the Union Water Company ditch, which supplies all of their mines with water for power and milling purposes; the chlorination plant, the largest in the State; the electric light plant, and contemplate putting in an electric power plant either at Murphy's or on the Stanislaus river. In addition, they own the large company store, mine hospital, and have an arrangement with the company physician and undertaker, so that they are able to take care of their employes from the cradle to the grave. At present the Utica and Stickle mills are running on ore from the upper levels. Once the cross shaft gets down to the rich Stickle ore shoot, the old-time large output will be resumed. The property, as is well known, is owned and operated by Alvinza Hayward, the Hobart estate and C. D. Lane.

The *Last Chance* mine adjoins the Stickle on the south and is the property of George Tryon, who has a shaft down 80 feet in a 30 to 40-foot vein and levels run. South of this mine is the *Tryon*, C. Tryon, superintendent. The shaft is now down 325 feet, with crosscut at the 300 level, showing a vein 24 feet wide of $2 to $12 ore. He will erect a 20-stamp mill in the spring.

Bolitho, A. N. Butts, general manager: This mine is south of the Tryon. The property is developed by a crosscut tunnel from the east, showing a vein 125 feet wide, while a drift is run in on the footwall, with crosscut from its end, showing a vein there 47 feet wide. There is a shaft down 300 feet, with crosscut run to the vein. Mr. Butts will now start another shaft. The mine covers 3000 feet on the east veins of the mother lode.

Drakes Properties, Limited, Leopold Meyer, general manager: This property embraces the old Tryon ranch, and other ranches to the east of it, and is situated southeast of the Stickle mine. The property is being developed by two shafts. That on the Ghost is now down 395 feet and will be continued on down to 1000 feet. An additional shaft is now started south on the Dead Horse vein. As these mines are developed an interesting question will be determined. Mr. Meyer holds that, as the title to the land to the north of him is townsite and that to the west agricultural, and his patent is also agricultural, all of the ore bodies to the north that come into his ground in depth, through his north end line, and all of the veins to the west, as well, will become his property as soon as they cross his line. This side line question in "agricultural" sections is destined to give the mining attorneys some princely fees.

Lightner, G. Maltman, superintendent: The Lightner adjoins the Utica on the north. The shaft is now down 300 feet and sinking; a crosscut 46 feet east is all in ore, of an average value of $4. They will erect a 20 stamp mill at once. At this time they have a friendly suit with the Utica Company to determine the amount of ore extracted, if any, by the Utica Company in operating their mine.

North of the Lightner is the Coleman, which is idle; to the north of the Coleman is the Bovee. This mine has been in operation by Mr. McKay, but is shut down at this time. It is the belief of all who know the history of this mine that it contains a second Utica, and only needs depth to prove it. East of the Bovee is the Great Western, Baumhoffer & Seibert, owners. The shaft is down 125 feet on a 6 to 12-foot vein. The stamp mill is about completed. Between this mine and the Stickle is the Hog Pen mine of Thos. Peachy, now down 40 feet, with vein 6 feet wide of ore that shows visible gold very nicely and that, Mr. Peachy states, will go $30 the ton.

On the north of these mines is the Keystone, now being developed under bond by C. S. Lillie. The shaft is now down 120 feet, with crosscut going to the vein that crops about 75 feet to the north and is locally known as the Dead Horse vein. Parallel with this mine are the mines of the *Curtiss Con. Mining Company*, covering 3300 feet on the veins, with five shafts sunk, showing ore values of $4 to $7.23 a ton. North is the Black Oak of A. N. Butts, which Mr. Butts will develop. South of Angels is the Tullock mine, now idle. Parallel with it is the *Santa Anna*, C. J. Steedman, general manager. Mr. Steedman has retimbered and straightened the shaft, which is now down 430 feet; crosscuts to the vein show it to be 12 feet wide; and installed a 150 H. P. air compressor, built by Demarest & Fullen of Angels, who are also building a large Corliss engine for the mine.

At Carson there is nothing doing. Attorney General Hart has made the trustees of the Carson Creek mines a proposition to take the mines and pay them a certain per cent of the gross output until their claim is satisfied, which will, no doubt, result in the reopening of the mines. They have a large and complete plant, with shaft down over 600 feet on the largest ore body in this section. While the ore is low in grade, it only needs a good manager to make it pay handsomely.

Leaving Angels and driving to San Andreas the first mine being developed is that on the Bunn ranch by the California Exploration Company. The shaft is now down 330 feet, with crosscuts driven showing the vein to be 5 to 15 feet wide.

South of the Bunn and the Thorpe is the *Demarest* mine, owned by Demarest & Fullen of Angels. The property consists of a mineral location 1100 feet long and an additional mile of ranch adjoining. The shaft is down 120 feet on a 5-foot vein of ore that has an average value of $50 a ton on the surface and mills $7 to $12 in depth. The owners are now erecting a 10-stamp mill and preparing to develop the mine.

The *Thorpe* mine, W. T. Jones, superintendent: This property embraces the old Thorpe ranch. The shaft is now down 700 feet on a vein 12 to 14 feet wide. The property is about to pass into the hands of the California Exploration Company. North of the Thorpe is the ranch of J. H. Wells, at Fourth Crossing, who has sunk a number of shafts on the Thorpe vein that prospects very fine in visible gold. The vein crops strong, showing 50 feet of vein matter. The work done seems to have been done more with a view of securing a good dump than a good ore body. A shaft on the ore body showing should develop a good property. North of this vein a tunnel has been driven 225 feet in mineralized slate to crosscut a vein that covers the entire summit of the hill with its croppings. The tunnel has still 20 feet to go to cut the vein proper.

San Andreas: The principal operator here is the California Exploration Company, W. L. Honnold, superintendent. In addition to its mines in other sections, the company are now developing the *Gottschalk* and *Gold Hill* mines, near San Andreas. On the Gold Hill the shaft is now down 300 feet on a vein 6 to 8 feet wide. The work is here done with a gasoline hoist. At the Gottschalk the mine is developed by a crosscut tunnel, at the end of which the shaft is now down 255 feet, making the vertical depth from the surface 455 feet. The vein runs from 3 to 8 feet in width. The most interesting feature about this mine is the electric hoist installed by the Abner Doble Company. Its action is as light as that of a stop-watch, while the speed is rapid, and the work in every way satisfactory to the superintendent.

Going north the *South Paloma*, with Mark B. Kerr, superintendent, is the next mine of interest. The shaft is now down 700 feet, with crosscut driven 65 feet to the vein, which is here 4 feet wide. Mr. Kerr states that they will now continue the shaft to the 1200 level. To the north of the Paloma is the *Gwinn*, F. F. Thomas, superintendent. It was clean-up day, and the pan full of gold would indicate that the Gwinn is a much better proposition than generally reported. The shaft is now down 1461 feet. Mr. Thomas is opening up the 1200, 1300 and 1400-foot levels. The vein in the north end is 10 feet in width, at the south end 25 feet wide. Mill is of forty stamps. At this time Mr. Rix is starting an air compressor plant of 500 H. P. This will be used to develop the south end of the mine. The compressor will be driven by the waste water of the mill and hoist, the air being returned through 6600 feet of pipe.

Away from the mother lode there is a placer mine operated by Alvin Lunberg, near Vallaceita, and the Central Hill placer mine, near Murphy's. To the north of Sheep Ranch, the old Page-Cutting placer is being worked by Rigney & Co. West of Mokelumne Hill, the Hexter drift gravel mine is being developed by tunnel. To the east of the Hill the *North Star* drift gravel mine, P. L. Shuman, superintendent, covers three miles on the channel. The gravel is worked by ten stamps and one Cox pan. At the time of my visit the mine was under examination by Mr. Farish of Denver. Ten miles S.E. of Mokelumne Hill, on Tunnel ridge, is the *Eclipse* drift gravel mine, J. F. Siegler, superintendent. The mine is opened by a bedrock tunnel 500 feet in length; the channel is 150 feet wide, while the pay streak is 3 to 5 feet next to the bedrock. This gravel yields $1 to $10 to the car of one-half ton.

East of Mokelumne Hill, on the east wall of the mother lode, is the *Esperanza*, or old *Boston* mine, P. Ely, superintendent. The shaft is down 700 feet, and, going to the 800, will be continued on down to the 1000. The ore in the shaft is rich in visible gold. The vein, where crosscut, shows a width of 45 feet; vein matter carries an average of 3 per cent of $75 sulphurets; 30-stamp mill running on the mine. To the north is the Monte Carlo, of Col. W. T. Robinson, now being opened.

On the back vein, the *Collier* mine, east of Murphy's, is now in its old-time rich ore, with Perry Condit in charge. On Six Mile a Mr. Spencer is developing, under bond, the Taylor mine. He is also opening the Taylor mines on San Domingo and San Antone creeks. At Murphy's Naylor Williams and Lewis Lane were operating the old Mexican mine and running a 5-stamp mill on the same. F. McNear has bonded the Buckhorn mines and has let a contract for their development. His work so far shows a 2-foot vein of $15 ore on a chute 300 feet long.

There is nothing doing in the old Calaveras group. Sheep Ranch is also closed down. A few small mines are being developed near El Dorado. Fenberg & Smith have purchased the *Greek* mine, near Wiggin's sawmill, and are putting up a 5-stamp mill.

At Railroad the old Petticoat mine has been sold to L. Rosenfeld. The vein is reported as 3 feet wide with the ore value $50 to the ton. In the past the chutes were thought to pitch south, and when they were not found south the mine was abandoned. The work done on the Petticoat shows that in that mine the chutes go north, and may explain why Railroad has been condemned without just cause.

To the north of the Petticoat is the Keystone, E. C. Loftus, owner. This mine has been worked for over twenty years past for a distance of 1100 feet along the vein—the ore worked in an arrastra and giving a return of from $35 to $65 a ton. Mr. Loftus has a 3-stamp mill on the mine and water power hoist. The shaft is down 275 feet on the vein, with levels run at 200 feet, where the vein's fissure is 3 to 6 feet wide.

There remains for the investor a large field on the mother lode. Undeveloped river channels cross the county in every direction. Where opened, they have paid to work. From Murphy's north extends a contact vein that can be traced for over fifteen miles. No work has been done on it. It lies between porphyry and limestone and is capped with limonite that assays well in places. While good mines do not grow on the bushes in Calaveras, there are still a number of promising locations awaiting capital to develop.

E. H. SCHAEFFLE.

Murphy's, Cal., Nov. 6th, '97.

Philip Deidesheimer has associated with him P. A. Finnegan of San Francisco to work the Maloney mine in Hawkeye district.

El Dorado.

Nugget: At the Gentle Annie mine they have completed the station at the 400-foot level and are crosscutting for the ledge. The shaft of the Pocahontas mine has been newly timbered to the 400-foot level and the ore chutes are being put in.

Excellent progress is being made at the Grand Victory mine in sinking the shaft below the 300-foot level. They are also crosscutting at the 300-foot level, with very favorable results.

The shaft at the Griffith is being enlarged preparatory to putting in new hoisting machinery capable of sinking 2000 feet.

Kern.

The railroad is out four and a half miles from Kramer, and graded fourteen miles.

At Johannesburg a new 10-stamp mill is under construction.

Mariposa.

(Special Correspondence).—Two strikes of rich ore have been made during the past week on the Porter properties, situated on the west vein about two miles southwest from Coulterville. Early in the week the shaft at a depth of 40 feet encountered nearly 5 feet of $20 ore, while a streak of about 8 inches on the foot and a similar streak on the hanging wall will run nearly $1000 per ton. A few days later, in a tunnel which was being run on the ledge toward the shaft, there was found a body of 18 inches of quartz assaying $500 per ton. This latter body is on the footwall, about 300 feet from the mouth of the tunnel and some 150 feet from the shaft. The drift has since been run about 25 feet into the chute, which seems to be slightly increasing in size. The rock is identical in appearance with the rich ore found a few years ago in the Tyro mine, adjoining on the north, and also with the specimen rock of the Merced Company's Malvina. The property is being operated under bond by Francis H. Hill (the price is said to be $12,500) and includes 320 acres and nearly a mile in length along the west vein. It is announced that the deeds, which are in escrow, will at once be taken out by Mr. Hill.

The Merced Mining Company are erecting a large air compressor at the Mary Harrison mine.

At the Virginia all the men who can be crowded on the work are building the mill and dam.

The additional stamps at the Louisiana mine were started up last week.

Mariposa, Nov. 15th, '97.

Nevada.

The new machinery recently introduced into the 1700-foot level of the Providence mine was successfully started last Wednesday. The company will continue sinking and opening up new levels.

The *Transcript* says that the Champion company have completed the purchase of the Delhi and St. Gothard quartz mines at Columbia Hill. It is stated that the Champion company will next spring reopen the tunnels.

A new style of quartz mill is to be introduced in Nevada county. It is an English patent, for which great things are claimed and which is used in quartz mines owned by some English corporations in South America. It is to be located on the Lucky Boy quartz mine, two miles south of Grass Valley, which has been purchased from Adams & Cook by Desborough & Co. The ledge in the Lucky Boy shows free gold. Mr. Desborough and his associates expect to expend $5000 next spring.

Correspondence *Transcript*: There are four great quartz lodes in our county, the first or lower one being the North Star and Allison Ranch lode on the west side of Wolf creek. Next comes the Eureka-Idaho lode from footwall to the Lucky and Cambridge mines, with its series of rich ore shoots, many as yet hardly touched, notwithstanding that these two great and rich lodes have produced in gold in forty-eight years $105,748,407. Then comes the Providence-Champion lode, from Town Talk to the La Suerte, which has produced, excluding Gold Flat, $72,000,000 in gold, and great portions of the lode remain untouched and unexplored. Many of the mines now being prospected will yet compare favorably with the great Providence and Champion mines. All that is needed is capital intelligently applied. Of course, there are hundreds of mines, and some good ones too, outside of these great lodes scattered throughout the county.

On the mother lode at the St. Patrick mine there are two tunnels, one above the other. The upper tunnel has been run across the lode 167 feet and shows 92 feet of ledge, pure quartz. The lower tunnel has been run in 270 feet and is 40 feet in ledge quartz not mixed. There was treated by mill process 500 pounds of this ore by George Bingay of this city, which yielded well in free gold. The sulphurets, of which there was 13 pounds, assayed $744.12 per ton. This is a giant shoot of ore, and with depth will undoubtedly make a gold mine. On the next claim to the south a tunnel has been run on the lode 100 feet or so. The ledge looks well. Several years ago an arrastra was used on this claim with good results. Directly opposite the town of Washington, at the El Capitan and Honest Frank, three tunnels have been run. The first tunnel ran through the ledge for 100 feet. Some of the ore milled $5 per ton and the sulphurets assayed $100 a ton. The mine was bonded to a French company and soon afterward work was stopped. Another tunnel was run south for 400 feet, but was too high. Still another tunnel was run 200 feet and cut through the rich stringers of quartz and slate, which assayed well in gold and showed about the same character of matter as is found in the mother-lode mines of Amador and other mother-lode counties. It is the intention to run another tunnel 400 feet deeper and 800 feet south of the present lower tunnel. This, from indications, will cut the great ore shoot where all the stringers and mineral feeders from both sides will be in place, forming 100 feet of rich ore. The cost to do this, compared with the reward, is a mere song.

The next mine south is the Giant King, with its two tunnels, cutting in the upper tunnel an ore shoot 120 feet wide. The shoot of ore has been traced south for a distance of 750 feet into the Giant Queen ground, and is a discovery that will no doubt lead down into the main ore shoots. The point of discovery is 120 feet south of the Giant King south line and 150 feet east of the lode line. Somebody will take hold of these now idle mines some day and make vast fortunes out of them, besides giving employment to hundreds of men and benefiting the whole county.

At the California the long tunnel has struck into the fissure, which is nearly 100 feet wide and filled with a series of pay shoots.

The Eagle Bird is still a good mine, notwithstanding the fact that it has produced $900,000.

Considerable work is being done along the river mines, but in nearly every case it is want of confidence and actual lack of capital. Where it would take $25,000 to insure success in a good gold quartz mining venture they expect to win on $10,000 and $15,000. It is the same old story—didn't put in enough to make it a success. That is the real cause of many failures in mining ventures.

Telegraph: The W. Y. O. D. mine is looking better now than it has looked for the past four years, and the twenty stamps are kept running night and day on more than average milling ore. Tuesday afternoon the mill was successfully started on its run with electricity.

Transcript: At the Texas mine the new three-compartment shaft is down 100 feet. The new hoisting and pumping rig will be started up by Dec. 1.

Placer.

Colfax *Sentinel*: The Gold Run Gravels Co., at Gold Run, are making extensive preparations for the coming season's run. They will operate two hydraulic monitors, tailings to be impounded in an accepted dam across Canyon creek. The 10-stamp mill that will crush gravel from the drift tunnels will be ready to start in about three weeks. During the summer this company has expended about $25,000 in building new flumes and repairing the ditches which convey their water supply. The company ditch is about twenty miles in length, with a carrying capacity of 2200 inches. The water is taken from the South Yuba river 3½ miles below Cisco. Five miles below, at Birce & Smart's mill, it is dropped into Bear river, conveyed six miles, and taken from Bear river to Gold run in the Bear river ditch. The company expect to employ forty men during the winter.

Plumas.

R. K. Lodge of Granite Basin has developed his mine by a tunnel and shaft; has tapped the ledge, showing it 1½ to 2 feet wide, and the rock will pay.

The Debris Commission has granted to the Miocene Mining Company permission to operate its placer mine near Crescent Mills.

San Diego.

Union: The Ranchita and North Star mines at Banner are being deepened, and drifting is also in progress. At the Alpha, owned by Dr. Stanley and Samuel Reeder, the men are drifting on two ledges which were encountered in the tunnel. The Elevada is in good ore in a drift about 80 feet from the 200-foot level.

At Hedges the 100 stamps may be increased to 140. Ex-Governor Markham has purchased a number of properties of which the principal mine is the American Girl.

Shasta.

(Special Correspondence). — The National Consolidated, owned in San Francisco, nine miles northeast of Redding, in the Rich Gulch district, have a new 10-stamp mill, concentrators and canvas plant in operation. Their tunnel is 785 feet; the main shaft, from the tunnel, is 100 feet, at the bottom of which a drift runs in two directions, all on the ledge, which is from 3 to 5 feet. There are eight claims in the group, water right, electric and steam power. The ore is high grade. Geo. Schmitt is president and general manager.

S. S. Stickler and two others have a crosscut tunnel 200 feet on a 3-foot ledge in a porphyry and slate formation. The ore is medium grade and the sulphurets are in good proportion. The same parties are doing development work on four properties.

Buckeye, Nov. 13, '97.

Bell & Scranton are developing four claims four miles from Shasta. They have two tun-

nels and a winze. The ledge will average 2 feet of high-grade ore.

Iler Brothers, four miles north of Shasta, have nine claims. In the 600 level they have a 10-foot ledge, which they claim gives an average assay of $26.85 per ton. It is rich in sulphurets.

Shasta, Nov. 12, '97.

Within ten miles of Redding, at Hart and Whitehouse, there is great activity in the mining industry. Both places are in a beautiful basin and within a mile of each other. The mines are strung along in a semicircle on the mountain side.

The Texas Consolidated, commonly known as the Hart mine, in porphyry and slate walls, has a vein 8 feet wide. The ore is carried by rope tramway about one mile to the mill on the banks of the Sacramento river. Passenger and freight traffic is conducted in the same method across the river to the railway station. There is a 20-stamp mill, operated by electricity, eight concentrators and canvas plant.

The Central mine, owned by an English company, ships forty tons of ore per day to Keswick, carrying the ore across the river by rope tramway.

The Spanish is preparing to ship ore to Keswick. R. G. Hart is manager of the three aforenamed properties and principal owner of the Texas.

The Mammoth has a main 1000 feet, 300 feet from the surface, and ships thirty tons per day to Keswick, delivering the ore by rope tramway across the river at the railway station. S. W. Cheyney is the manager.

Panther & Litch own the Evening Star Consolidated, comprising three claims. They have 900 feet of tunnel in a porphyry formation, and an 18-inch ledge. They ship their high-grade ($500) ore to Selby and their second-class ($60) to Keswick.

Hart, Nov. 13, '97.

(Special Correspondence).—D. W. Thompson is developing two claims two and a half miles from the town of Keswick on the line of the Iron Mountain Railroad. He has four ledges, 2½ to 4 feet wide, in an iron and porphyry formation. Assays from the ore in the surface cuts run from $2 to $16.

D. Pessenti is working on five claims adjoining the Thompson claims. He has a 60-foot shaft and 200-foot tunnel on the ledge, on one claim, and a 90-foot tunnel on another claim. The ledge is about 18 inches, in a good grade of ore.

McCarthy & Carlson have five claims one-half mile above the smelter. They have 400 feet of tunnel on a 4-foot vein of medium grade ore. The formation is quartzite and porphyry. They are building railroad connection with the Mountain Copper Co., with whom they have contracted to furnish thirty tons of ore per day to the smelter.

J. B. McLaughlin, the druggist at Iron Mountain, has an 80-foot tunnel on a 4-foot ledge at Copley. The ore will go to the smelter.

Searchlight: Litsch & Panter are driving a tunnel to tap their ledge, and are also shipping ore to the smelter at Keswick. Hitherto they had hauled to Redding and thence shipped by rail, but now they are using the Central cable, under lease to R. G. Hart, Sr.

E. W. Brackett, at the Mount Pleasant mine, three miles west of Redding, is sacking ore for shipment to Keswick. The ore gives a better pan prospect than any yet shipped, and of all the cars delivered at the smelter not one has gone below $16 net per ton, and from that up to $57.

Sierra.

At the York quartz mine, Slug canyon, the new quartz mill is completed and only a shortage of water will delay crushing. Twenty men are at present employed by Supt. Copeland.

Siskiyou.

(Special Correspondence).—The Schroeder Consolidated Mining Co., nine miles southwest of here, whose 10-stamp mill was destroyed by fire about a year ago, is erecting a 20-stamp mill. On the 1200-foot level the ore body is over 100 feet wide, which bears sulphurets in value throughout of from $3 to $4, and a 4-foot ledge that yields $132 per ton in free gold. The formation is porphyry.

Yreka, Nov. 15, '97.

Two new quartz mills are being erected within two miles of Hornbrook, one on the Norfolk ledge and the other on the Lodi ledge. These mines were worked in early days by McConnell & McMannus, John Daggett and others, but have been abandoned for years and are now to be opened up again. I. O. Jillson is putting up one of the mills, being connected with Capt. Roberts of Sacramento. The other mill is being erected by LaFlesh & Martin.

The Spengler Bros. have their extensive flume at the mouth of Humbug creek nearly completed for winter sluicing. The flume is 40 wide and 40 inches deep, three-fourths of a mile long.

The Blue Gravel mine has been closed down temporarily owing to a shortage of water. On last Tuesday workmen struck the tunnel in the old mine, which flooded the miners out.

At the Spencer quartz mine men are at work on the tunnel. It is slow work and will take some time before they strike the ledge, as they are digging through a formation almost like iron.

At the Siskiyou mine on Klamath river, near Happy Camp, the owners will put in an electric light plant, so that they can work night and day during the time they have water.

Trinity.

The Grattan Mining and Improvement Co. have begun operations on a placer claim on the North Fork of Swift creek, 2½ miles west of Trinity Center. They are working in good pay gravel.

At Cinnabar there are now about 40 feet of water in the Altoona mine, which is rapidly being lowered. As soon as the water was lowered to a depth of 5 feet, the 9000-lb pump had to be lowered that distance before pumping could be resumed. The company expects to increase its force to seventy-five men by Dec. 1st. During the season J. Porter has delivered at the mine 5000 cords wood and 500 M feet lumber.

Tuolumne.

One who claims to be familiar with the Santa Ysabel mining property says: "The Santa Ysabel mine has three shafts and a fourth is now being sunk. Shaft No. 1 is an old shaft not now worked. No. 2 has the Mascot vein and No. 3 the Knox & Boyle vein. This latter one is the principal vein. Years ago it was worked in a crude way to a depth of 150 to 200 feet and ore was taken out valued at $50 to $65 a ton, but an intrusion of slate was then encountered, which at that time was thought to end the vein. When the present management took hold of the property it cut through this slate deposit and found the vein. Assays of the ore showed it to be worth $25 a ton. After discovering the value of this vein, work was stopped in order that other veins could be worked and the full value of the property demonstrated. It was from the Mascot vein that a preliminary mill run test showed the value of the ore to be $16 a ton. The Mascot vein is very irregular, and it was from a lean part of the vein that a second preliminary test—not a full mill run—of 300 tons showed the ore to average but $8 a ton. It was this test that has caused some disappointment in the property, but Superintendent Newcomb, who was recently in Boston, expresses great confidence in the Mascot vein. Should the Mascot vein prove still more discouraging, there is the Knox & Boyle vein to fall back upon. An increase in the floating debt of from $40,000 to $50,000 was incurred by the erection of the stamp mill, installation of machinery and development of the mine. The directors are considering the question of caring for this floating debt. It is held by friends of the property, and it will be taken care of without detriment to the stockholders. Santa Ysabel was put on the market at $5 per share, the par value, and the stock is non-assessable."

General Manager Buckminster states that the latest advices from the property are as follows: "Work on the No. 4 shaft is still suspended pending the placing of the hoist. The Central ore chute, as shown up by the No. 5 crosscut, is about 4 feet wide and of a very high grade of ore. One foot of this quartz laying at the footwall is very rich and assays $500 50 per ton. From the same sample $395.50 was obtained by an amalgamating test, the gold amalgamating freely. The percentage of sulphurets in the ore is about 7-10 of 1 per cent. This is the most important showing we have ever had. We have never had anything like this above the No. 3 level, which means much. We are doing all we can to open up this body of ore. Expect in a day or two to have sufficient water to run ten stamps."

Sinking on the Ready mine continues. There are twenty men working in the Lady Washington mine. Sinking continues at the Grizzly mine.

NEVADA.

The men employed by the Boston & Nevada Copper Company on the mine recently purchased in Santa Fe district have discontinued work, the ledge as far as worked not being sufficiently high grade.

A. C. Cleveland is locally credited with ability to make $150,000 by the sale of the Grey Eagle and Star mines in Cherry Creek.

The De Lamar mine is now producing 9000 tons of ore monthly.

The *Lode* says the De Lamar company, under the new arrangement for the transmission of its gold bullion, will deposit it in a safe weighing 500 pounds and send it direct to Salt Lake.

Tuscarora *Times-Review:* Work at the Independence jigs has been suspended for the winter. The work had passed the experimental stage and was a pronounced success. The difficulty of keeping the water from freezing and the cost of fuel at present renders it impossible to run the plant during the winter months.

Supt. H. C. McTerney of the Eureka Con. M. Co., Eureka, reports: "During the year ending September 30th, 1897, we have shipped to the Salt Lake smelters 1121.25 tons tribute ore, 15.51 tons company ore from the mine, and 69.55 tons of material from the surface dumps. Most of the ore shipped was from the surface workings and tunnel on the west side of the hill, all the work having been done by tributers."

The *Sentinel* says that the ores now being shipped from Eureka average 60 per cent in gold.

For the year ending September 30th, '97, the McEllin mine, near Hamilton, produced $25,013 for its owners from 418 tons of ore.

OREGON.

Baker City *Democrat:* Shipment of ore and concentrates from Sumpter over the S. V. R. R. to this city, thence over the O. R. & N. to the smelters, is becoming a big item. The heaviest shipments are made by the E. & E. mines at Bourne, but all the other mines contribute largely. The North Pole and Columbia and Bonanza are the other large contributors.

F. S. Baillie, manager and one of the owners of the Columbia mine, says early next spring his company will commence the enlargement of the mill plant to forty stamps.

W. J. Connors, owner of the California mine in Cable Cove, reports the machinery of his mill plant in place and ready to drop stamps. He is finishing the covering of a 3000-foot ditch which will convey water to his mill. Covering of the ditch will prevent the water freezing in winter. Another week will see the mine in full operation.

The Nilson quartz mine and the adjoining Gordon mine, near Baker City, have been sold to Walker & Jones of Cripple Creek.

WASHINGTON.

The Republic mine, Eureka camp, Colville reservation, shows value under development. Thirty men are employed. The flume for the mill is completed. It is 10,000 feet long, and will give the company 100 H. P. The ore is partly free milling, and it is probable that a combination plant will be put in. P. Clark is superintendent.

BRITISH COLUMBIA.

There are thirty-five mines in the vicinity of Rossland which use steam plants that cost in the aggregate $370,000. The Le Roi heads the list so far as size is concerned. Early in the present year it installed a 40-drill compressor, which was necessary in order to increase the output of the mine. The mine is equipped with a 200 H. P. hoist, an electric light plant, tramway, and large crusher and other machinery. This requires 500 H. P. boilers. The plant cost $150,000.

ALASKA.

John D. McGillivray is at Circle City, and in a letter to the *Herald*, says:

"Hydraulic mining is to be attempted on a large scale in the Minook Creek district next spring and summer, as is evidenced by the fact that a company composed of Seattle and San Francisco capitalists has sent prospectors and agents into the country to locate claims and buy tracts of land.

"As the claims are held now—generally 500 feet in length—it would be impracticable to work them separately, but under one ownership a large number of claims would pay for bringing in water and laying the necessary pipes. By the present method of working only the richer pay streaks are taken out, and in most cases this is only about an eighth or a tenth of the width of the whole of the gravel of the creeks. If these gravels are worked by hydraulics, in many cases it would pay well to work all the gravel.

"There is no law here but miner law, but under that one must walk straight as far as honesty goes. All last winter, with a thousand miners who came to have a good time, and with all the idleness and drinking and gambling, there was possibly as little fighting and less crime than in any other city in the United States of its size. There were two murders, but the men concerned had no place in this community. The Miners' Association is feared more by the evil-doers than any laws or courts elsewhere. To be sent down the river in a small boat is worse punishment than imprisonment. The law is that a pistol must not be carried in Circle City. It is miner law, and is therefore obeyed. None but miners may join the Association, but all may ask its protection.

"The season's work in the Birch creek mines is about over, and the yield of the number of men in the district is large. It will exceed $500,000, and possibly will reach $600,000, according to conservative estimates. Of this sum $80,000 comes from one mine and $60,000 each from two others, all on Mastodon, a tributary of Birch creek. About a dozen other mines on the same creek produced from $4000 to $15,000 each."

Record: The Treadwell Company is constructing a new railroad track along the beach between the Douglas sawmill and the chlorination works. The company has begun active operations on the new 300-stamp mill, which will be located near the chlorination plant. Work has also begun on the 100-stamp mill on the Alaska United Gold Mining Company's claims.

THE KLONDIKE.

The collector of customs for British Columbia and the N. W. T. has been consulted on some doubtful questions and the information below is believed to be correct.

The bonding stations on the routes to Dawson City are Leonora, 110 miles north of Fort Wrangle on the Stikeen river; Lake Taggish, seventy-two miles from the coast on the Dyea and Skaguay trails; Fort Selkirk on the Pelly river, on the Dalton trail and Cudahy or Dawson City on the Yukon. Parties desiring to go through Northwest Territory into northern Alaska, cannot take their goods in bond, neither will there be any refund made of duties paid on such goods, and while this matter has been considered by the Dominion Government, it is not probable that there will be any change in this law for the present. Invoices of goods should be produced in duplicate when they are purchased, and collections will be made in accordance with prices therein named—not on the value of the goods where the collection is made. On most goods subject to ad valorem duty, the weight of the receptacle is included and assessed the same as the contents. The exemptions are: Miner's blankets, personal clothing in use, cooking utensils in use, 100 pounds of food, sled, wagon or sleigh for the transportation of your own outfit, and a reasonable amount of tools for prospecting or mining. The "blankets and cooking utensils in use" does not mean just what articles the miner may require for immediate use, but a sufficient quantity to make them comfortable for a reasonable time. Officers will use their own discretion in exempting the 100 pounds of food, endeavoring to strike an average, and exempt accordingly. Miners will be allowed a sufficient number of horses or other animals free to transport their goods. All kinds of machinery imported exclusively for the reduction, mining and smelting of ores, free.

The duties on the most important articles are: Flour, .60 per barrel; bean, .15 per bushel; bacon, .02 per pound; coffee, specific, .02, ad valorem, .10; baking powder, .06 specific; cornmeal, .02 ad valorem; candles, .25, ad valorem; meat and meat extracts, .25 ad valorem, and tobacco, .50 specific.

On the 17th ult., a party of railroad engineers, supposed to be sent out by the Northern Pacific railroad, arrived by the steamship Rosalie, at Taiia, and ran a line from Taiia to Lake Lindeman, twenty-seven miles; and supplies began to arrive for a railroad, railroad telephone, tramway, etc., and work is in full blast at several places along the line. A temporary track of wooden rail will be laid from Taiia to the canyon, nine miles away, to be used as a tramway and operated by horses. At the canyon a power house is being erected, which will run a wire tramway to Sheep Camp, four miles, where another power house is going up, and the tramway continued on to Crater lake, four miles farther. From Crater to Lake Lindeman, a distance of ten miles, sleds will be used during the winter and every spring, and as the snow disappears in the spring, a grade will be built and horse-tramway used. Then, as soon as the high-water mark can be determined in the spring, a railroad grade will be built and thirty-pound rails laid and engines and cars put on from Taiia to the canyon. The whole line will be completed and in operation as tramway by January 1st from Taiia to Crater lake. The work on the grade and at the power house is progressing; cutting out the right of way, drilling holes in the rock for the towers for the tramway, stringing out the wire tramway, and erecting poles for the telephone. Four miles of wire are on the poles on the way to Sheep Camp and the upper power house.

One of the numerous "Alaska development" companies is having a dredger built in Seattle, Wash., to be used on the Yukon next summer. The sand and gravel do not come in contact with the wearing parts of the machinery. A suction pipe is run down into a sand or gravel bank to bedrock, and has crossbars at the inlet end to prevent any material over half its size from entering. The material is pumped up to the sluice boxes by two plunger pumps having cylinders of such size that the solid material does not touch them. The plungers work in a brass plate placed in the top of the cylinder and perforated with holes one thirty-second of an inch in diameter. Through these holes a jet of pure water continually flows, being fed from a separate pipe, and prevents the material from striking the plunger and wearing it. The material passes through the bottom of the pumps into a third cylinder placed between them, which maintains a regular flow into the sluice boxes. There will be two sets of sluice boxes, so that while dirt is being washed in one the other can be cleaned and the work can go on continually. Each set of sluice boxes will extend part way along one side, across the end and along the other side of the boat, running far enough over the stern to make the debris clear the wheel. The boat part consists of a catamaran scow 125 feet long and 32 feet beam, run by a stern wheel. A 72x14-inch engine will furnish motive power, and the dredger will be run by a 25 H. P. high-speed engine, geared up to gain eight times its nominal power. The pumps will have 26-inch plungers and a 12-inch suction pipe, rendered movable by knuckled joints. It is claimed that they will have a capacity of 2880 cubic yards in twenty-four hours.

UTAH.

Capt. De Lamar has paid $237,500 for a part of the Resolute No. 2 at Mercur.

A Washington, D. C., dispatch says the representatives of a New York syndicate and the agent of a St. Louis corporation now engaged in the gilsonite trade want to control the gilsonite business. On April 1, '98, the Uncompahgre Indian reservation in Utah will be opened to settlement, all except the mineral lands, which are reserved by the Government. These mineral lands embrace about 100,000 acres. G. H. Eldridge, the United States geological expert, says in his report that 23,000,000 tons of asphaltum can be mined in this Territory. Capt. Beck, agent for the Uncompahgre reservation, who is in Washington, explained that great difficulty is experienced in getting the gilsonite to market. The Denver & Rio Grande Railroad, which is the most accessible line, is 125 miles distant. The new syndicate that wins would, of course, construct a railroad from the mines to connect with the Denver & Rio Grande, thus greatly cheapening marketing of the product. The syndicate could afford to reduce the price without lessening its profits and at the same time create an increased demand. The net profit now realized on the gilsonite shipped from the vicinity of the Uncompahgre reservation is $10 a ton. The profit of a syndicate controlling the entire deposits and reducing the carrying charges might be twice as much per ton.

IDAHO.

At the Bingham Placer Company's property near Gibbonsville, arrangements for next season's washings have been perfected, and double the amount of gravel handled in 1897 is promised.

John Pilmer, who has been foreman at the Peacock mine, tells the Weiser *Signal* that the smelter, capacity 70 tons per day, will be in operation Jan. 1, '98. It is eleven miles from the Peacock. At the Peacock there is a face of 60 feet of ore in the open cut. It is his opinion that the entire face of 60 feet will average over 20 per cent copper. A lot of 480 tons of second-class ore left by those who formerly worked the mine was carefully sampled last summer and gave a return of 13.8 per cent. A tunnel has been run in 80 feet. The Helena mine is being worked under the superintendency of Jno. Anchor. It is developing a large amount of high-grade ore, carrying more than 50 per cent copper. The company is building a road to this property.

The Sonora Mining and Milling Company has incorporated at Wallace, capital stock $1,000,000; A. F. Gill, president.

A Boise dispatch says the sequel to what is believed there to be an attempt on the part of an English company to steal a valuable tract of placer ground was opened there this week when B. Wilson began suit against the Pioneer Gravel and Gold Mining Co., Limited, for the recovery of $130,000, with legal interest from April 2, 1894. The property involved is the old producing placer mines at Pioneerville, forty miles from Boise. An idea of their extent is given by the statement that water is supplied the immense tract from eighteen ditches, having an aggregate length of 100 miles. Wilson says he sold the mines to an English company for $150,000 in April, 1894,

receiving $20,000, and turned over the mines to the Englishmen, and that the latter have failed to pay anything additional, according to contract, and refusing to give up the ground, which Wilson claims they have looted. He also asks for a receiver.

The Mastodon and Milling Company is incorporated at Boise, capital stock $2,000,000; A. R. Sweet, secretary, Lewiston, Idaho. Its properties are in Elk City mining district, Idaho.

MONTANA.

The Garnet mill, three miles from Pony, is upon a natural millsite. Ore from the mine comes down 1000 feet on a gravity tram. The mill consists of twenty stamps, two 4-foot vanners and four 6-foot vanners. The capacity is three tons per stamp, or sixty tons of ore per day of twenty-four hours. In the mill and mine twenty-two men are employed. The result is the shipment of three cars of concentrates a month.

Inter-Mountain: Here are a few of the Montana mines which are recorded as dividend payers in the past or present, with the dividends paid to date:

Alice	$1,035,000
Bimetallic	1,630,000
Elkhorn	1,212,000
Parrot	1,656.122
Heela	2,175,000
Montana (limited)	2,890,637
Lexington	4,200,000
Boston and Montana	6,275,000
Granite Mountain	12,120,000
Anaconda	3,750,000
Hope	702,252
Iron Mountain	497,500
Montana Ore P. Co	6 0,000
Bald Butte	482,500
Florence	133,530
Western Mine Ent. Co.	12,000
Total	$39,410,541

J. Work has disposed of his Crevasse mine and mill to Clark & Westbrook of New York. The terms of the sale provide for the payment of $20,000; $6000 Dec. 4, $4000 March 15, 1898, and the balance on or before Aug. 1, 1898. The working lease provides for immediate possession of the mine and mills, consisting of thirty stamps.

COLORADO.

An Aspen dispatch says the owners of the Smuggler mine, which has been on fire, announce that the situation is much improved, inasmuch as they have succeeded in carrying lines of steam pipes to within a short distance of the fire, and hope in a few hours more to be playing upon it. Outsiders, however, take a different view of the situation. Already the gas has permeated the workings in the various mines on Smuggler mountain for two miles to the north of the Smuggler shaft, and 500 men have been driven out and two or three times that number will have to quit work if the fire is not quenched. The feeling here is gloomy, as it is believed a long shut down of the principal mines of the camp may occur.

At Aspen, the Argentum-Juniata Mining Company has decided not to renew the leases of that portion of the mine above the fourth level, and will in the future work the ground itself.

A Victor dispatch to the *Republican* says the rush with which ore is now coming out is blocking everything. Not only are the mills more than filled to the capacity of the bins, but the ore haulers are blocked and the railroads are, as usual, between fires trying to satisfy the three factors, with themselves in a crippled condition through shortage of rolling stock, and are urging the mine managers to ship in small lots and more frequently in order that the movement of cars may be expedited. The mills had educated the miners into shipping in large quantities in order to avoid the frequent clean-ups of the sampling machinery after small lots, and the railroads are coming in now and changing the order.

Business is booming all over the mountain system, and in a short time the Denver & Rio Grande will have to use 700 and 800 additional cars to handle the 1000 tons of daily production of iron ore the Pueblo rolling mills will require from the mines at Orient and Calumet. The output of Cripple Creek at the present time, with even a short haul of 40 miles, requires not less than 500 cars, and the demand will increase rather than diminish between now and the first of the year.

Idaho Springs *News*: Dewey Bros. have sold their sampling works in this city to the Kilton Chlorination Works of Breckenridge. The company have works at Boulder and Cripple Creek as well as at Breckenridge. Possession of the plant in this place is to be given between now and Dec. 1st. Oscar Lachmund will have charge under the new ownership.

NEW MEXICO.

An Albuquerque dispatch reports a mining deed filed in which P. A. Campbell of Brooklyn, N. Y., transfers mining property in township 12 north, range 6 east to the Industrial Gold Placer Company, the consideration being $20,000,000 worth of capital stock.

The *New Mexican* says the 80-ton smelter of the Mary Mining & Smelting Company, at Cerrillos, is nearing completion.

At Hillsboro, E. S. Flagg, manager New Mexico Dry Ore Concentrating Company, has a bond and lease on the Gold Star, Scandia and Unicorn mines. One thousand dollars, 10 per cent of the purchase price, was paid down, further payments extending over sufficient time to enable the lessees to thoroughly test the value of the property. The company will erect a mill at the mine with a capacity of fifty tons per day.

ARIZONA.

At Nacosari the Copper Queen Company are building a narrow gauge road four miles long to connect the mine and smelter site. A tunnel 5000 feet long will carry the road right under the mine, and the ore will go down to the cars in chutes.

The Gold Cliff Mining Company of Pearce W. H. Wren secretary, will proceed at once to erect rock crushers and rollers to prepare the ore to be treated by the cyanide process. The company has a large quantity of ore now upon the dumps ready for treatment, and will soon increase the capacity of the plant now in operation to meet the increased output of the mine.

At the Vulture mine twenty men are employed getting out ore. The 10-stamp mill is at work. Mr. McLeish is operating a cyanide plant and expects to complete the work in two months.

In accordance with orders from the operating company's offices at New York, the smelter at Crittenden, Pima county, has been closed down. The Hardshell mine, which supplied the reduction plant, has an ore body 15 feet in width, all of which went to the smelter. An assay from a depth of 300 feet gave returns of $105 in silver and $75 in lead.

The crude carbonate of soda from the head of the Gulf of California averages 75 per cent sodium carbonate, and may be used in its natural state for the saturation of crude boracic acid and for other purposes. It is considered to be a variety of the mineral known as "troua."

The Nogales *Oasis* is informed on good authority that the Garretson Smelting Company of Buffalo, N. Y., have arranged to erect a 250-ton smelter at Washington Camp.

At the Congress mine, at a depth of 1325 feet, a crosscut is being run to strike a body of ore known to exist.

MEXICO.

Wm. Guggenheim of Aguas Calientes was in Mexico City last month on business connected with his smelters. As to the present production of silver and gold in Mexico, he says: "We are receiving more gold at our smelters than ever before. A few years ago the entire output of gold in Mexico was only $3,000,000. Last year it was over $6,000,000—an increase of 100 per cent—but still a comparatively unimportant item in the world's supply of the yellow metal. The silver output has been greater this year than in '96."

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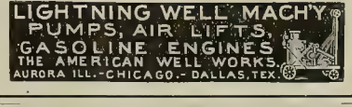

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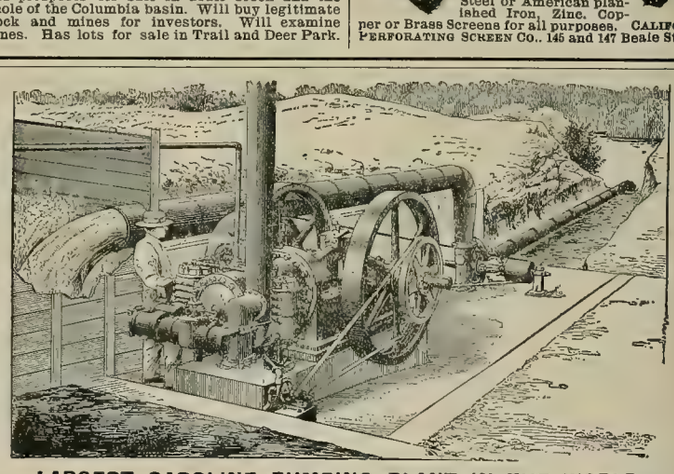
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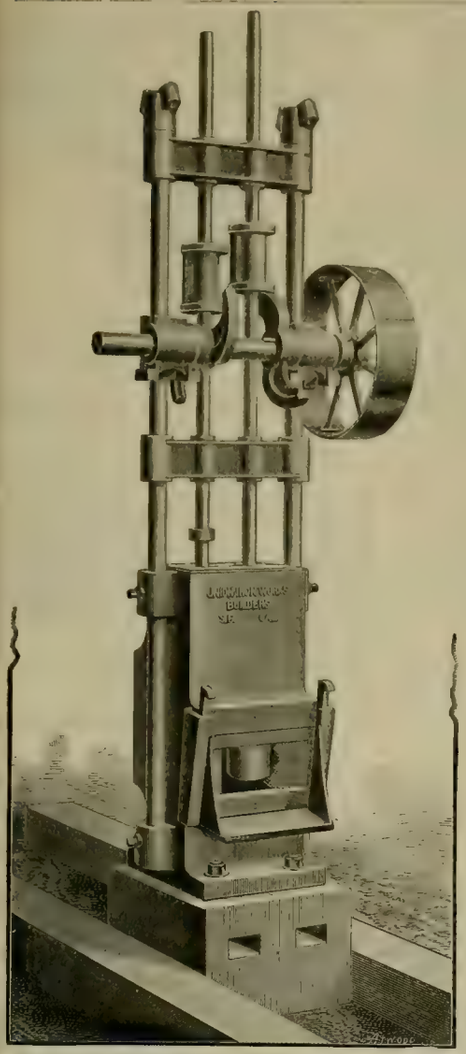

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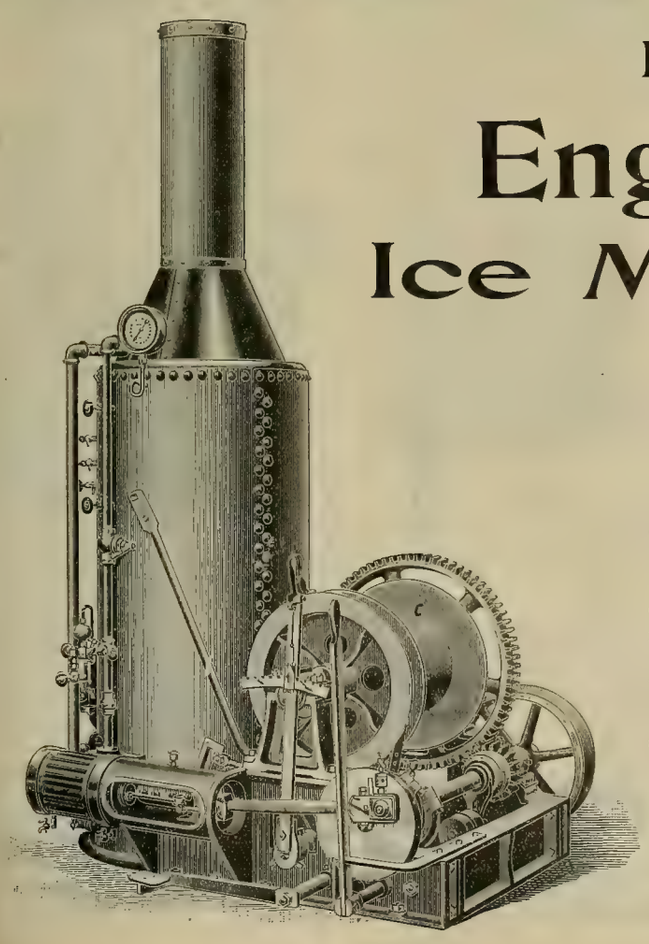

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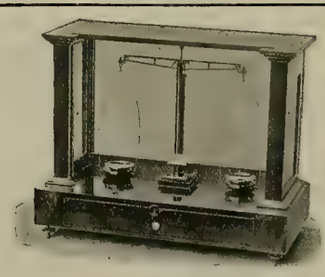

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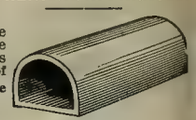
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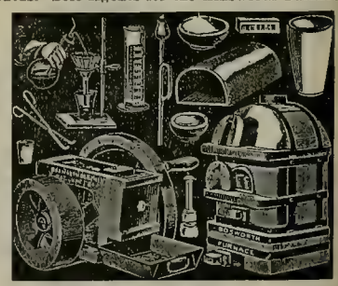
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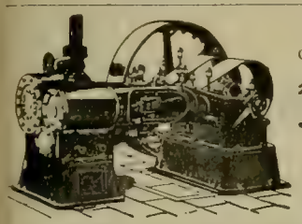

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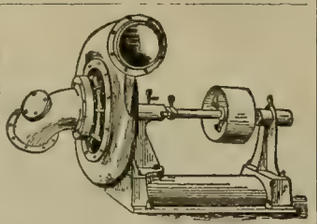

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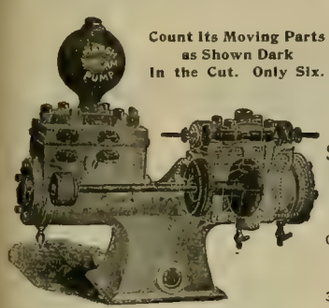

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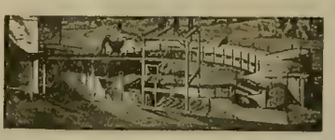

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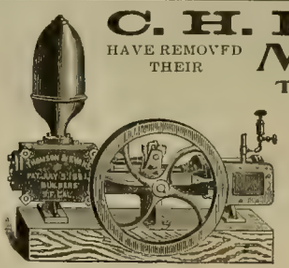

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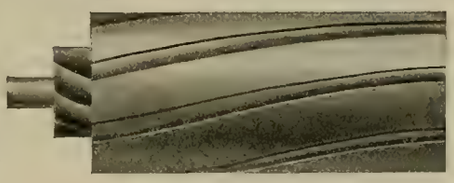
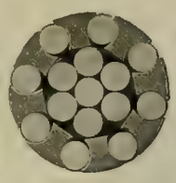
Locked-Coil   Track Cable

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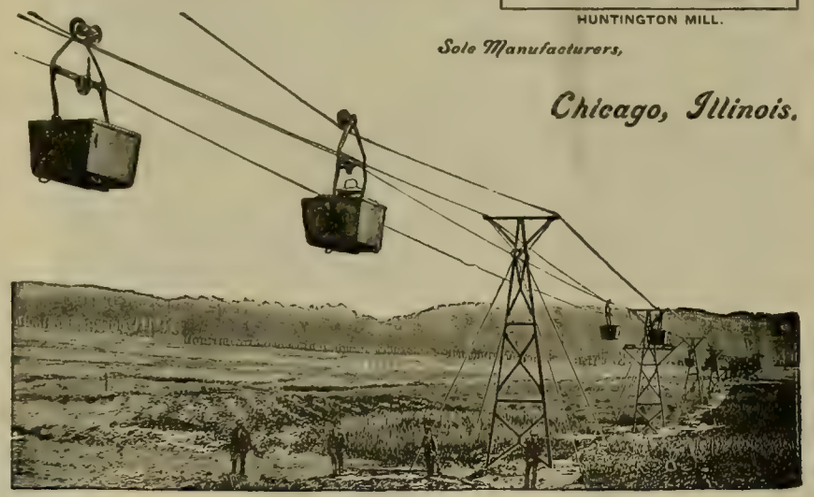

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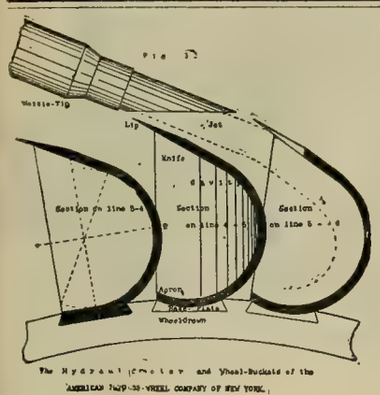

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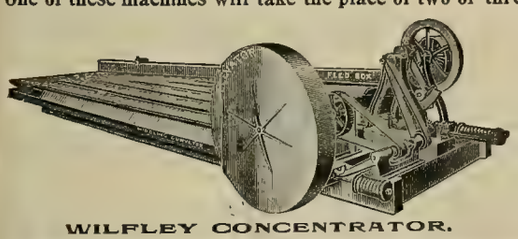

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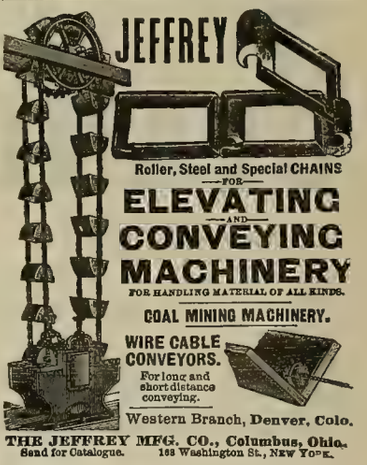

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Beg to draw your attention to the introduction of the . . .

FINLAYSON PATENT WIRE ROPE TRAMWAY.

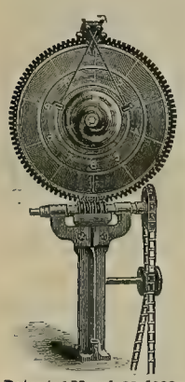
It is of the double rope pattern and the newest and best thing in its line ever placed on the market. The automatic features, simplicity of construction, ease of running and economy in operation places the

Finlayson Tramway

far ahead of all other systems of aerial ropeways. It is unsurpassed in tonnage capacity. It is on the principle of "You push the button and the machine does the rest." If interested send for special catalogue.

Our Line of Manufactures includes all kinds of Modern Equipments for the Successful Milling and Smelting of Metalliferous Ores. Special Catalogues on Application.

"KEEP YOUR EYE ON THE INDICATOR."



Patented March 28, 1893.

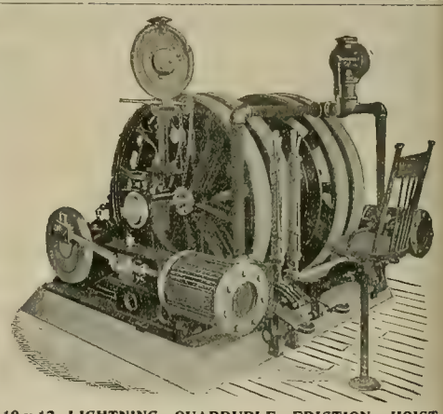
The Bolthoff Automatic Signal Alarm Indicator.

HUNDREDS NOW IN USE. UNIVERSALLY RECOMMENDED.

It is without question the most accurate indicator for hoisting engines ever constructed. Not only is there no lost motion, but it has the valuable feature of a device whereby automatically the approach to station, curves in the shaft, bad places, obstructions, or, in fact, if for any reason the engineer desires to be warned of the approach of the cage or bucket to any particular point in his shaft, either in hoisting or lowering, he can set it so that the signal bell will automatically sound its alarm.

HENDRIE & BOLTHOFF M'F'G CO.,

DENVER, COLORADO, U. S. A.



10 x 12 LIGHTNING QUADRUPLE FRICTION HOIST.

CYANIDE OF POTASSIUM.

Highest Known Grade of Cyanogen.

GUARANTEED 99% and over.

In 112-lb. Zinc Lined Cases.

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THE GAS LIGHT & COKE COMPANY.
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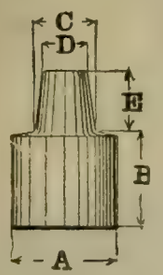
"BIRCH" IMPROVED TWO-STAMP MILL.

IRON FRAME, TRIPLE DISCHARGE, 850-LB. STAMPS, FORGED STEEL SHOES AND DIES.

Price, $450 f. o. b.

Manufacturers of the LIGHTNER QUARTZ MILL.



A=.....inches.
B=..... "
C=..... "
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RISDON IRON WORKS,

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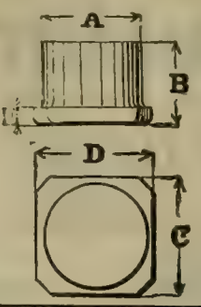
MINERS, ATTENTION!

We beg to call attention to our RISDON HAMMERED PROJECTILE STEEL SHOES AND DIES, which are made of a special quality of steel, are hammered and then compressed in moulds so as to give the greatest possible density.

These Shoes will outlast any other make and will not chip or cup.

We have attached a sketch showing sizes; fill in the size of your Shoes and Dies, and order a trial set.

Our prices are as low as any, and the article we offer should commend it to all mine owners and mill men.



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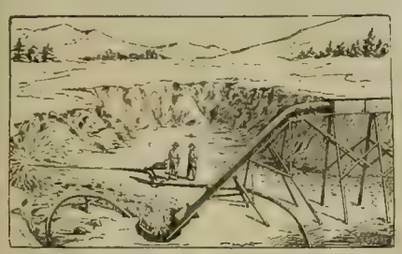
Principal Office: NO. 42 FREMONT STREET. - - Works: Corners Bay, Kearny and Francisco Streets, SAN FRANCISCO, CAL.

SPECIAL DEPARTMENT OF

Hydraulic Mining Machinery,

Comprising Hydraulic Gravel Elevators, Double-Jointed Ball-Bearing and Single-Jointed Giants, Sheet-Iron and Steel Water Pipe and Fittings, Water Gates, Etc.



HYDRAULIC GRAVEL ELEVATOR (In position.)

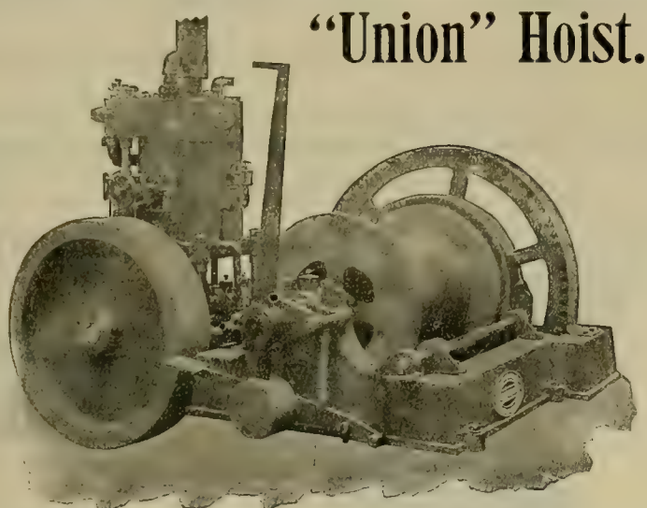
NOTICE.—All other forms of Hydraulic Gravel Elevators are simply poor imitations in construction and infringements of the patents held by us.

The Double-Jointed Ball-Bearing Giants recently perfected and patented by our MR. JOHN H. HENDY are incontestibly superior to any other form of Giants yet introduced.

We are prepared to furnish plans and estimates of cost of any proposed Hydraulic Mining Plants upon any specifications submitted to us, and tender the services of our Hydraulic Mining Engineer to erect and place same in successful operation under guarantee.

TRANSVERSE SECTION HYDRAULIC GRAVEL ELEVATOR.

"Union" Hoist.



The above cut represents our 10 h. p. Double Cylinder Engine of latest type, and Hoist combined on strong iron base. This hoist is designed to raise one ton 125 feet per minute from an inclined shaft, or 1500 pounds at the same speed vertical lift. The drum will hold over 600 feet of ⅝-inch cable. The outfit weighs 3500 pounds.

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"Union" Gas Engines,

Which use either Manufactured or Natural Gas, Ordinary Stove Gasoline (Naphtha or Benzine), Distillate or Kerosene.

STATIONARY ENGINES for All Kinds of Work, Built in Sizes from 3 to 200 h. p.
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HOISTS and COMPRESSORS Can Be Built in Larger Sizes to Order.
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"UNION" ENGINES Are In Use All Over the United States.
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Stern Wheel Boats, 25 ft. to 200 ft. in length. Light draught. Shipped--knocked down--and set up at St. Michael's ready to run. Send for Circulars and Prices.

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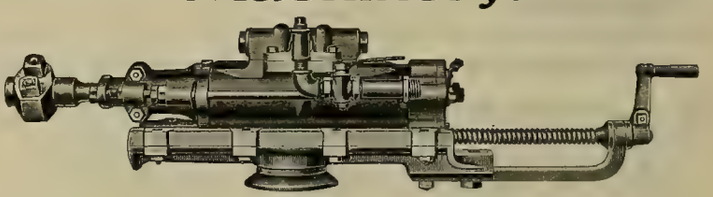
FLOUR MILL, SAW MILL. WIS., U.S.A. MINING & ICE MACHY.

Mining, Milling and Smelting Machinery.



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Iron cut, punched and formed, for making pipe on ground where required. All kinds of Tools supplied for making Pipe. Estimates given when required. Are prepared or coating all sizes of Pipes with Asphaltum.

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For Heavy Mining Pump Buckets. Will outwear any other material and give best satisfaction. Samples furnished on application. A. C. NICHOLS & CO., Leather Manufacturers and Dealers, 404 Battery St., S. F.

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TURBINE AND CASCADE WATER WHEEL

Adapted to all Heads from

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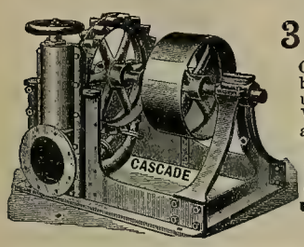

Our experience of **33 YEARS** building Water Wheels enables us to suit every requirement of Water Power Plants. We guarantee satisfaction.

Send for a Pamphlet of either Wheel and write full particulars.

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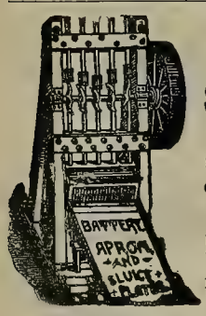

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Silver Plated Copper Amalgamating Plates

For Saving Gold in Quartz and Placer Mining.

Every Description of Mining Plates Made.

ONLY BEST COPPER AND REFINED SILVER USED. OLD MINING PLATES REPLATED. TWENTY-SIX MEDALS AWARDED. GOLD, SILVER, NICKEL, COPPER & BRASS PLATING.

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Telephone, Main 5931. Send for Circular.

THE CHEAPEST PLACE ON EARTH TO OUTFIT A MINE

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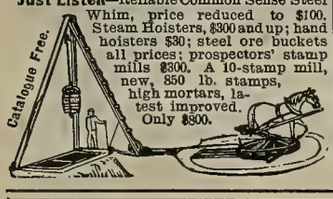

Just Listen—Reliable Common Sense Steel Whim, price reduced to $100. Steam Hoisters, $300 and up; hand hoisters $30; steel ore buckets all prices; prospectors' stamp mills $300. A 10-stamp mill, new, 850 lb. stamps, high mortars, latest improved. Only $800.

Ores tested and amalgamation and concentration mills built to **fit the ore** and guaranteed to save what we say. Coal Mine equipments, Screens, Jigs, Tramways, Arastors, Chillian Mills, Ore Sacks, etc. Cornish Rolls, 12x20, weight 6,000 lbs., price $350; Feeders, Bumping Tables; Blake Crushers, 7x10, weight 8,100 lbs, only $250. Our 100 page illustrated catalogue **FREE.**

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H. D. MORRIS & CO., Agents, 141 First St., San Francisco, Cal.

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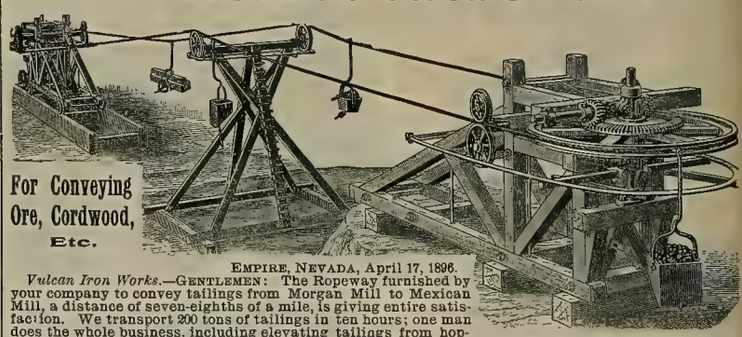
—WITH—

AUTOMATIC ORE LOADER AND AUTOMATIC DUMPING DEVICE.



For Conveying Ore, Cordwood, Etc.

EMPIRE, NEVADA, April 17, 1896.

Vulcan Iron Works.—GENTLEMEN: The Ropeway furnished by your company to convey tailings from Morgan Mill to Mexican Mill, a distance of seven-eighths of a mile, is giving entire satisfaction. We transport 200 tons of tailings in ten hours; one man does the whole business, including elevating tailings from hopper in the ground, operating Vulcan self-loader, and attending to the Ropeway generally. The self dumper requires no attention whatever. The Vulcan loader I consider the best feature in the whole Ropeway, making it possible for one man to load 200 tons in ten hours.

Yours very truly, J. P. WOODBURY, Supt.

VULCAN IRON WORKS,

MANUFACTURERS OF MINING MACHINERY,

Office, 505 Mission Street, San Francisco, Cal.

IF YOU HAVE A SMELTER--YOU WANT IT.
IF YOU HAVE A COPPER MINE--YOU NEED IT.
IF YOU HAVE A CYANIDE PLANT--YOU OUGHT TO HAVE IT.
IF YOU OWN CHLORINATION WORKS--YOU SHOULD BUY IT.
IF YOU ARE INTERESTED IN A MINE OR MILL--YOU CAN'T DO WITHOUT IT.

What? P. & B. Paint.

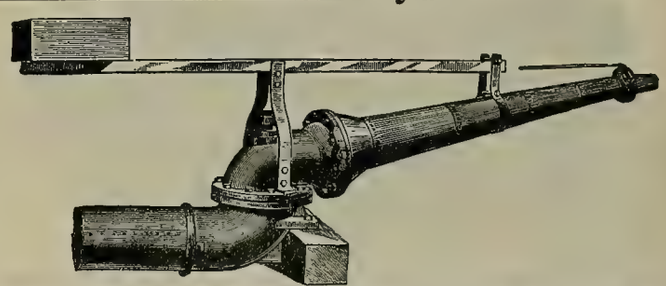
IT IS ABSOLUTELY ACID PROOF---TRIED AND PROVEN.

Manufactured by

PARAFFINE PAINT CO., San Francisco. Los Angeles.

You Can Order It From Your Dealer.

Double-Jointed Ball-Bearing Hydraulic Giants.



The above presents an improved **Double-Jointed Ball-Bearing Hydraulic Giant** which we build. The improvement consists of the introduction of a **Ball Bearing** by which the pressure of the water is reduced to a minimum and the direction of the nozzle changed at will with ease.

Catalogues and prices of our specialties of HYDRAULIC MINING MACHINERY furnished upon application. **JOSHUA HENDY MACHINE WORKS, 38 to 44 Fremont St., San Francisco, Cal.**

ADAMANTINE SHOES AND DIES

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CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

STAMP SHOES.

STAMP DIES.

These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

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IMPERIAL ENGINES, Write and we will tell you about them.
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BOLTHOFF'S HOISTS, Latest designs.
THE TRUAX ORE CAR, We sell 'em. We make 'em.

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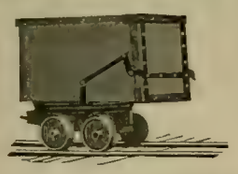

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And in the meantime if you do not see what you need write for it.

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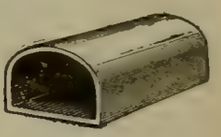
Miners' and Chemists' Supplies
OF EVERY DESCRIPTION.

CHEMICALS, Etc.



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Self-Oiling, without Oil Cups, Pumps or Tanks. Adjustable and accessible bearings. Renewable bushings for main and rocker arm bearings. Frictionless four-admission slide valve. Oil chamber entirely separated from steam. Cylinder contact. Rite's inertia governor. Perfect regulation. All sizes. Simple or compound. Belted or direct connection. High, medium or low speed. Designed for every use.

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Stamp Mills a Specialty (from two-stamp up). HOISTING ENGINES. Agents for Henry R. Worthington STEAM PUMPING MACHINERY and the ATLAS ENGINES AND BOILERS. General Foundry Work and all kinds of Heavy Forgings. Oil and Water Well Tools. CORRESPONDENCE SOLICITED.

Manufacturers of MINING AND MILLING MACHINERY.

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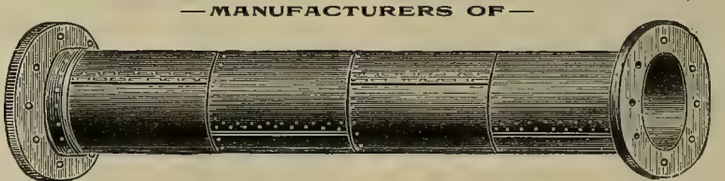

Steel Water Pipe for Hydraulic Mining and Irrigation.
WELL CASING.
Oil Tanks, and General Sheet Iron Work.
IRRIGATION SUPPLIES.
All Correspondence Will Receive Prompt Attention.
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Water Pipe for Placer, Hydraulic and Quartz Mining a Specialty. Made up complete, or cut, rolled and punched to be riveted at mine. Well Casing; Oil, Water and Cyanide Tanks: Galvanized Air Pipe; Ore Cars and Ore Buckets, and all kinds of Sheet Iron and Steel Work. Mail orders promptly attended to. Correspondence Solicited.

Market Reports.

The Markets.

SAN FRANCISCO, Nov. 18, 1897.

General business in quiet compared with a month ago, but is considerable larger than in this month in 1896. It would seem as if the prices of nearly every commodity dealt in had been advanced higher than the situation warranted for lower quotations begin to be given out. Some say that this is due to a desire to reduce stocks before the new year at which time stock taking is the order. The outlook for 1898 is conceded by one and all to be of the most encouraging character so far as concerns business, and to meet the promised demand for goods merchants are arranging to carry more in stock of commodities specially adapted to mining sections. It looks as if there will be strong competition between steamship lines for the Alaska trade, for it is stated that Goodall, Perkins & Co. will increase the service by the addition of four or five steamers; the Alaska Commercial Co. will put on more vessels and the Philadelphia Company, at the head of which is one of the Cramps, will have five steamers in service. Each line will make San Francisco headquarters. These will insure the bulk of that far north's trade to this city, and with gold mines opening will cause a good demand for machinery from here.

The banks continue to report a plethora of funds with deposits steadily increasing. Notwithstanding the piling up of funds, the banks continue to scrutinize paper very closely. Backed by gilt-edge security there is no difficulty in getting all the money wanted. After Congress meets, and a general idea is obtained regarding monetary legislation, it is altogether likely that much easier times will rule and both capitalists and banks be more disposed to put out funds. The uncertainty regarding congressional legislation is having its effect, notwithstanding the impression that there will not be any unless the silver interest is favored more than it looks it will be at this writing. Eastern advices report generally easy markets, with no urgent demand from any particular source. There is a large accumulation of funds, which will be added to next month, so as to meet the January disbursements. These are expected to be exceptionally heavy.

New York Silver Prices.

NEW YORK, Nov. 18.—Following are the closing prices for the week:

	Silver in— London.	N. Y.
Friday	26⅝	57⅛
Saturday	26⅝	57¾
Monday	26⅝	57⅞
Tuesday	27⅛	58¾
Wednesday	27	58⅜
Thursday	26⅝	57⅞

	Copper.	Lead.	Iron.	Tin.
Fri.	10 80 @11 00	3 80	10 00@12 25	13 70
Sat.	10 75 @10 90	3 75	10 00@12 25	13 75
Mon.	10 75 @10 90	3 72½	10 00@12 25	13 75
Tue.	10 75 @10 85	3 75	10 00@12 25	13 77½
Wed.	10 75 @10 85	3 82½	10 00@12 25	13 77½
Thur.	10 75 @10 85	3 85	10 00@12 25	13 77½

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	12½c Prem
New York Telegraphic Transfer	15c Prem
London Bankers' 60 days	$4.83¾
London Merchants	$4.82½
London Sight Bankers	$4.86½
Refined Silver, per oz., 1000 fine	57⅞
Mexican Dollars nominal	46½

SILVER.—The ups and downs of the market are somewhat mystifying. It can be accounted for only on the proposition that supplies are fairly well in hand, and any unexpected demand is met by an advance before outside sources of supply can come in. If published advices are correct, then it would seem as if every country is moving for a gold standard. The latest report put out is that the Straits contemplate adopting the gold standard, This is a large consumer of the white metal, although last year the demand fell away.

MEXICAN DOLLARS.—The market has been, and continues to be, quite active, to meet the China shipping demand for exchange.

COPPER.—The market is weak, with concessions given to effect sales. The markets at the East are lower and irregular. The offerings are in excess of the demand. The consumption abroad is less, although it is still quite free, but not enough to meet the output of the mines in this and other countries. It is expected that there will be no improvement until the turn of 1898.

Our market is quoted as follows:

Ingot casting, jobbing	13 @—
Ingot " wholesale	12¼@—
Sheet copper	— @16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½

QUICKSILVER.—The market is steady at quotations.

Our market is quoted at $39 for domestic consumption and $35@36 for export to the west coast of Mexico. A Boston report says: "The quicksilver market is at present in a stronger position than it has been for years. Within the last ten days an advance of $1 per flask (76½ pounds) has been made to about $38 per flask. The stock of quicksilver in first hands is said to have undergone a great diminution in the last ten years, and to-day is not more than one-third what it was several years ago. An authority says the stock in first hands to-day does not exceed 4000 flasks. The Rothschilds, who control the Idria quicksilver mines of Austria, are said to control the market price. The domestic consumption is so steadily increasing that already the question of importing quicksilver is being discussed." The local properties Napa, Ætna and New Idria are in good condition. The Napa has already declared an extra dividend, with extras on the other properties by no means future impossibilities.

LEAD.—In our market there is nothing new to report. At the East the markets weakened, but towards the close they are strengthening. The outlook is favorable for steady to strong markets.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	4 75 @ 5 00
Sheet	6 30 @ 6 80
Pipe	5 60 @ 6 10

TIN.—The market is quiet, with concessions obtainable for both spot and to arrive. Sales for future delivery have been made, but on private terms.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C, coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

SHOT.—The market is steady.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 40
Drop, B and larger sizes, " "	1 65
Buck, Balls and Chilled, do, " "	1 65

POWDER.—The market is steady.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9 to 11c, according to strength and quantity.

ZINC.—The market is firm.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

ANTIMONY.—The market is firm.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 8c for Cookson's, 7½c for Hallett's and 7c for Japanese.

IRON.—There is nothing new to report in our market. As usual at this season of the year, the consumption is light; but the outlook for 1898 is of the most encouraging character.

NAILS.—The market is weak at a decline.

We quote the following basis: 20d to 60d inclusive, wire $2.35, cut $2.25.

COAL.—The market is steady at combine quotations. An attempt is to be made to dissolve the combination through the courts. The supply of foreign promises to fall away, owing to lessened cargoes on the way. This makes some grades firmer.

Receipts of coal for the week ending with Tuesday were as follows in tons: Departure Bay, 4372; Puget Sound, 7500; Comox, 2500; Swansea, 4639; Coquille River, 115. Total, 19,125.

COKE.—The market is steady.

The market is quoted as follows:

Gas Companies'	— — — —
English, to load	— — @ — —
" spot, in bulk	11 00 @ — —
" in sacks	12 00 @ — —
Cumberland	10 00 @ — —

PLATINUM.—The market is firm.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

BORAX.—The market is fairly firm.

The market is quoted as follows:

Refined, in carload lots, in barrels	5½
Refined, in carload lots in sacks	5½
Powdered, in car lots	5½
Concentrated, "	5

Chemicals.

The market is quiet in about every line. There seems to be no disposition to strengthen prices, but rather in some articles there is more or less irregularity. The East reports quiet markets, with some shading.

SULPHURIC ACID.—The demand is quiet.

We quote in a jobbing way at 1½c per lb for 66°.

ACETIC ACID.—The market is firm at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported steady from store at 6½@7c per pound in carboys.

BLUE VITRIOL.—Our market is steady, with better inquiry.

We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is firm.

Our market is quoted in a jobbing way at $1.40 a pound.

BONEASH.—There is a good demand at unchanged quotations.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

PHOSPHORUS.—The market is steady.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is steady at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is steady at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—The market is quiet at 2½c a pound from stores.

NITRATE OF SODA.—The market is easy for spot and shipment.

Our market is quoted from store at 4c for 95%.

San Francisco Stock Board Sales.

SAN FRANCISCO, Nov. 18, 1897.

9:30 A. M. SESSION.

800 Belcher	32	400 Ophir	78
200 Best & Belcher	37	200 Overman	08
500 Bullion	12	200 Savage	37
200 Con Cal & Va	1 15	400 Seg Belcher	10
300 Crown Point	23	100 Sierra Nevada	65
200 Gould & Curry	29	200 Union	34
100 H. & N	1 70	100 Utah	10
250 Justice	61	200 Yellow Jacket	41
150 Mexican	41		

SECOND SESSION—2:30 P. M.

200 Gould & Curry	27	600 Belcher	30
100 Con Cal & Va	1 10	100 Confidence	94
200 Savage	35	300 Sierra Nevada	65
100 Potosi	51	300 Justice	61
250 Crown Point	21		

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delinq't and Sale.	Secretary.
Best & Belcher M Co, Nev	63	25c	Nov 2.	Dec 7. Dec 28.	M Jaffe, 309 Montgomery
Caledonia S M Co, Nev	47	10c	Oct 6.	Nov 10. Dec 2.	A S Groth, 414 California
Con Cal & Va M Co, Nev	10	25c	Nov 3.	Dec 8. Dec 29.	A W Havens, 309 Montgomery
Con Imp M Co, Nev	39	1c	Sept 27.	Nov 2. Nov 23.	C L McCoy, Mills Building
Crown Point G & S M Co, Nev.	72	20c	Nov 10.	Dec 15. Jan 5.	Jas Newlands, Mills Building
E Best & Belcher S M Co, Nev.	6	15c	Oct 30.	Dec 3. Dec 18.	E W Sichel, 337 Pine
Exchequer M Co, Nev	40	5c	Nov 1.	Dec 6. Dec 30.	C E Elliott, 309 Montgomery
Gold Ridge Con M & M Co, Cal.	5	4c	Aug 3.	Sept 18. Nov 23.	H Sylvester, 43 Sixth
Gould & Curry S M Co, Nev.	82	20c	Nov 2.	Dec 7. Dec 29.	A K Durbrow, 309 Montgomery
Hale & Norcross S M Co, Nev.	11	10c	Mar 20.	Dec 28. Jan 18.	R R Grayson, 331 Pine
Kentuck Con M Co, Nev	14	5c	Oct 27.	Dec 1. Dec 22.	A Waterman, 309 Montgomery
Marguerite G M & M Co, Cal.	8	10c	Nov 4.	Dec 13. Jan 15.	F Mettmann, 237 Twelfth
Thorpe M Co, Cal	8	2½c	Sept 28.	Nov 20. Dec 13.	A F Frey, Phelan Building

Mining Share Market.

SAN FRANCISCO, Nov. 18, 1897.

The market has been slow, with the manipulators for the moneyed pool successful in forcing lower prices for the more desirable shares. The slow, steady decline, with the market made to look extremely sick as if going to pieces, enabled quite a line of shares to be secured. While prices may go lower yet, the writer's experience warrants the assertion that a good-sized deal is in contemplation. This opinion is strengthened by the persistent efforts of tools and others in creating the impression that John W. Mackay, J. L. Flood, D. O. Mills and Col. Hayward are paying no attention to the market, and would not make thousands of dollars if given the opportunity, as if they would give their business away. All successful moves, either up or down, have been made by blinding the public to the true situation and what moneyed men are doing. There is important work going on in several mines, but at present it is largely for the purpose of getting them into better condition for working when the time is ripe for a good-sized move. The general financial and business interests of the country are healthy and on a good footing for better times ahead There never was more money in the country available for speculative purposes and legitimate business transactions, and it is well known that the public on this coast and at the East are ripe for gambles, and with attention centered to this coast owing to the Alaskan gold discoveries, a boom in Comstock mining shares can be successfully made. The only drawback at present is the meeting of Congress, when the monetary system of the country will come to the front for discussion and, if possible, revision. While this is under way, it is not at all likely much of, if any, bull movement will be inaugurated, although there are some who look for an up-move before the holidays, or else soon after. The past week Justice showed considerable activity at higher prices, owing to reports of an improvement in the mines. So far as we can learn the prospects are quite encouraging, but even if a good-sized body of ore is uncovered, who will get the bullion?

The news from the Comstock mines given out seems to be largely for the purpose of attracting attention to mines in which there is very little hope entertained of finding good sized bodies of ore. In doing his outsiders not informed on the true situation and surface dealers let go shares of mines marked for future dealing. In Utah they are still running west, but nothing new is reported from it. They continue drifting north in Andes on the 175-foot level. Low-grade ore and quartz are found. On the Layton tunnel of Sierra Nevada they hoist a few tons of ore each week while prosecuting work. They have milled over 150 tons. They are pushing the Riley tunnel ahead and at the same time doing some repair work in the north lateral drift on the 900-foot level. In Union they have finished some repair work and are again doing dead work on the 900-foot level. They continue to block out work in Mexican on the 1000-foot level. Last letter from Ophir reports the west crossdrift on the 1000-foot level was in the west country. If they do not get bewildered and turn in the wrong direction they will strike ore further west. They are still blocking out on the Central tunnel level. In Con. Virginia work is continued on the 1550-foot, 1650-foot and 1750-foot levels. From the nature of the work it ought to cause surprise if an improvement is announced before the end of next month. In Gould & Curry they are still extracting and hoisting low-grade ore. That milled shows a large percentage of silver. It is doubtful if it will pay unless the charges are low. From Savage nothing new comes to hand. No work is reported in Hale & Norcross. In Chollar they are still repairing below the 1100-foot level in the incline shaft. Private advices are rather encouraging from the work in the south drift as it goes towards Bullion. Nothing important is reported from the work in other parts of the mine. In Alpha they are still going northeast on the 500-foot level. Some low-grade ore was run into. They are still going west in Con. Imperial. The flow of water is still quite strong. Work is suspended in Confidence. Private advices from Yellow Jacket are quite encouraging. If the shares were better concentrated there would be a good move in them on the showing in the mine towards Kentuck. Active work is being done in both Crown Point and Belcher with every prospect of finding ore before the end of the year. Nothing new is reported from Overman or Seg. Belcher. The official letter from Justice reports an 18-inch vein of ore going about $105 to the ton. If this should widen it will create some buying of the shares.

From the Brunswick lode there is absolutely nothing new to report, although the work in Occidental, Potosi and joint work in Gould & Curry and Best & Belcher is quite encouraging. The Occidental management is quite hopeful of developing a paying mine, but it will take time and money to do it, even if the ore is there. The official letter says they will have to go 100 feet on the 750-foot before reaching the ore found above. They are pushing south in Potosi on the 500-foot level. In Chollar active work is being done on the levels and in the same directions heretofore reported. The returns from ore milled gave $4579 in gold and 3384 ounces of silver. The work in Savage and the joint work in Gould & Curry, Best & Belcher and Con. Virginia is practically the same as reported last week.

The following illustrates the changes of the week:

Mines.	Nov. 11.	Nov. 18.
Alpha	$ 09	09
Alta Consolidated	08	08
Andes	27	27
Belcher	37	$ 32
Best & Belcher	40	37
Bodie		
Bullion	08	12
Challenge	30	
Chollar	55	
Confidence		94
Consolidated California and Virginia	1 00	1 15
Consolidated New York		
Crown Point	30	23
Exchequer		
Gould & Curry	34	29
Hale & Norcross	1 50	1 70
Justice	21	61
Mexican		41
Ophir	83	78
Overman	09	08
Potosi	52	51
Savage	37	37
Sierra Nevada	66	65
Union	37	34
Utah	10	10
Yellow Jacket	38	41

Rainfall and Temperature.

The following data for the week ending 5 A. M., November 17, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

California Stations.	Total Rainfall for the Week.	Total Seasonal Rainfall to Date.	Total Seasonal Rainfall Last Year to Same Date.	Average Seasonal Rainfall to Date.	Minimum Temperature for the Week.	Maximum Temperature for the Week.
Eureka	.57	5.60	10 41	6.39	34	60
Red Bluff	T	2.79	2.65	3.79	34	76
Sacramento	.01	2.14	1.06	2.19	36	74
San Francisco	.00	2.08	2.76	3.05	46	68
Fresno	.00	1.24	1.57	1.27	32	72
San Luis Obispo	.00	.86	1.68	*	30	80
Los Angeles	.00	2.47	1.35	1 68	42	84
San Diego	.00	1.07	1.18	.94	50	78
Yuma	.00	.81	1.14	1.10	42	82

WILL NEGOTIATE with owners or their duly authorized agents only.

WILL INVESTIGATE only thoroughly bonafide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

E. N. BREITUNG,
Marquette, Mich., U. S. A.
Operator and Dealer in
Mines, Mining Properties and Mineral Lands,
Mining Stocks, Bonds, Options, Leases, Contracts and Securities.

MONEY LOANED ON BONA-FIDE MINES

WILL EXAMINE on reasonable terms all kinds of Mines, Mining Properties and Mineral Lands as to their value, method of working and the condition of their titles.

WILL GIVE Options, Leases, Bonds and Contracts on all kinds of Mines, Mining Properties and Mineral Lands.

Assay and Chemical Work Done on Reasonable Terms.

Have best of bank and other references. Use McNeill's or A B C Telegraphic Codes.

DO ALL OUR OWN EXPERT AND CHEMICAL WORK.

Working Capital for Mines.

PACIFIC EXPLORATION COMPANY

Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from D. D. Allard et als., in the Cambridge Mine near Plymouth, Amador Co., to deposit tailings on a flat; from W. C. Corbett and A. W. Carmichael, in the McMartin Mine near Onion Valley, Plumas Co., to deposit tailings behind the dam of the Good Hope Mining Co in Onion Valley Creek; from Geo. W. Mohler, in the Mohler Mine near Pike City, Sierra Co., to deposit tailings in a ravine below the mine; from Manuel Silva and Joseph Enos, in the Manuel Silva Mining Company's Mine near Cherokee, Butte Co., to deposit tailings in Spring Valley Creek; from J. H. Kneeland, Jr., in the Colfax Gravel and Pierce claims, near Colfax, Placer Co., to deposit tailings in Long Ravine; from L. L. Sherrod et als., in the American Gravel Mining Company's Mine near Centerville, Butte Co., to deposit tailings in ravines below the mine; and from the Kate Hayes Mining Co., in the Manzanita Mine near Sweetland, Nevada Co., to deposit tailings in the impounding basin of the old Manzanita Mine, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on November 29, 1897, at 1:30 P. M.

Assessment Notices.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 2d day of November, 1897, an assessment (No. 2) of 20 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 29, Nevada block No. 309 Montgomery stre t, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of December, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 29th day of December, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room 29, Nevada block No. 309 Montgomery street, San Francisco, California.

BEST & BELCHER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 2d day of November, 1897, an assessment (No. 65) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of December, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 28th day of December, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Director-.

M. JAFFE, Secretary

Office- Room 33, Nevada block, No 309 Montgomery street, San Francisco, California.

CONSOLIDATED CALIFORNIA & VIRGINIA Mining Company.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3d day of November, 1897, an assessment (No. 10) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of December, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 29th day of December, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office—Room 29, Nevada blo k No. 309 Montgomery street, San Francisco, California.

MARGUERITE GOLD MINING AND MILLING Company. Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 4th day of November, 1897, an assessment (No. 8) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 237 Twelfth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of December, 1897, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on SATURDAY, the 15th day of January, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

F. METTMANN, Secretary.

Office—237 Twelfth street, San Francisco, California.

The secretary will also receive payments from 12 to 5 P. M. at his business office, 225 Sansome street.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of September, 1897, an assessment (No 8) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of November, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 29th day of November, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Thorpe Mining Company the day of delinquence in the above assessment notice has been postponed to November 20th, 1897, and the day of sale to MONDAY, December 13th, 1897.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

SPECIAL MEETING OF STOCKHOLDERS.

Notice is hereby given, that a Special Meeting of the Stockholders of the New El Dorado Gold Mining Company will be held at the office of the Company, No. 310 Pine Street, Rooms 15 and 17, San Francisco, Cal., on MONDAY, November 29th, 1897, at 3 o'clock P. M., for the purpose of considering the sale of the stock now in the treasury, and approving a contract for the development of the Company's property. By order of the Board of Directors. J. W. PEW, Secretary.

Office—No. 310 Pine Street, Rooms 15 and 17, San Francisco, California.

INVENTORS, Take Notice!

L. PETERSON, MODEL MAKER,

226 MARKET ST., N. E. Corner Front (Up Stairs), SAN FRANCISCO. Experimental machinery and all kinds of models. Tin and brasswork All communications *strictly confidential.*

DELINQUENT SALE NOTICE.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.— Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties California.

Notice.—There are delinquent upon the following described stock on account of assessment (No. 5) levied on the 3rd day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows.

Name	No. Cert.	No Shares	Amt.
John A. Heninger	16	250	10 00
Nils Johnson	120	100	4 00
Nils Johnson	121	100	4 00
Hattie E. Gray	124	100	4 00
Wm. Westhoff	144	250	10 00
A. O. Lindstrom	148	200	10 00
Wm. Westhoff	177	500	20 00
Richard Phelan	188	5	20
Wm. Westhoff	200	100	4 00
Wm. H. Lillie	202	10,500	420 00
Mark Strouse	208	5	20
P. E. Robertson	215	250	10 00
Sarah Spalding	218	100	4 00
Abe MacCreadie	220	500	20 00
Alfred H. Hogg	221	300	12 00
Abe MacCreadie	222	250	10 00
J. W. Brown	234	4,099	163 96
C. D. MacNeill	236	200	8 00
Paul Muller	239	50	2 00
Paul Muller	240	100	4 00
Paul Muller	242	1,000	40 00
Chr. W. Heyer	243	755	30 20
Chr. W. Heyer	246	606	24 24
Abe MacCreadie	247	200	8 00
Wm. Westhoff	250	200	8 00
Mary Ann Robertson	251	250	10 00
Mary Ann Robertson	252	250	10 00
R. H. Daley	268	1,000	40 00
C. M. Howe	272	1,000	40 00
C. M. Howe	274	500	20 00
R. H. Daley	275	1,500	60 00
Francis Brady	277	700	28 00
R. H. Daley	278	100	4 00
Dr. H. Sylvester (2,000 shares of this cert. have been paid by H. Sylvester, being part of his stock.)	280	51,278	1,971 12
L. V. Merle	286	10	40
J. T. M. Kelly	289	500	20 00
R. H. Daley	290	100	4 00
R. H. Daley	294	750	30 00
R. H. Daley	295	185	7 40
E. Swenson	296	1,750	70 00
Mark Strouse	297	5,000	200 00
Mark Weil	299	750	30 00
C. W. Heyer	300	400	16 00
Mark Strouse	301	100	4 00
Geo. Day	302	1,000	40 00
Dr. H. Sylvester, Trustee	305	1,105	44 20
Dr. H. Sylvester, Trustee	306	5 000	200 00
R. H. Daley	307	250	10 00
R. H. Daley	308	240	9 60
F. Heard	309	125	5 00
Mark Weil	310	125	5 00

And in accordance with law, and an order from the Board of Directors, made on the 3rd day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Rooms 12 and 13, No. 43 Sixth St., San Francisco, California, on SATURDAY, the 9th day of October, 1897, at the hour of 12 o'clock M. of said day. to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

The day of sale of the above delinquent stock has been postponed by order of the Board of Directors to THURSDAY, October 28th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, the 4th day of November, 1897, at the same hour and place.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, November 11th, 1897 at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

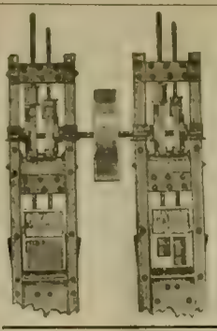
By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to TUESDAY, November 16th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to TUESDAY, November 23rd, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.



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Rock Breakers, Ore Feeders, Concentrators, Engines and Boilers, Hoisting Rigs to be operated by Horse, Steam Power, or any other motor; Ore Cars and Ore Buckets, Cornish and Jack-head Pumps, Triple-Acting Pumps, Centrifugal Sand and Gravel Pumps, Wooden Tanks and Pumps for the Cyanide Process, Pipe and Gate Valves, Link Chain Elevators for elevating and conveying all kinds of material

Estimates as to cost of machinery and its erection furnished upon application. Write for Catalogue and Prices.

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Bankers, Importers, Exporters and Commission Merchants.

Representatives and Agents of the principal Mining Companies in the State of Sinaloa and the dependencies of the Pacific coast in the States of Durango, Chihuahua, Sonora, Lower California and Jalisco.

ORE BUYERS AND EXPORTERS. - MINING SUPPLIES.

Weber GASOLINE HOISTING ENGINE.

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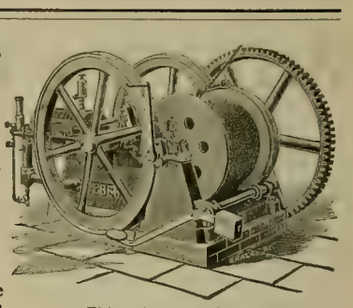

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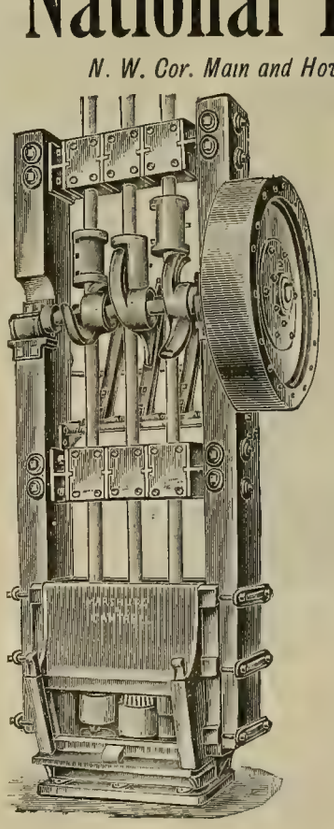

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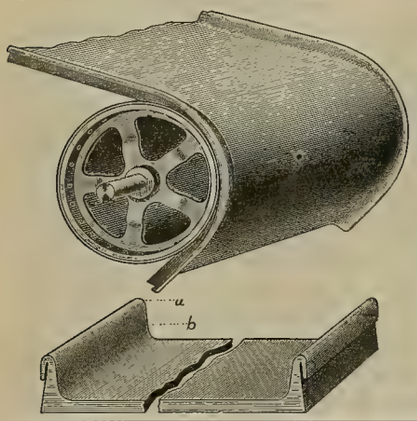

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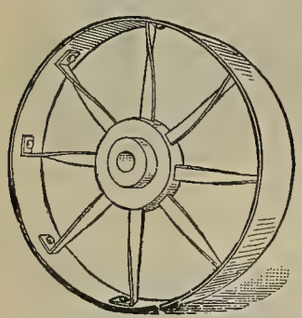

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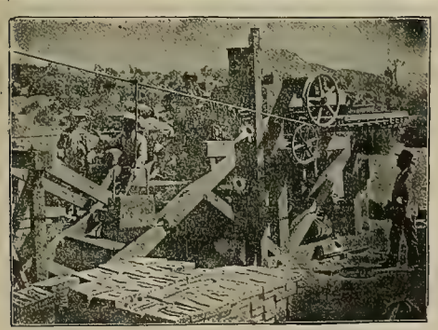

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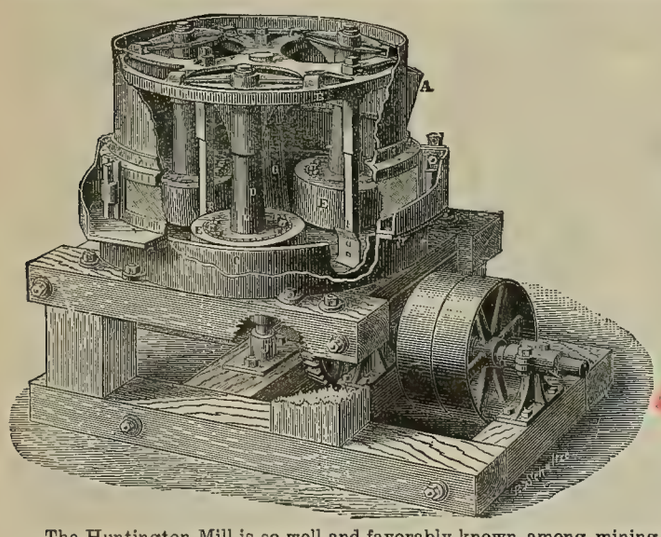

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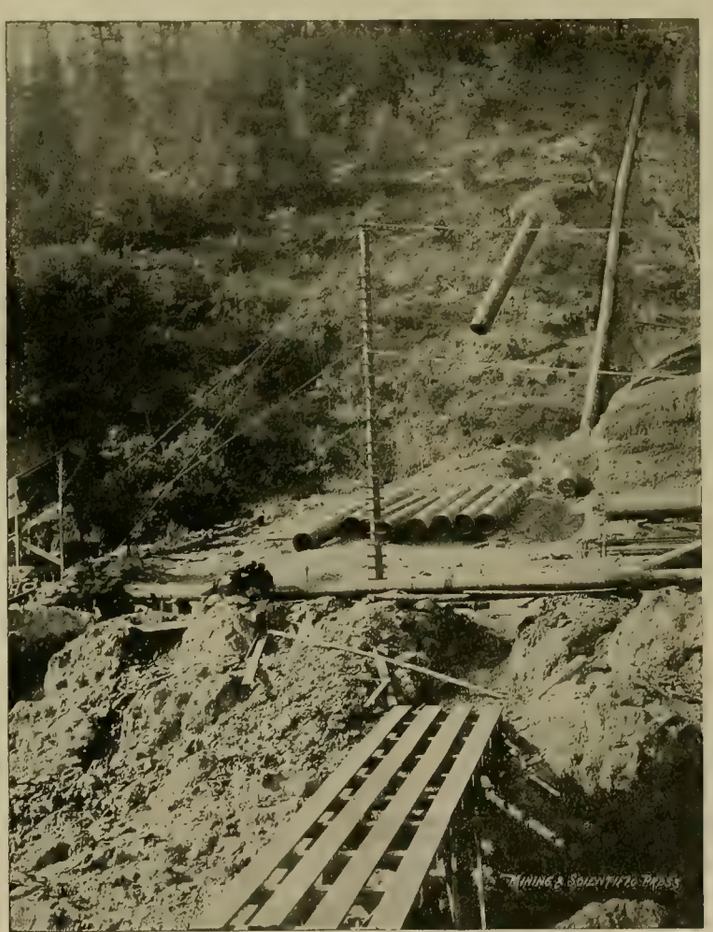
No. 1951.—VOLUME LXXV. Number 22. SAN FRANCISCO, SATURDAY, NOVEMBER 27, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

A Golden Jubilee.

It was suggested about a year ago in these columns that the fiftieth anniversary of the discovery of gold in California would be a fitting time for a golden jubilee, attracting attention to California and serving as a good advertisement for this State. The sentimental part of it was taken up the California Society of Pioneers; the more practical part by the California State Miners' Association. It has been decided that there shall be a celebration of the fiftieth anniversary of the discovery of gold in this State on January 24, 1898, under the direction of the California Society of Pioneers, and that in an active way these venerable men shall have the co-operation of the California State Miners' Association. The programme is to have the celebration take the form of a parade in San Francisco and literary exercises during the evening. The State militia will be called out to take part in the parade, and the Governor of the State will declare the day a legal holiday. It is a golden jubilee in fact as well as in name. The only emulation that need be between the associations and organizations that propose to carry on the celebration should be to see which can most greatly aid in making it a success. In this regard the MINING AND SCIENTIFIC PRESS would simply suggest that the celebration should not be used merely as the commemoration of a historical event of considerable importance, but possessing no active interest in connection with the present. This might be well enough for those whose names are forever stricken from the muster roll of duty and who are content to slip down the back stairs of time to oblivion; but it is in order to make this semi-centennial a celebration of one of the greatest events in modern history—the means of attracting the attention of everyone everywhere to the fact that, where gold mining in this nation first received its great impetus, there has been throughout the years steady progress in scientific methods, in intelligent handling of ores and in economical management; so that to-day, in place of being the worn-out "has been" that is so often intimated, California stands in the van. This occasion should be taken hold of with the one idea sole in view, namely, to give the widest publicity to the truth regarding the present condition of mining in California; to proclaim as thoroughly and widely as the facts justify, that California is the leading gold-producing State in the Union; that the $1,315,000,000 worth of gold taken from its soil is but an index of what remains to be secured; and that were capital invested in mines here as largely as elsewhere, there would be a continual sound of dropping stamps for a distance of 700 miles; that in California, of all places on earth, man can work 365 days in the year; that California has solved the problem of cheap creation of power; that it is fast absolving itself from the thralldom of coal; that in no place on earth, at any time of which there is any record, has gold been produced as abundantly and under as favorable and economical conditions as in this commonwealth. These things can be demonstrated grandly and truthfully by those in charge of the semi-centennial celebration of the discovery of gold by James Marshall, at Coloma, El Dorado Co., January 24, 1848.

Large Hydraulic Pipe in Trinity Co., Cal.

Considerable interest has been manifested in the enterprise of the Cie Fse des Placers Hydrauliques de Junction City, Trinity county, Cal., of which Mr. E. Saladin is manager. It is one of the largest schemes of that kind ever inaugurated in this State—that is, taking into consideration the size of the pipe used and its length. It is of course well known to hydraulic miners that the ditch is the cheapest way of getting water to the grounds to be worked; but where there is much rock to be taken out, or where the ground is broken and porous, where water must be conveyed across canyons or around mountain sides, or where water is so scarce that the operation of absorption must be reduced to the minimum, flumes are used, and some of the finest mining engineering work in this State has been in building flumes. Where even flumes are inadmissible, or water is required to be conveyed to points far above or below the ditch or flume level, use must be made of iron pipes, if sufficient head cannot be secured to force the water over the obstruction. Where obstacles are to be overcome which preclude resource to the flume, iron pipe in the form of an inverted syphon is employed.



LAYING 36-IN. IRON PIPE BY TROLLEY CABLE, TRINITY CO., CAL.

Many years ago the writer noted the construction of a pipe of this kind, built by the Spring Valley Canal Co. in Butte county, where in pipes of 24 and 30 inches the water was carried by their ditch across a deep canyon. They let down a 30-inch line pipe, extending from one side of the gorge to the other, a distance of 1400 feet, the point where the water ended being about 100 feet above the bottom of the canyon and 150 feet above the point where it escaped. The water where it entered the pipe had a head of 150 feet, and yet at this end of the pipe it never attained a head of 50 feet, which would seem to denote that a smaller pipe than that laid down would have been sufficient. This pipe, which under the pressure mentioned, discharged 50 cubic feet per second, served its purpose; for at many points the pressure exerted ranged from 74 to 384 pounds per square inch. In the enterprise under discussion—that of the French company which is intelligently expending a large sum of money in Trinity county, in the northern part of this State—the improved appliances of later years have been utilized, it having been deemed necessary to combine the three methods of carrying water, namely, ditch, flume and piping. The work was taken up about one year ago and is now being brought to a successful conclusion. The total length of the ditch is eleven miles. A semi-hexagonal flume on the Canyon Creek line has the bottom 4 feet, top 3 feet, grade 8 feet to the mile, and length 2100 feet. The length of all the flumes in the ditch is one and one-half miles. The syphon is 5700 feet long across the Trinity River valley, a canyon passing over a divide 280 feet deep, drop of water 24 feet. The first portion of the pipe is 18 inches in diameter; then 2200 feet of 30-inch pipe and 3400 feet of 36-inch pipe. The 30-inch pipe is made of No. 10 iron in 48-foot sections, each section weighing 340 pounds. The work of laying the pipe called out an exhibition of engineering skill. A hoisting machine, ordinarily used for removing boulders by means of a cable, was called into requisition and used to lay the big pipe on each side of the syphon. It consists of a Pelton wheel with a 3-foot drive; a friction wheel, on each side of which is applied, by means of a lever, an iron driving drum. One drum used was made of ½-inch cast steel flexible rope; the other drum, used to drive the big line, ⅝-inch.

The illustration shows the method of laying the pipe by the trolley cable, operated by water power; size of the pipe, 36 inches. The heaviest iron in the construction was No. 6; its total weight, 280 tons. The pipe was furnished by Schaw, Ingram, Batcher & Co. of Sacramento. The engineering was by Mr. E. Saladin. The pipe was delivered at Redding and hauled in sections to where it was to be used, where it was put in place (as briefly described) and riveted, so as to make the entire 5700 feet one continuous piece. Mr. Saladin writes: "All the work of laying the pipe has been done entirely by the company, furnishing all the engineering and calculations, to the last anchor bolt, receiving the pipe in only 24-foot sections, delivered at Junction City by the makers." This is one of the largest enterprises of the kind in the history of hydraulic mining in this State.

MINING AND SCIENTIFIC PRESS.

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J. F. HALLORAN.....General Manager

San Francisco, November 27, 1897.

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English Purchasers of California Mines.

A good many letters come to this office from present or prospective British investors in California mines, vigorously criticising local methods and usually objecting to "the California manner of procedure." Several of them have been given place herein on the principle under which this paper is conducted, namely, an open court or public forum for the discussion of questions pertaining to practical mining and scientific matters; and the question of the purchase of a mine is just as much a matter of scientific mining as anything else in connection with the industry.

Our English correspondents suggest a wide field of discussion. In all these matters so very much depends upon the point of view. The letters in the issues of October 2nd and November 20th are fairly representative of a host of similar communications constantly received in this office and, doubtless, received by others who have something to say or do with mining matters in California, their entire tenor being summed up in the expression, more or less courteously conveyed, that we do not know much here about how to do these things and that, out of the plentitude of their knowledge, our English friends are willing to vouchsafe us some practical information thereon.

After fifty years of successful gold mining in this State; after originating, developing and perfecting the best methods of mining in nearly every department; after successfully attempting, during that time, to furnish the world's demand for the best men to manage large enterprises; and after successful handling of the biggest and best mines on this continent, both as to their discovery, development, transfer and actual working, it is not beyond the bounds of belief that California has some just claim to knowing a little about these matters.

One view that is sometimes presented to the editor of this paper, from apparently competent English sources, is that we are not sufficiently appreciative here of the possibilities of English investment and that we do not value that source of favor sufficiently high; that ordinary business requirements or customary practice should be ignored; and that California owners of mines should hasten to disregard any suggestion other than to comply with every demand of possible British investors.

It may be that our English friends are disquieted at the presumption of Californians in exhibiting some slight hesitation in accepting a proposition to make over to them valuable properties without sufficient financial inducement. But it is respectfully submitted that, whenever an Englishman has a good thing, he is ordinarily loth to surrender its control without due financial recompense. The instances that our correspondents cite ordinarily seem fair to both prospective purchaser and buyer. Were the positions reversed and were American capital seeking to invest in British mines, it is possible that the point of view of the British mine owner might be changed somewhat.

An objection often voiced is that California mine properties should not be bought in London, because of disastrous results of management of English properties in this State—properties, too, that had, anterior to their sale to English capitalists, paid regular dividends. Some few prominent instances of this kind are always cited; but the hundreds of instances where American properties have shown steady value are usually ignored.

In relation to the oft-repeated claim that English investments in California mines are unsatisfactory to the investor, it can be said that the English investors have only themselves to blame. In the first place, it is customary, when a mine is purchased by an English company, to ignore any suggestion, advice, experience, friendly counsel or business requirements other than that emanating from the London board of directors. As a general thing, though not always, the superintendent or manager, sometimes a younger son of a younger brother, is an Englishman "fresh" from London; the foreman is at first an Englishman; everybody that possibly can be given employment in the mine is English. A most ridiculous prospectus is issued; some duke, or earl, or lord is put in as a figurehead in ostensible control, and the whole thing is managed in the most extravagant way in London, entirely from the London standpoint. The glittering and meretricious prospectus—which reads more like a romance than a statement of facts, placing an immense capitalization on the mine—is circulated where it will do the most good—or harm; and little tricks and practices that are invidiously implied to the "Yankee" are practiced to an extent that no "Yankee" ever dreamed of, to induce the well-to-do middle class of Englishmen to invest.

When, after a brief term of mismanagement, no dividends are forthcoming, the odium of the failure is turned upon California. The directors frown, and imply, or plainly state, that there is a swindle or deception in the transaction, forgetting the fact that the property was accepted by the English syndicate on the report of its own engineer. These engineers rely solely on their own judgment, acting in ignorance or defiance of the opinion of California experts—who, it is believed, know more about California mines than any British mining engineer can possibly know, except by the same severe course of practical local study that gave the California engineer his knowledge in these matters. Then, again, the English mining investor seems imbued with the idea that nothing but a "going" mine is worthy of his consideration. He wants a mine that is developed, blocked out, paying steady dividends, with the prospects of continuance in this regard, and then at his own price. These mines are very rare. Ordinarily, where such a mine exists in California, or anywhere else, its present owners are fully cognizant of its value and do not care to sell it, except on the same terms as any other established business could be transferred, namely, with regard to its actual value as a dividend proposition under proper, intelligent management.

The writer has in view a recent proffer that came under his personal observation, where the owners of a California gold mine, being importuned repeatedly to place some value on their property—which has been paying dividends for years, and which, if named herein, would be recognized at once—finally acceded, with, substantially, this proposition: That they would make certain statements in regard to the mine, its present condition, the dividends that it had paid and was now paying, the amount of ore in sight, and the probability of a continuance of such dividends; that they would take $1,250,000 for their property; that the British investors could send their own experts to examine the mine and their own expert accountants to have full investigation of all their books and accounts; that as a preliminary a deposit of $10,000 should be made in escrow. If upon investigation by their accountants the proposed English purchasers should find that the statements made by the American owners were not borne out by the facts, the $10,000 should be returned. If found to be in accordance with statements of the owners, the $10,000 should be retained to apply on the purchase price. That upon the further payment of $50,000 the English mining experts appointed by the proposed purchasers should have the privilege of examining the entire workings of the property. If their report was favorable, the $50,000 was to be applied to the purchase price; if unfavorable, the $50,000, together with the $10,000, was to be returned. If upon favorable reports from the English expert accountants and expert mining engineers the English syndicate proposed to go on further, the remaining $1,190,000 was to be paid in three installments, divided conveniently as to time and amount.

From the American standpoint this seems fair. The proposition upon reaching England was considered outrageous and many virtuous expressions of shocked sensibilities were vouchsafed. Whether the proposition was fair or unfair, can readily be left without comment to the good sense of any mining man in any part of the world. It need but be said that the owners of this claim had never offered the mine for sale, and justly looked upon their property the same as the owners of a piece of profitable ground in the city of London would, viz: as something to be sold for what it was worth, viewed in that light.

Another case comes to mind of a gravel proposition in this State, where, after solicitation, the owners said to the representative of the English company: "You can pay us $10,000 down and take the property as it is; or you can have a working bond on it for six months, and if, at the end of that time, you consider that you want the property, you can pay us $20,000 for it."

This also looks fair, from our standpoint; but it was rejected by the London people with some discourteous expressions as to Yankee tricks; though where the trick is in either of these transactions, is not apparent.

The above is not proffered otherwise than in the most courteous manner. It is not desired to be ill-natured nor unjust; but the facts are believed to justify these statements. Californians are just like any other people—if they have a good thing and anybody wants it, whether he lives in California or Tasmania, he must pay a fair price for it. Nor is it to be assumed, as some of our critics volubly assure us, that we are all standing round here in humble expectancy of having our British friends vouchsafe occasional suggestions in our direction, and when they can get anything on their own terms, take it.

San Francisco, and other cities of California, are investing as of old. San Francisco capital to the amount of $4,000,000 has gone into one California county within the last two years. Whether British residents invest in California or decline so to do is not a matter of immediate concern here. Nobody, so far as the writer is aware, is worrying over the situation; there is no clamoring for recognition, nor disappointment when such recognition is not forthcoming. The facts are patent to the world; California has led in all these years in its gold production, and the gold taken from its soil is but an index of that which remains. These are not mere assertions; it is but necessary to point to the facts.

A little less brag and bluster, a little less lofty assumption of superiority in business requirements, experience and knowledge, a little more recognition of the facts, would, on the part of our British friends, tend to a better understanding of the situation, so far as the purchase or sale of gold mines in California is concerned.

To English investors who want to work the mine and not the street, who wish a fair opportunity for investment in mines with the maximum of probable profit and the minimum of the gambling element; who are in the frame of mind that permits them to have more faith in the unprejudiced reports of competent experts than the glittering statements of London mining prospectuses; the writer may say, without detriment to other rich regions, that no section of gold producing territory offers more favorable opportunity for profit than California.

The $1,315,000,000 produced in gold in this State is but an index of that which remains to be secured by intelligent, up-to-date scientific, economical methods. America is a favorite field, and, under ordinary business conditions, a profitable one for the

English investor. Englishmen know and concede this in nearly all departments of business life; prominent among them is the business of mining, considered purely as a legitimate business. There is probably no region on earth where gold mining has long been carried on with greater success; and to those who have been its chief movers there has been almost total absence of stock jobbing and stock manipulation in connection with California. There are probably few or no "fake" companies in California, designed primarily to mine the pockets of the stock holders. Instances of this kind are very rare and are at once locally noted and exposed. The London journals are constantly full of warning to investors to beware of gambles in which the actual merits of the properties do not count as factors. Such gambles are manipulated by big financial houses, who do with the investors what they will.

It may be said in this regard that where English money is invested in California gold mines, while English purchasers or buyers usually evince a preference for what is termed a "going concern," they often could probably do better for the money by buying what we here term a "prospect." California's interpretation of the word "prospect" has a wider latitude than that given it by English residents, and with us means more than the dictionary definition of the word might imply. A "prospect" in California is a mining property of at least sufficient value to justify considerable time and money spent in exploiting, exploring, securing sure title, and developing it; and while a prospector is by nature a little disposed to be too sanguine, such disposition is usually toned down by experience. A practical prospector is very unlikely to spend a great deal of money on a valueless piece of ground. True, he may want too much for his claim; but under the circumstances he is unable to misrepresent in such a way that his misrepresentations cannot be found out.

"Going" concerns are usually profitable and the owner is rarely willing to sell unless he gets a good price; and a mistake made in buying a going concern is usually more costly than an error in the purchase of a prospect.

At present in London mining journals there seems to be a concerted effort to publish statements derogatory to California mines and eulogistic of mining properties in other districts. Meanwhile, California goes steadily ahead leading in gold production. There are booms and boomerangs elsewhere and a good many deluded investors lose money.

Of course, it is usually understood that trade follows the flag, and that an Englishman prefers to invest in mining property in a country through which is heard the daily drum-beat of British control, the world round; which shows evidence of patriotism on his part, whatever may be said of his business judgment. It is also sometimes asked: "Why do not your local capitalists invest? You are on the spot and have the money and pretend to know all about it. Why do you allow these things to get away from you?" The same question could with equal propriety be asked of British Columbia, or Australia, or Rhodesia, or Guiana, or anywhere else where gold mining is carried on and where English capital is invested. It is probably unnecessary to say that there is a limit to capital—even to the capital of Californians, who, as a general thing, always invest to the extent of their means.

There are hundreds of claims all over this State that show as much promise as once did the largest and best mines that we have. They were all mere prospects originally, and would so have remained to this day had not their owners secured the money for their development. The best properties to-day were, with rarely an exception, sold for the proverbial song. They are now paying handsome dividends to private owners, of which little is ever heard. It is not held that all such concerns or investments are successes; of course there are failures; but business statistics have shown that there is a very large percentage of failures in mercantile life; yet men will persist in buying and selling goods. The same statistics show a far less percentage of failures and loss in the mining world than any other department of business life.

It may be said in addition that while there are thousands of good prospects in this State, the owners are often too poor or too lazy to work and develop them. This is the opportunity of the capitalist, local or foreign, and no field furnishes a more inviting one for investment in that regard than this. Whatever the claims of other districts, whatever the prophecies, one fact stands undisputed: that no other State or like subdivision has ever yet been able to consecutively equal the annual gold output of California.

There are fifty-seven counties in this State—some of them many thousand square miles in area—and in thirty-seven of these counties abundant gold is produced; whether mountain, valley, or coast, all yield it in some form; not only in the quartz, but in hydraulic washings, dry creeks, wet and dry placers, sands of the sea beach, the gravel beds of ancient rivers underlying volcanic lava of æons ago—everywhere throughout California's ample domain is found the metal that all are seeking, and which dominates the business world to-day.

Other States have the advantage of California in understanding how to advertise their mineral resources. In this State the policy has always been to keep quiet about the producing mines and give out as little as possible, declining to furnish statistics, underrating the yield and in every way doing the reverse of what is done in many other regions of less substantial value. The greatest gold mines in the United States are in California, and yet they are scarcely heard of even in this State, still less in other States, least of all in foreign countries. The reason for this is due largely to the fact that our gold mines are not stock operations. Gold mining stocks, with very few exceptions, are not sold in the market, and the stock exchanges know nothing of them. These gold mines are represented by private concerns, who keep their business strictly to themselves. They do not herald rich strikes; they do not publish any voluminous reports; but their richness is evident from the many enterprises, public and private, that their owners promote—in the magnificence of their private homes and their princely manner of living.

Few States are more favorably related in law to the business of gold mining. California has been gold mining so long that its details have been thoroughly mastered. In the neighboring States of Utah and Nevada the net product of the mines is taxed; no such tax is imposed in California. In this regard much, too, has been said regarding alien ownership; but no Englishmen or other foreign investors have ever found any serious difficulty in this regard, this matter having been thoroughly answered and explained in previous issues.

Investors from England or elsewhere cannot find the mines they want in a day or a week, and they cannot buy them for a song nor can they ordinarily induce the owners of paying mines to part with them except for value received. But those who seriously propose investing can probably do better to-day in California than they can in any other part of the world.

A Commendable Idea.

In connection with the commemoration of the fiftieth anniversary of the discovery of gold in this State, has been broached the project of holding a golden jubilee fair at the Mechanics' Institute in this city. The idea is a most commendable one, and deserves to be carried out on the lines indicated. While the fiftieth anniversary of the discovery of gold in this State is of itself a notable event, existing business conditions justify, in connection with it, such a fair as that proposed to be held. The several commercial bodies of the city have already appointed a joint committee, and with proper concerted action and prompt effort, the project can be made a success. The Golden Jubilee Fair, under the auspices of the California State Miners' Association, the San Francisco County Miners' Association, the Manufacturers' and Producers' Association, the State Board of Trade and the Alaskan Trade Committee, can be made a powerful factor in demonstrating California's advantageous trade position, in showing what has been done and can be done in mining in California, and in exhibiting to thousands of visitors interested in mining here and elsewhere the latest, best, most scientific and most economical methods of mining gold.

Especially is this the case in reference to what is universally understood to be a great movement next season toward the newly discovered placers of the Yukon region. That there will be a tremendous outpouring in the early months of '98 to the extreme northwest is evident. The Atlantic slope and central Mississippi valley will, it is thought, send at least 100,000 men next spring, the vast majority of whom know nothing whatever about mining and who will want to learn. No better object lesson for them and no better business advertisement for California could be devised than the proposed fair. The good business policy of the undertaking is so manifest as to need no elaboration. Nothing could more readily induce a large percentage of the coming gold seekers to visit this city than such an exhibition.

In this regard, it is to be said that one immediate requisite to insure the greatest success is advertising. The project should at once receive the widest advertising all over the country.

The revival of gold mining, which began in '92, has been great. The fact that gold is the only product that has not depreciated in value, that is sure of a market at a set rate, makes it the most sought for of any product of the world; and it remains now for San Francisco to take the tide at its full. The time is so short that it will require vigorous and concerted effort on the part of every one connected with or favoring the enterprise to make it the success that it should be; and stress is laid herein on the one point hitherto not noted in connection with the matter, namely, immediate and widespread announcement throughout the region east of the Rocky mountains of the fact that such a fair will be held and every honorable inducement made to secure a large number of visitors.

Speaking only of recent years, the mineral products of this State for 1895 had a market commercial value of $22,844,000; for 1896 a value of $24,891,000; it is believed that the value of mineral products in this commonwealth for the current year will approximate $27,000,000. Of such great amount a large percentage is disbursed in this State and in this city for machinery and supplies. Estimates of San Francisco's annual sales of mining machinery and supplies to the miners approximate $6,000,000, this showing what business reasons there are for advocating the mining industry.

There is a too prevalent opinion in a great many quarters that California was "played out" years ago. It was with amusement, not untinged with regret, that the writer, at a dinner given in this city some time ago in honor of the visit of one of the best informed men in the world, Chauncey Depew of New York, heard that usually well-informed gentleman, in the course of his remarks, say in his good-natured, patronizing way: "True, you of California have worked out all your gold, but then you can raise nuts and oranges, and there is money in fruit." The genial Mr. Depew believed what he said, and his belief is shared in by a great many. When such unusually well-posted men as he think so, what must be said of the density of ordinary ignorance regarding this State's gold.

The very fact that gold was discovered in this State nearly fifty years ago, and that men now middle-aged have always known of California as being the golden State, argues in the minds of many that such golden pre-eminence cannot possibly continue anywhere, and that California must have been pretty well mined out long ago.

If the proposed celebration on the 24th of next January and the projected midwinter golden jubilee fair can tend to dispel in any degree such mistaken ideas in the minds of many people, it will be a business success; and in this lies the largest measure of its value.

MR. H. R. CASSELL, manager of the Bromine Gold Extraction Co., claims that his company has now succeeded in treating ore with a loss of only about half an ounce of bromine to the ton of ore treated, and that the ability to recover the bromine at a small loss and a small nominal cost overcomes the chief objection to its use. He says that the bromine is now converted into a dry salt, and shipped in that form to any part of the world: and that by a series of experiments, the company has succeeded in treating ores containing both gold and copper with success, at a low cost and a saving of both metals.

Notes on By-Products in the Gold Mining Industry.*

By CHARLES BUTTERS.

By-Products from Stamp Mills.—In the process of amalgamation we have the inside copper plates, the screens through which the pulp passes and the outside copper plates, brushes and rags that are used to clean the plates with, the screen frames, mortar boxes, shoes and dies; all these come in contact with the gold and quicksilver and take up more or less amalgam. The ordinary cleanup gives the plate scrapings, which contain, besides the gold amalgam, particles of iron, sand, iron pyrites, especially magnetic iron pyrites when present, bits of copper, sometimes a little grease, and various colored metallic films that spread over the plates as a result of the decomposition of pyrites and other sulphur compounds. This amalgam is then cleaned by grinding and washing, generally in an amalgamating barrel with various chemicals, such as lime, cyanide of potassium, and other chemicals special to the individual amalgamator. Into this barrel is also put the ashes which result from the burning of the chips, rags, brushes, scalings from the screens, the cleanings round the dies, and all the odds and ends round the amalgamating room that may contain a little amalgam. As a rule this barrel is a grinding barrel, and its products at the finish of the operation are clean amalgam, fine silica, slime, and water containing various chemicals. At many of the best mills, when the barrel is empty all these various products are saved, because complete amalgamation of all the gold contained in the barrel has not by any means taken place. Some of the quicksilver has been floured, some of the hard amalgam has been ground up into an impalpable powder, and in the grinding up of the pyrites some of the amalgam adhering to the fine grains of the pyrites is floured. Where cyanide has been used, which is frequently the case, some of this floured gold has been dissolved. Hence, besides looking after the amalgam from this barrel, the sands and slimes should be most carefully settled and the water drained into a collecting tank filled with scrap iron, old zinc, cyanide cases, bits of screen from the battery—in fact, any old scrap iron that may be about that might contain gold. This tank is acidulated with sulphuric acid, and the sludge from it, in addition to the slime and sand settled from the washing of the amalgam, can be sent away for treatment. The value of this product will vary from 50 to 300 ounces to the ton. The sludge tank should be cleaned up once or twice a year, and the sands and slimes twice or four times a year, according to the size of mill. The above remarks apply to any form of grinding-pan or other machine for cleaning amalgam. The value of this product and the weight obtained varies, of course, with the size of the mill and the richness of the ores. In a 100-stamp mill from 40 to 50 ounces may be easily obtained from this source per month. In many mills this material is run straight to waste. The screens, after being rusted and beaten, still contain about two ounces to the ton, and can be readily sold as a blast furnace flux or worked up for ferrous sulphate in a chlorination works, and the sludge from this afterwards treated. The copper sufficient being worn out and being cast to one side, still contain, after the most careful scaling, plates upon gold to make them worth more for their gold contents than for their copper value. These should always be sold to a refinery. The iron chips, which are known as battery chips, always contain more or less amalgam, even after the most careful rusting and cleaning. A very efficient and cheap way of rusting battery chips, old screens, and any old iron that may be suspected of containing amalgam, is to make a bed of clean concentrates — that is, concentrates containing as much sulphur as possible—and bed the screens and chips in alternate layers of screens, chips and concentrates, and keep his bed watered with a solution of warm water and salt for about a month or six weeks. At the end of that time, if this has been done in a warm place near a boiler furnace, or, if that is not obtainable, under a glass frame, in the same way as a forcing bed for flowers would be arranged, this material can be dried and put through a ball mill. What iron is left from the chips, or pieces of iron, would be so deeply rusted that all amalgam is scaled off, and the screens will be found to have disappeared and pulverized. This product is then available for the blast furnace or chlorination works. The gold obtained from these various sources is quite sufficient to warrant the serious attention of the amalgamator.

By-Products from Cyanide Works.—The by-products that are obtained from the cyanide works are very much less in the case of fresh unoxidized ores than from acid or partly oxidized ores. Where the ores crushed have been exposed to atmospheric influences and are partly weathered the products of incomplete decomposition of the iron compounds always introduces a series of complications in the solution and precipitation of the gold that increases the amount of by-products, whether the gold so dissolved is precipitated by chemical or electrical agency. In the case of the unweathered pyritic ore, or of perfectly oxidized ore, a solution is obtained comparatively free of iron salts, but in the case of a partially oxidized ore the ferrous and ferric salts produced form, with cyanide and alkali, ferrocyanides and ferrous and ferric hydrates. These diminish the efficiency, more especially of the chemical precipitating agency, and also increase the amount of sludge obtained from the electrical precipitation boxes. In the case of these acid ores a comparatively large amount of lime is needed, which, going into solution in the shape of hydrate, carbonate and sulphate of lime, crystallizes out in the zinc box and in the electrical precipitating box upon almost everything that it comes in contact with, more or less destroying the precipitating surfaces. This is a serious difficulty in the treatment of acid slimes. The surfaces of the lead cathode are almost completely covered after a few weeks by these comparatively insoluble lime salts, which gradually slip off the lead surfaces. By carrying down gold they thus tend to enrich the precipitates in the bottom of the boxes, as well as the floating precipitates which pass through the boxes and out into the sump. In zinc precipitation everything that accumulates in the box in the way of slime is taken as the main cleanup. The particles which flow away from the box in mechanical suspension in the form of insoluble complex cyanides and hydrates, clayey matter, insoluble humus which has been precipitated from humic acid, and, in fact, any flocculent precipitates that may float through the box, will always carry gold along with them, which may be partly deposited in the sump. Hence one might properly say the only by-product produced directly from the zinc precipitation boxes, outside of the products resulting from the treatment of the zinc slimes, are the precipitates obtained from either the settlement of the precipitated liquors, or the precipitate obtained by filtration of all the liquids after passing through the zinc box. Under ordinary conditions, in a well-conducted cyanide works treating fresh ores, filtration of the precipitated solutions merely to obtain the floating matter from the zinc boxes would not pay, but where acid ores are treated, the precipitated sludge obtained from the sumps is of sufficient importance to warrant its careful collection. This precipitate varies in value from 1 up to 20 oz. to the ton. Precipitates so obtained from the Simmer and Jack cyanide works, where fresh pyritic ores have been treated, assayed 2 oz. 18 dwts. During the precipitation of rich solutions, running from 5 oz. to 8 oz. to the ton, flocculent precipitates assaying 14 oz. per ton, and composed of zinc cyanide and zinc ferro-cyanide, insoluble in the dilute liquor used, were carried over into the sumps. A skimming taken from the top of the treated tank partly mixed with exhausted residue gave an assay of 16 dwts. per ton, due mainly to finely divided precipitated gold which had been pumped back. Black skimmings of organic matter, resulting in the same way from the filtering through sand of precipitated liquors, gave an assay of 5 dwts. per ton. I consider it worth the attention of cyanide managers to see that the sumps are regularly cleaned of sludge, which may be dried by pouring into a small enclosure or dam made of tailings in the open air. After two or three weeks this material is dry enough to sample and assay, and in nearly every case will be found rich enough to sell to the smelting works. The gold in precipitates so obtained is not easily soluble in cyanide solutions unless special preparation is given to their proper oxidation, either by means of preliminary roasting or long-continued exposure to aeration and agitation with cyanide solution in an agitating vat. At one of the earliest meetings of the society it was mentioned that 300 oz. of gold were recovered from the sludge in the sumps at certain works.

By-Products Obtained from Siemens and Halske's Precipitation Boxes.—In the Siemens and Halske boxes the main clean-up is obtained from the melting of the lead cathodes. Whatever else is obtained from the box in the shape of gold is termed gold from by-products. The sources of these by-products are the insoluble compounds of iron and cyanogen. The iron of the anode oxidizes, forming ferrous hydrate, which partly unites with the cyanide in the solution forming ferro-cyanide, from which Prussian blue is derived, and partly undergoes further oxidation to ferric hydrate. A portion of these precipitates settles in the bottoms of the boxes and a portion floats through them into the sump, where they become by degrees oxidized to the ferric state. This precipitate also adheres to and saturates the sacking which covers the iron plate; when, after long usage, this sacking becomes rotten, it is removed and burnt, and the anodes are likewise carefully scaled of oxide. The value of the Prussian blue, of the ashes resulting from the burning of the sacks and of the scalings of the plates vary with the care and regularity with which the process has been carried on. In a sand plant where all the solutions come filtered clear to the boxes the Prussian blue may be cleaned up for sale every two months, and may contain from five to fifty ounces to the ton. The product from the sacks and the plates, which is obtained once every one or two years, may have about the same average value as the Prussian blue. The value of these by-products has averaged so far at the Worcester, which is the oldest Siemens and Halske sand plant, about 25 ounces for scalings in 1895 and 21 ounces for scalings in 1896, 21 ozs. for Prussian blue in 1895, and 9 ozs. for Prussian blue in 1896. In a slime plant the difficulty of obtaining an absolutely clear liquid for precipitation introduces a certain amount of ore slime, which becomes mixed with the Prussian blue in, thereby increasing the quantity and decreasing the value of this product. With fresh slimes a clearer liquid and less mud is introduced into the precipitation boxes than with acid slimes. What with mud from imperfect settlement, precipitated lime salts, and the formation of insoluble sulphates and hydrates and complex cyanides, any precipitation process, no matter how perfect, is very much handicapped. To prevent this state of affairs in the precipitation boxes I am now constructing sand filters to clarify the liquid before precipitation. When a sand and slimes plant are worked together, as at the Bonanza, a large proportion of the solutions decanted off from the slimes can be clarified by passing through the sand vats as a wash. The precipitates which form in the boxes themselves do not have nearly so bad an effect as the introduction of a small amount of finely divided silica or clay. While there may not be over one ounce to the ton of finely-suspended siliceous slime in the liquid flowing through the box, still this small quantity coats both the anode and cathode with a fine film of non-conducting material, thus preventing the gold from adhering firmly to the cathode, as well as raising the voltage in the box. Hence the clarification of the solutions, whether from fresh or accumulated slimes, will tend to reduce the amount of by-products, which must be sold and increase the percentage of gold directly obtained by the melting of the lead strips.

Siemens and Halske Melting Room By-Product.—The melting of the Siemens and Halske strips is generally done in a small reverberatory furnace, about 5 feet by 2 feet 6 inches. If this lead is fairly clean and free from siliceous mud and iron salts a quick clean melting takes place, and at the end of the operation a little powdered coal may be spread over the surface of the oxidized bath and the temperature raised to as high a point as possible; afterwards the furnace is allowed to cool down and the lead tapped into moulds. In addition to the clean lead obtained from this melting, which may run from .5 per cent up to 10 per cent in gold, there is obtained a clean liquid slag which is mostly litharge, or in the case of dirty lead strips the temperature obtained is not sufficient to slag this, and a pulverulent residue is left in the furnace which is known as "skimmings." Generally, where it is necessary to make more than one melting for a cleanup, all the skimmings resulting from previous meltings are put into the furnace and the furnace is brought to as high a temperature as possible, and the skimmings are sweated of their remaining lead contents. When every drop of lead has been drained from them that can be obtained, the hot skimmings are raked out and allowed to cool. These skimmings are then ground in a Chilean edge-roller mill and screened through a screen of about eight holes to the linear inch, from which two by-products are obtained, known as "coarse metallics" and "ground skimmings." The coarse metallics are melted in a pot and yield one or two bars of lead. The lead bars obtained from the melting furnace are then remelted in an iron melting, carefully skimmed, and poured into moulds. The skimmings obtained from this melting pot are added to the first lot of the skimmings obtained from the reverberatory furnace. All the lead, whether obtained directly as bars from the reverberatory furnace or from melting the coarse metallics, is considered lead bullion, and only the skimmings are known as "by-products," for the reason that the skimmings must be remelted in a pan furnace before their contents are obtained as lead bullion. Under careful treatment the amount of gold obtained in the skimmings may be reduced to under 1 per cent. The cupellation of this bullion produces another set of by-products, amounting to about ¼ per cent, which are known as the "refinery by-products."

Chlorination Works By-Products.— The only by-product which is obtained from chlorination works is the sludge which is cleaned up once or twice a year from the second set of precipitation vats. In the precipitation of gold from chlorine solutions, by means of sulphate of iron, the presence of certain salts in the solution prevent complete precipitation of the gold, and in addition to that there always remains a certain amount of suspended gold in the liquids. Sufficient time for complete settlement is seldom given. In some works the precipitated liquor is drawn off from the gold twenty-four hours after precipitation; in other works forty-eight hours are given. I rarely draw it off before seventy-two hours. In some cases this liquor is passed through the filter press. Either long settlement or the filter pressing of the liquor will reduce its assay value, which, however, will still vary with the salts which are contained in it. At our works, after seventy-two hours, the assay value of the liquor is from 4 to 12 grains; if there is much copper present, an average of about 2 dwts. may be expected. The presence of lime also tends to give a higher value. The

* Chemical and Metallurgical Society of South Africa.

precipitation of very dilute liquors of from 2 dwts to 3 dwts. is frequently very imperfect with $FeSO_4$. Precipitation by means of hydrogen sulphide gives the lowest residue. This acid liquor, when drawn off from the precipitated gold and placed in tanks filled with scrap iron, rapidly decomposes, yielding a precipitate of gold, copper and basic iron sulphates and hydrates. In a temperate climate, at the end of a week, the liquor can be run to waste assaying not over two grains; in a cold climate these vats are generally enclosed in a house, and slightly warmed by steam. The sludge obtained from these final precipitation vats is worth from 1s. to 8s. per ton of ore treated, and no chlorination works is considered complete without them. In California the gold obtained from this sludge is equivalent to about 2 per cent to 2½ per cent of the total gold obtained in the chlorination works. The by-products obtained from melting the slimes are very small, because in well-conducted works the slime is nearly pure gold. The treatment of the slag produced will be mentioned under the heading of "melting room by-products."

By-Products of the Melting Room.—The product taken to the melting room from the chlorination works is slime which has been treated by sulphuric acid and carefully washed, and may contain from 25 per cent to 90 per cent of gold. In the handling and melting of this there is a certain loss of gold which is left on the hands and tools when mixing with fluxes; and a certain amount is lost in transferring to the crucible in the slag, in the mould, and in the sink where the bar is scrubbed and cleaned. From every one of these sources of loss ultimately the bulk of the gold can be recovered. All the above remarks apply also to the precipitates obtained from zinc boxes. In every melting room there should be a couple of tanks holding from 100 to 200 gallons of water. All the washings from the tools and hands and from the sink where the bar is cleaned should be thrown in this tank. At the end of every four or five months this liquid should be carefully drawn off after assaying, and the precipitate cleaned up. I have known as high as 200 ounces taken from a tank of this description. At the end of the year, even with the most careful work, the tank in the melting room is always a source of profit. The pots may be scaled and the scalings melted after grinding; after most careful scaling the pots will still be found to contain from 20 to 40 ounces to the ton. The ashes and flue dust from the melting furnaces may be cleaned up and the former will be found to contain on an average about 5 ounces to the ton; along with the pots they form the most refractory material with which the smelter has to deal. The slag from melting zinc gold slimes, after grinding and panning, will assay from 25 to 200 ounces to the ton; an average of 50 ounces to the ton is generally what is found here. Unless the zinc slimes have been treated by the acid process, the slags are by far the most important by-product of the melting room. In case the slimes have been treated by the acid process, the thin lead matte which is found upon the bar after pouring has been found to contain about 14 per cent gold. Finally, the furnace in which the material has been either roasted or melted becomes saturated with gold, and when renovations take place all brickwork and mortar of the furnace, as well as the brickwork of the floor, will give an average value of about 20 ounces to the ton. Where mill gold only is handled, only the immediate lining of the furnace is valuable. In the panning of the ground slags for the coarse gold, which is sometimes done here in small rockers or on incline tables, I have frequently noticed that only the coarse particles of this ground slag is saved, and the finer particles or slimes flowing away with the water are allowed to go to waste. Quite 20 per cent or 25 per cent of the ground slag goes into slimes, and this assays just as high as the coarser particles. No water should be allowed to flow to waste when the slags are washed, but should all be retained in tanks for clear settlement and subsequent cleaning and drying of the settled slimes. The cemented or iron floor of the melting room should be kept scrupulously clean and the sweepings carefully saved, as they will invariably assay over 5 ounces to the ton.

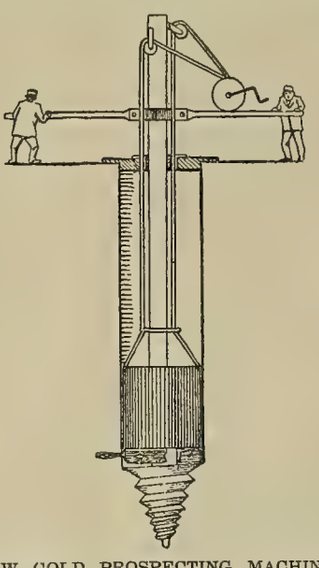
The attention of managers and directors should be given to these sources of income, and regular quarterly account sales of these by-products should be required. Too frequently the battery is utilized as the great sewer through which these valuable products disappear, along with a large proportion of their values.

A New Prospecting Machine.

W. Schwarnweber has a patent for a prospecting machine that he thinks will obviate all difficulties arising from the frozen ground of the Yukon region.

Thus far it has been necessary for the miners to build fires on the frozen gravel of the rivers in order to remove even a few inches of dirt. Six inches deep is considered a good thaw, and fire after fire has to be kindled to make any kind of impression on the ground. The invention herewith portrayed is expected to enable two miners to prospect to a depth of 30 feet or more without the necessity of building a fire.

The device consists of a steel screw, which is

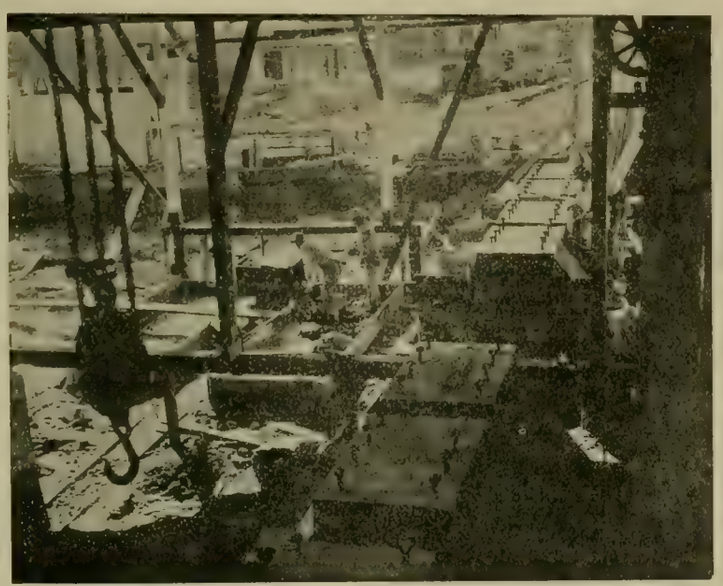


NEW GOLD PROSPECTING MACHINE.

worked into the ground like a posthole auger. A cylinder of the same diameter of the screw and 2 feet in depth follows the screw into the ground, and within the cylinder is a well bucket, which has an open bottom, into which the detached dirt and gravel are forced. When full, this bucket is elevated by a windlass attachment and can be washed out and panned, while the bucket is returned for another load.

Stamp-Mill Concrete Foundation.

In new construction of stamp mills in California, in Nevada county, Butte county, and also in the southern part of the State, there is a tendency to materially change the old-time plan and replace the timber foundations with concrete. The new 40-stamp mill, being erected by Geo. H. Evans at the Banner mine, near Oroville, California, is the latest instance of the kind that has come under our observation. Herewith are two photo-engravings of the concrete blocks, which illustrate the change. The concrete is in pyramidal form, 8 feet at the base, composed of one part of cement, two of sand, and five of course rock to a height of 3 feet. As the structure assumes an oblong form the next 6 inches is composed of one part of cement and two of fine river sand. This structure complete is 4 feet in height. The bolts for the mortars extend 6 inches above the top surface and are imbedded in the cement structure to a depth of 33 inches. The whole structure is laid on a line of solid bedrock, there being concrete sills for the 12x20-inch posts.



CONCRETE FOUNDATIONS FOR STAMP MILL.

CONCRETE FOUNDATIONS FOR STAMP MILL.

New Explosives in Mining.

Inventors have been busy lately in the endeavor to discover a safer and cheaper explosive than gunpowder for the blasting of coal. Some interesting experiments were recently carried out at Southport, to determine the relative strength and efficacy of a new explosive. The conditions of test in each case were the same, ten grammes of the explosive being used. This was placed in a steel mortar loaded with a projectile weighing thirty-five pounds. All shots were fired at an angle of 35°, with the following result: Gunpowder threw the projectile 51 yards, kynite 88½ yards, benedite, as the new powder is called, 155 yards, and dynamite 161½ yards. Benedite contains no nitro-glycerine, and it was also subjected to severe tests as regards handling. Unlike dynamite and explosives generally, benedite could not be exploded by either a blow from a hammer or direct application of flame, an advantage which ensures perfect safety in the use and handling of the explosive. It can only be exploded by means of a detonator. For safety blasting in coal mines a series of trials have shown that when it is exploded in the presence of highly inflamable mixtures of pit gas and coal dust it would not ignite them. It is further claimed for the new safety explosive that its cost of production is much below that of powerful explosives generally, and it is to be put on the market at a considerably lower price.

During the past few years several articles have been published on the possibility and advisability of welding instead of riveting boiler plates. The advantages of employing electric welding have been fairly shown up, but so far as known no boiler maker has used the process in practical work. Two or three shops are, however, experimenting with the process, and hope to find it available for welding on the heads of tubular boilers, though they are not yet ready to make any statement regarding the success of these experiments.

Mining Summary.

CALIFORNIA.

Alpine.

The company working the Leviathan mine at Monitor has twenty men employed and expect to have 200 at work before long.

Amador.

(Special Correspondence).--While the mother lode counties are all attracting attention at this time by the number and value of the mines that are constantly being added to the dividend list, Amador justly considers herself the mother of them all. The mines of Amador were recognized as of great and proven value when those of Calaveras and Tuolumne were scoffed at and condemned as pocket mines. In fact, a number of Amador's mines had been worked to a depth of 1400 feet, and were considered worked out, before the mother lode mines of the counties to the north and south were given the recognition they have since earned and now hold.

Along the north end of the lode, in the vicinity of Plymouth, the mines are resting on their past history. Going south, at Amador City the old Keystone, under J. D. Treadwell, holds its record as the largest gold producer (with bullion receipts to verify the claim), not only on the mother lode but in the State as well. The company's books show that to date the mine has produced over $15,000,000, and, unlike most old mines, is today reopening and working her upper levels. In the past the mine was worked to a depth of 1400 feet. For some time the closing of the mine was in contemplation. A change of superintendents brought about a change in the development of the mine and proved in time that the mine held in reserve in its upper works ore bodies as large and rich as those of the mine's earliest history. At present the ore is coming from the 700-foot level, where the vein shows nearly 100 feet wide. At present the development is by upraise, winze and crosscuts. The old method of following one wall has been abandoned; when an ore body gives out another is sought above, below or on both sides. The ore bodies are not continuous, nor are they in a line, but huge lens-shaped bodies that go dodging along between the walls like a huge salmon running up a stream. The Keystone promises to hold many years of profitable fishing for ore bodies in what was considered a worked-out mine. At present the 40-stamp mill and two other mills are running steadily, the stamps on the clean quartz and the others on the gouge and slaty material. Mr. Treadwell has arranged for systematic search for ore bodies a complete history by levels of every section of the mine, which enables him at a glance to tell not only where the old levels are, where work stopped, but the character of the ground as well. This, with an extensive system of maps, places the old mine before the reader as plain as though the works were open for inspection. As is well known, the Keystone and South Spring Hill mine, adjoining, are in litigation over the apex of the lode in the South Spring Hill end of the mines.

At the South Spring Hill Consolidated, J. Tregloan superintendent, the mill has been running irregularly while the shaft was sunk to the 1200-foot level. The shaft is now down and a crosscut is being driven to the vein.

To the south, near Sutter Creek, the Mahoney is operated under bond to the Wildman Co. and forty stamps are dropping.

At the Wildman, J. Ross, Jr., superintendent, the shaft on the mine is now down 1300 feet, with a vein 3 to 75 feet in width. The Wildman and Mahoney are in charge of a thorough miner, who has rebuilt the Wildman plant, adding ten stamps, making forty on the Wildman, opened up both mines and will soon have them in excellent shape, both above and below, without calling on his company for a dollar.

On the Central Eureka, to the north of the South Eureka, W. R. Thompson as superintendent has the shaft down 950 feet and is sinking.

The South Eureka, J. Parks superintendent, is now down 1250 feet on a vein of from 6 inches to 15 feet. Twenty stamps are dropping. The company is about to change to electric power for the mill, blower and crusher.

The Pontazuba mine, S. Moyle superintendent, is situated to the north of the Baliol and about one mile southeast of Sutter Creek. The shaft is now down 550 feet in the center of the vein. Stations are now being put in and preparations made to drift both ways on the vein. A mill run of surface ore from this vein showed its value to be over $25 to the ton.

To the south is the Baliol mine, G. McM. Ross superintennent. The Baliol covers a large area. The vein is supposed to be the Zeila vein, as its location is on the east wall of the mother lode. The mine is opened by cuts on the vein, showing mineralized slate and greenstone, with a belt 100 feet wide. The open cuts are at this time about 100 feet deep. The ore is quarried out and trammed to the 40-stamp mill, where the 1000-pound stamps crush an average of 270 tons a day at a cost of 85 cents a ton for mining and milling. The company contemplates adding sixty stamps, bringing the number up to 100, when by adding steam shovels and other machinery for rapid and economical working of the large ore body Mr. Ross estimates that the cost can be reduced to 50 cents a ton. In addition to the present large ore body the mine contains the Pontazuba vein to the west, which can be added to the ore reserves at any time. Since Mr. Ross has taken hold of the property the plant has been thoroughly overhauled and the mistakes and weak spots in the construction removed, and the whole plant placed on the present extensive, economical and business basis. If there were more superintendents like these of Amador, there would be few failures on any proposition on the mother lode.

Near Jackson the Kennedy, under its superintendent, J. Parks, is now down 2275 feet, making it the deepest mine on the lode and establishing the fact that the values in the mother lode are not limited to the 1400-foot level, but if followed down can be depended upon to extend into the earth indefinitely. The vein in the mine is from 2 inches to 20 feet. The mill is of forty stamps of 850 pounds weight, crushing 100 tons a day. The superintendent is always exceedingly coy about the output of the mine, evidently believing that "good wine needs no bush." The record of the mine is thought to be only second to that of the Keystone. The mine is equipped with a chlorination plant.

The old Eureka is the property of Mrs. Hetty Green, who is content to let it lay idle notwithstanding the eagerness of many to secure the property with its large bodies of low-grade ore left standing in the upper levels, to say nothing of the vast wealth that must be below the old works.

The Argonaut, W. F. Detert general manager, adjoins the Kennedy on the south. The shaft is opened up 1350 feet and sinking going on. The vein, like that of the Kennedy, is from a few inches to 20 feet. The company is just completing the best planned mill that the writer has seen on the lode. The stamps are 950 pounds weight, forty in number, with twelve 6-foot concentrators.

The Amelia, J. E. Reese superintendent, parallels the Argonaut on the east and is better known as the old Muldoon mine. The shaft is now down 350 feet and sinking on what is thought to be the foot wall, with gouge but no vein matter. This property has come into prominence through the fact that it is now claimed that in the Amelia crops the apex of the Kennedy vein. This "fact" is disputed by the Argonaut Company, who are making connections from the bottom to the top of their works to prove that the vein they have extends to the surface inside of their side lines. As the works of the Argonaut and Kennedy connect, there can be no doubt about the location of the vein in depth. The Amelia people base their faith on the croppings, which in their mine and the Kennedy are in slate, while that of the Argonaut is in greenstone, and that crosscuts run in the Kennedy ground show that the Argonaut vein does not go down. The Argonaut Company admit that their vein crops in the greenstone, but state that it is superficial and a mere cap. The fact that the Alma, to the south of the Argonaut, crosscut ,735 feet to find the Amelia vein, in vain, makes honors easy on that score. On the Bell mine, near Tuttletown, Tuolumne county, the country rocks make the same change in depth as the Argonaut. Apparently both properties have a vein apexing on their ground. Once the Amelia people get down to the levels of the Argonaut, the question will be quickly settled as to which mine carries the Kennedy apex and vein.

At the Oneida, John Truscott superintendent, the shaft is down over 1300 feet and will be continued to 1700 or 1800 feet before the vein is reached. A crosscut will be run at the 1500-foot level. The hoist is a duplicate of the Homestake and Anaconda mines, and is without doubt the finest hoist on the lode.

The Alma, J. E. Francis superintendent, is to the south of the Argonaut. The shaft is down 1000 feet, with a crosscut run east 100 feet to the Kennedy vein, which is here 35 feet wide. A crosscut 735 feet east from the shaft to locate the Muldoon or Amelia vein failed to locate it. Levels are now being run on the 950-foot level.

The Anita, P. Reichling superintendent, is south of the Alma and directly west of the Zeila. The shaft is now down 500 feet, with crosscut of 75 feet to the vein, and drifts run north and south 700 feet to the ore bodies. Mr. Reichling is one of the oldest superintendents on the lode. Having found a good mine in the Kennedy, in the past, he has come back to the old location to seek another Kennedy in the Anita.

The Zeila, W. F. Deitert superintendent, is now down 1000 feet, with a vein of from 25 to 30 feet, and forty stamps are dropping. The vein matter is heavily sulphureted. The mine has its own chlorination plant of five tons capacity. Other superintendents hint at the large values of their ores, but Mr. Deitert boasts that the Zeila never was a $5 proposition, nor a $4; and yet, under the excellent management of the superintendent, the mine has been a steady dividend payer ever since it was placed under his management, and shows what can be done with mother lode ores of low value when worked to a depth of 1000 feet with a Deitert in charge. The Zeila Company have shown their appreciation of their superintendent by erecting the handsomest, most convenient and extensive office on the lode.

The Amador Reduction Works, Voorhies & Barney proprietors, located at Amador City, with a branch at Drytown, affords the mines of the county an opportunity to have their sulphurets worked at home at a reasonable price by people who have the confidence of every miner in the county.

Knight's Iron Works at Sutter Creek are conveniently located and are a convenience and saving to all the mines in the county. Mr. Knight has just placed one of his water governors on the Baliol mine at Sutter Creek, and has also equipped the large electric plant at Ogden with one of the same pattern.

To the east of Jackson, near Volcano, lies the Monte Cristo mine, J. S. McCall superintendent. This is an immense mineralized dyke, decomposed and easily milled. The mine is developed by a crosscut tunnel which places a body of ore estimated at 1,000,000 tons in sight. The vein is 60 to 200 feet in width, carries an average value of $2, and is mined and milled at an average cost of 60 cents a ton. The ore at present is crushed in a 6-foot Huntington. E. H. SCHAEFFLE.

Murphys, Cal., Nov. 20, '97.

Butte.

At Forbestown the upraise in the Gold Bank mine from the 1600-foot tunnel has reached the upper works. This upraise is said to be the longest of the kind in the world.

The Butte County Miners' Association has reorganized at Oroville, W. E. Duncan, Sr., Pres., S. S. Boynton, Sec.

Calaveras.

From Jan. 1st to Nov 1st, '97, 564 mining locations were made and recorded in Calaveras county.

It is understood the filing of articles of incorporation of the Utica Mining Company does not mean any change in the ownership of the Utica mine at Angels. The act of incorporation was decided on by the original owners of the property to easier handle their interests and to provide for the perpetuation of the concern on the original lines in the event of the death of any one of the owners. The incorporators named in the articles filed are now connected with the management of the property. Mr. Shinn, one of the directors, is C. D. Lane's attorney in fact, and another director is T. T. Lane, the superintendent of the mine and the son of Charles Lane. The mine is still owned by Col. Hayward, the Hobart Estate Company and C. D. Lane.

Los Angeles.

R. E. Nickel says the Red Rover mine at Acton is locally reported to be taking out $3000 in gold daily. The company owning the mine is arranging to develop electricity on the Big creek.

James S. Crawford et al., on July 21, 1877, located the Kentuck petroleum mine, in the Los Angeles land district. Entry was made January 23, 1892. Part of the patent was in conflict with the Southern Pacific Railway Company, and this company filed a protest, claiming that petroleum lands are not mineral lands. The protest of the company was dismissed, and its selection held for cancellation. The Secretary of the Interior recently decided that the entry of the mineral claimant may be passed to patent.

O. S. and William Bookhout, January 2, 1892, located land in the Los Angeles district as "the Bookhout placer oil claim," under the mineral land laws. January 27, 1893, the State of California filed its application to select this land as indemnity for lost school lands. The Secretary of the Interior has rejected the application of the State.

Secretary Bliss has rendered a decision in the case of the motion for review of departmental decision of August 27, 1896, filed by the Union Oil Company. On January 16, 1894, this company made mineral entry covering seventy-nine acres of land in the Los Angeles land district, known as the Central oil mine. A portion of it had been selected by the Southern Pacific Railway in 1887 as indemnity under its grant of March 3, 1871. The railroad company was allowed sixty days to show cause why its selection should not be cancelled, and the mineral claimant was required to show a discovery of a valuable mineral deposit for each twenty-acre tract or fraction thereof. From this action the mineral claimant appealed. The railroad company, in answer to the rule upon it, alleged that lands containing petroleum are not mineral lands. In conclusion, Secretary Bliss says:

"The decision under review is hereby vacated. The mineral entry in question will be allowed to stand, and if satisfactory in other respects, may be passed to patent."

Mono.

Bodie is the only $4 camp in the State. At present about 250 men are working for wages, at a *per diem* of $4. Bodie is on a cash basis. Farmers receive spot coin for every article they deliver and sell.

J. S. Cane has purchased the Noon Day mine, and in the future will furnish tailings for his cyanide plant.

The principal mines of Bodie are: The Standard, Syndicate and the Bodie Tunnel. Within a radius of twenty miles are Lundy, Copper Mountain, Dunderberg and Ward Shaft, all of which are working full forces, and as far as the public knows, the ore produced is good.

Sup't Kermeen of the Dunderberg has closed the cyanide works for the present. At and around this mine there are thirty-five men working. The ledge is from 11 to 12 feet wide, and a shaft is going to be sunk from the tunnel. The Dunderberg is operated by an English company from the Isle of Man. Six men are working in the Ward shaft.

Bodie *Times-Index*: Utah's pumice stone deposits are now supplying over 60 per cent of that article in this country, and with a tariff of $6 per ton the peoned product of foreign rivals is practically shut out. We have vast quantities of pumice in Mono county, between here and Mammoth, particularly around Mono lake, in which vicinity there are enormous quantities of it, but cost of transportation "knocks the sand out of it," so far as profit is concerned. But we may yet have a railroad to tide water.

Nevada.

Supt. Simmonds at the W. Y. O. D. mine, Grass Valley, has put in electric power. The 40 H. P. motor runs the 20-stamp mill rock breaker and eight concentrators. The mill has 850-pound stamps, dropping ninety-five times per minute. Recently a new chute of ore was struck in the 900 level. About sixty men are employed.

The tunnel of the Red Dog drift mine at You Bet is in 400 feet from the foot of the incline. The owners of this claim have already spent $12,000 in opening the property.

Union: The St. Gothard Mining Company have gone to work on the Delhi mine, recently purchased by them from Robert McMurray and others. Seven men are employed at present, with A. S. Bigelow of Columbia Hill in charge.

Transcript: At the Bellefontaine mine the ledge has finally been struck at a point 55 feet from the incline and 100 feet below the main tunnel. The ledge there is 2½ feet thick.

Herald: At the Providence mine the new hoisting rig is on the bottom level (1780 feet), in the south drift, 350 feet from the main shaft. Here another shaft was started, down now about 100 feet. It is the company's intention to sink 1000 feet. The shaft is on the Providence Company's front ledge, about 7 feet thick at this point, with walls of granite. The ore is rich.

A good body of ore is reported in the Maryland mine.

Transcript: The Bismark and the Gladstone quartz mines on Selby Flat two miles from Nevada City, have been sold by Sidney Smith of San Francisco to a New York company who will erect machinery and develop the property.

Placer.

The Pioneer mine earned $9337 gross for October, and $3058 net. The amount of rock crushed was 508 tons, and the average yield was $18.38 per ton. The lack of water hampered the working of the mill to its full extent, but advices from the mine received recently state that there are four inches of snow on the ground. The October output compares with previous months thus:

	Oct.	*Sept.*	*Aug*
Tons rock crushed	508	610	765
Val. gold bars	$9,337	$11,858	$14,543
Payroll	4,636	4,441	4,367
Bills	1,642	1,271	1,723
Total ex	$6,278	$5,712	$6,090
Net earnings	3,058	6,146	8,453
Av. value rock	18.38	19.44	19.01
Men employed	57	56	53

Sentinel: The Bear River Hydraulic Company has turned in 200 inches of water and started their hydraulic elevator in Bear river, near Colfax. The plant is in successful operation.

Plumas.

J. H. Challen, Supt. Topaz-Centennial, has two shifts of miners driving a bedrock tunnel to open up the gravel channel. Two hundred feet of the contract has been completed. The same distance is yet to be run.

Angus Cameron in his drift mine on the North Fork this season has taken out an average of an ounce a day to each man employed in the mine.

National-Bulletin: At Granite Basin many of the miners have suspended work till next spring. See & Jolly continue to extract ore from their mine and crush it in their 5-stamp mill. The Benjamim mine has closed down for the winter, but in the spring work will be resumed.

The Chicago Company, a few weeks ago, released their hold on the Robinson mine, on which they had been prosecuting development work. By maintaining an expensive crops of officials and by mismanagement, they failed to make success of the proposition, though the ore was of good quality, a fact demonstrated by six of the men who, after the company quit work, in eight days mined and milled ore from which they obtained $300. The shaft is down over 100 feet and the ore body is good, yielding from $8 to $12 per ton, free milling. Five per cent of the ore is sulphurets worth $100 a ton. The pay chute is 200 feet long, and it bears strong evidence of going down to great depth.

Riverside.

The Perris district, as soon as the Gavilan is finished, will contain eighty stamps.

San Diego.

At the Contact mine the work consists of three tunnels, 28, 39 and 110 feet, and a 10-foot shaft. A ledge from 3 to 7 feet in width has been struck, of which an average assay shows the value of $20 per ton, free milling. Fuel and water are reported plenty.

L. N. Bailey, owner of the Kentuck S. mine, has interested a New York company in his mine and will drive a crosscut tunnel to tap the ledge at a vertical depth of 320 feet.

Shasta.

(Special Correspondence).—The Iron Mountain property comprises about 200 acres of mining ground. The compressor is operated by steam, working six drills. Work is carried on in three levels, the lowest of these being 800 feet below the surface. A narrow-gauge steam railway circles down the mountain a distance of thirteen miles to the smelter. An average of five trains daily of ten to seventeen cars is used for transporting the ore. The elevation is about 2000 feet higher than Keswick. The company employs 400 men. Mr. F. B. Willson is superintendent. The property is owned by the Mountain Copper Co., Limited, of England. Matte from the smelters goes direct from Keswick to Galveston, Texas, by rail. It is shipped then by sea to Newport News, Virginia, where it is transferred to vessels that land it at the refineries at Elizabethtown, N. J. It takes about three weeks.

Sierra.

Sup't Wingate of the Thistle Shaft mine, is expected to arrive this week from Scotland, when it will be known what is to be done in regard to resuming work on that mine.

Last week gravel was struck once more in the South Fork mine, near Forest City, the bedrock having pitched 30 feet in a short distance.

The *Enterprise* reports good progress being made with the new mill being built at Sierra Buttes.

Wm. York at the Rising Sun mine near Downieville while tunneling last week struck a rich ledge. The *Messenger* says: "One piece of rock taken out contained forty-nine ounces of gold."

Siskiyou.

Yreka *Journal*: The Blue Gravel mine at Greenhorn will be started up again as soon as sufficient water can be secured.

The Distlehorst & Barton dredger has moved down the Klamath a little further, having worked out the gravel where they have been stationed for several months past. They are now again on good pay dirt.

At the Minetta B mine men are putting in a new elevator and rigging up for the winter work.

A Scott Valley paper says there will be a

great deal of development work done on the various quartz mines on upper Humbug next season. It reports a deposit of copper ore near the head of Dutch creek "running from 10 to 20 per cent in copper, $100 per ton in gold."

The *Journal* reports the river miners on the Klamath still hoisting pay gravel in spite of the late storms, and doing well in taking out an abundance of gold dust. The rain has raised the river a few inches, to make heavier current for the wheels, as the stream was lower this year than for many years, causing much trouble in keeping the wheels turning at some points with sufficient force.

Trinity.

Pres. and Manager Allenberg of the Altoona quicksilver mine at Cinnabar, says that after eight months' idleness on account of water in the mine work will soon be resumed. Two fine ore bodies have been discovered.

Tuolumne.

The Santa Ysabel Gold Mining Company has ten stamps at work.

In the Rawhide, the main shaft is 1300 feet deep. About 100 men are employed. In the App the main shaft is now over 1000 feet deep; seventy men are employed.

NEVADA.

A shaft has been sunk 185 feet, 200 feet of crosscuts and 500 feet of drifts run and a 10-stamp mill keep running since its construction on ores extracted from the Berlin mine, Ione, Jos. Bray, superintendent.

Times have changed in the old Silver State. At Stateline, the Stateline G. M. Co., A. Popkiss manager, the company is paying twenty cents per hour for laborers and $2.85 a day for miners.

The Wells *Herald* says the Salmon Mining and Smelting Company at Contact is preparing to resume. The smelter will be remodeled and ready for business by the first of the year.

The Gold Creek, Elko County, Mining Company stockholders are dissatisfied with the management of J. L. Robertson and F. Hopkins, a Wall street manipulator, has been elected president in his place.

H. H. Blood, sup't of the leaching plant in Sixmile canyon, near Dayton, says that one-half the plant is completed and ready to operate, but it is doubtful if it will be started up this winter, as the cold weather would freeze the water pipes and cause considerable damage. The plant as now completed is capable of handling 150 tons of material per day. In the spring it will be enlarged so as to handle 300 tons per day.

The Kingman *Miner* thinks that as a result of Supt. Gracey's Eastern visit and conference with the owners the company will build a 100-stamp mill at Eldorado Canyon, Lincoln county.

Virginia *Enterprise*: Tuesday, while workmen at the Harris, Blood & Co. plant were working along on the bedrock under the tailings, they uncovered a lump of nearly solid amalgam weighing about 100 pounds. This amalgam, although mixed with black clay, contained a sufficient quantity of gold to give it a rich yellow color, and was soft, being largely quicksilver. The lump was considered to be worth several thousand dollars.

OREGON.

The Ollie Woodman group of mines, Sparta district, Baker county, are reported sold to Portland men for $5000.

The White Bird mine is bonded for six months for $10,000.

W. P. Keady, manager East Eagle Mining Company, is at the company's mines in the eastern part of Union county and making arrangements for resuming work.

J. S. Wallace, sup't Rachel mine, tells the Baker City *Democrat* that he will have water supply for milling purposes.

The Junction Bar Placer M. Co. has incorporated at Walla Walla, Wash., to operate the Junction Bar placer mine in Grant county; capital stock, $60,000.

WASHINGTON.

Work on the Big Four at Silverton has suspended for the winter. The owners, the Livingstone-Andrews Mining Company, will begin shipping in the spring.

Commissioner Binger Hermann, of the General Land Office, has recently addressed a letter to Representative Lewis of Washington, replying to some questions of the latter relative to the rights of mineral claimants to land in the north half of the Colville Indian reservation. Representative Lewis desired to know, on behalf of some constituents who had written him, whether mineral claimants on the said reservation can cut timber from their claims, and whether a patent to a mining claim on the reservation conveys the ground absolutely to the entire exclusion of the Indians.

"The act of February 26, 1896," says the commissioner, "provides that the mineral land laws of the United States be and are hereby extended so as to apply to all lands within the north half of the Colville reservation.

"Owners of valid mining locations are permitted to take timber from their claims for actual mining purposes. This authority was given by an act of June 3, 1878, and the provisions of this act were extended to all public land States by an act passed August 4, 1892.

"A mineral patent conveys not only the right to the use of the surface and to extract the minerals, but also a fee simple title in the land described."

BRITISH COLUMBIA.

H. S. Jones is sup't Waverley mine, in in Albert canyon, twenty-one miles east of Revelstoke. During the summer he had 170 men at work; they built a road twenty-seven miles in length connecting the mine with the railway. Over this road the Waverley ore will be transported. At present there are fifty men at work on the Waverley and they are getting out ore rapidly. It is the intention to ship 1000 tons of ore to Swansea.

C. Innes, manager Fern mine, on Morning mountain, near the headwaters of Hall creek, furnishes the following report of a 38 days' run to November 13th: Bullion shipped, $11,325; bullion on hand, $870; concentrates shipped, 20 tons; net smelter returns, $1500; six tons of concentrates on hand, $450; total product of the mill, $13,945; ore shipped, 20 tons; net returns, $1200; making a total of the mine and mill for the 38 days of $15,145. The total number of tons milled was 965, or an average of 25.4 tons per day. The segregation of values recovered is as follows: The first five days 30 tons per day, making 150 tons at $8 per ton, $1200; succeeding ten days, 25 tons per day, 250 tons at $9 per ton, $2250; the next ten days, 24 tons per day, 240 tons at $14 per ton, $3360; the next thirteen days, 25 tons per day, 325 tons at $21.95, $7135. The average duty per stamp in twenty-four hours was 2.54 tons. The average free gold per ton milled was $12.43. The average value of concentrates per ton milled was $2.02. The estimated cost of mining and milling per ton was $4.50. At the latter figure the total cost of mining and milling for the 38 days amounted to $4342.50, leaving a balance to the credit of the mine of $10,803.50.

Concerning the cost of mining in the Trail Creek district at a Red mountain property that is being developed entirely by hand, five men are employed, including the foreman, working two ten-hour shifts. The nature of the work in hand is a crosscut tunnel, driven through a very hard syenite formation. The tunnel itself is 4½x6½ feet in size, and is now in over 250 feet. Working by hand under the above circumstances, the tunnel is being driven at the rate of 42 feet per month, or 17 inches per day. The average cost for this development is $15 per foot, which comprises $13.50 for labor and superintendence, and $1.50 for explosives. At a fully developed mine on Red mountain, which is being worked with power furnished by its own compressor, the cost of sinking a double-compartment shaft, including breaking, timbering, explosives and lights, exclusive of hoisting, is set at $50 per foot. The estimated speed, including stations, is set at 1 foot per day. The item of hoisting is not included in this case, as the engineer, besides attending to the hoisting plant, also looks after several other departments. In this property the cost of tunneling is set at $12 per foot, including all expenses of drilling, tramming, explosives and lights. The item remains about the same whether or not operations are being carried on in the country rock or along the vein. The cost of breaking and delivering ore is set at $2.50 per ton. This includes drilling, lights, tramming, sorting, timbering and delivering on the cars, direct, without the use of teams.

At Rossland the British American Corporation has bought the Great Western for 10 cents per share, or $100,000; $25,000 down, balance January 1st, '98.

The concentrator at Pilot Bay has been running a month, employing about 200 men. Concentrating work will possibly continue before the smelter is blown in, the object being to have enough concentrated ore on hand to insure a steady run.

The *Spokesman-Review* says there no longer seems to be any question that the Josie Mining Company's officers have entered into negotiations and have practically closed a deal whereby the controlling interest in the Josie mine at Rossland will pass into the hands of the British American syndicate, of which Governor Mackintosh is the managing director. The price is 30 cents per share.

THE KLONDIKE.

At Dawson men to locate claims are in demand, and are paid from $1,000 to $1,500 for such services.

The Metropolitan Mining Expedition, a company composed entirely of Siberians, has been organized in San Francisco to explore the Yukon region. The younger members of the company were born and raised in Siberia, the others have spent the greater part of their lives in that region, and the rigors of the Arctic winter have no terrors for them. They will leave San Francisco about January 15, '98, claiming that it is much easier and safer to travel in winter through that region on sleds, when the whole country is covered with snow and ice, than at any other time of the year. They will take a supply of provisions and enough tools and implements to last them one year. From this city they will go to Dyea thence overland to the Yukon country by means of sleds. Prospecting is to begin as soon as they strike the headwaters of the Yukon, and will continue along its banks and its tributaries. The originator of the expedition says: "We are all familiar with placer mining and gold-washing. The climate and temperature of Siberia differ little from that of Alaska. We do not fear cold, and can travel, camp or work in snow and ice all winter. Our methods of washing gold in Siberia in mid-winter may appear novel to American miners, but we are obliged to resort to them because the winters are so long, and we cannot afford to be idle. In taking gravel, we make a large hole in the ground, deep and wide, like a cistern. The walls and bottom are lined with rocks, clay or cement. In winter the opening is packed with snow, which is melted by hot stones and rocks. We have to keep up a continuous fire to thaw the frozen ground before digging it."

The Chilkoot Railroad & Transportation Co. is building a railroad and aerial tramway from Dyea over Chilkoot pass to Lake Linderman. The railroad will be completed by the middle of December, and the whole line, including the aerial tramway, in operation by Jan. 15th. It will have a capacity of carrying the outfits of 400 men daily. This is expected to insure getting provisions to Dawson City not later than March 1st and to preclude the possibility of a famine in Dawson. The company has completed its telephone line from Dyea to Sheep Camp.

UTAH.

W. B. Devereux describes in the Salt Lake *Tribune* a method of blowing in a lead furnace, which, he says, starts the furnace in good condition, and with ordinary care gives very little trouble. The crucible is heated with cord wood, and as soon as the walls are fairly hot, a 2-inch pipe bent at an angle is inserted through the breast to the bottom of the wood fire and the air is blown in. The crucible is filled with cord wood and, as soon as it is blazing well, several bars of bullion are shoved in on a plank and tipped off on the wood. This bullion melts and runs down through the hot fire to the bottom, becoming red-hot. This process is continued until the crucible is full of lead, when the fire is raked out and the lead thoroughly stirred up from the bottom and skimmed. The crucible and siphon are then full of red-hot lead perfectly clean. Brands and wood are then put back on the lead to form a support for the coke and to kindle it; the breast is put in and the furnace filled with coke to about 18 inches above the tuyeres; then light slag charges and coke to the top of the jackets; then charges part ore and slag, and finally normal ore charges to the top.

A light blast is turned on until the slag begins to show at the slag taps and it can then be raised gradually to normal pressure. In this way the fusion zone is kept from rising and the furnace starts off with cool walls and a cool top. If lead makes too slowly and shows a tendency too cool in the well, a few bars can be dipped out and charged into the furnace again.

H. A. Gebhardt, sec'y Phœnix Mining Company of Bingham, reports that during the past six months the mine has produced 680,421 pounds of lead, 8047 fine ounces of silver and 65 fine ounces of gold.

A Mercur paper says: "The Chloride Point made a car shipment of ore this week which averaged 198 ounces in silver. A fact worthy of remark is that this mine, which thus far produces silver almost exclusively, has shipped and marketed since the 1st of October, '96, $20,000 worth of ore, with a force of thirteen men. This will pay for the mill, operating expenses and leave a balance in the treasury."

Mercur *Mercury*: The Gladstone shaft is producing 60,000 gallons of water every twenty-four hours and the flow seems to be increasing. Col. Wall is doing a large amount of surface work on the Glencoe group, but when winter sets in this will be discontinued and the development of the ore body recently discovered in the ground will be undertaken. The Golden Gate mill structure is going up steadily and the tanks also are being put together. The machinery for machine shops has been ordered, so that all repairs to the immense plant can be made right on the ground.

IDAHO.

The Sonora Mining and Milling Company of Wallace has incorporated; capital stock $1,000,000.

H. Glidden, from Florence, has nineteen pounds of gold, product of the sixteen days' run of the mill on the Banner mine; $14.50 per ounce: $3300. Mr. Glidden is manager for the Banner and Goldbug Companies, operating that camp.

The Upper Boise Hydraulic Mining Company, West Virginia, F. R. Reed agent in Boise, capital stock $5,000,000, is starting a new hydraulic enterprise on Boise river, on the opposite side of the river from the Twin Springs Company's works.

MONTANA.

This paper recently had illustrated descriptions of the dredges operating in Grasshopper creek at Bannack. Three dredges have been in operation, conducted by the Gilman & Barry Company, the Graeter Company and the Chicago Gold Dredging Company. Further reports from there are to the effect that the richest yield of this season was cleaned up by the Graeter dredge—$7000 in a run of twenty-four hours. The Chicago Company gathered in $4000 in one day of twenty-four hours, and the Gilman & Barry Company cleaned up 125 ounces in a similar run, equal to $2500. A fair average of the work of the companies for the season may be estimated at $10,000 per week. The dredges handle about 100 cubic yards of dirt per hour, and worked constantly until the stream froze.

Of the Golden Scepter at Quigley J. M. Burkhart says: "By the recent sale which has been confirmed by the court the whole property, including the mine, mill and partly built tramway from the mine to the town where the mill is located, passes into the hands of the new company, and with good conservative management and plenty of working capital the plant will soon be a producer and dividends will be paid from the start, as soon as the plant is fairly in operation. There is ore enough in sight to run the mill at its full capacity for fifty years. The ore is low grade and will average not more than $4.50 per ton."

The State of Montana, with a population of 180,000, produced $62,000,000 of wealth in 1896, and since 1890 every smelter in the State has doubled its capacity, with one exception.

At Norris the 10-stamp mill recently erected by the Montana Boy Consolidated Mining Co., which has been operating for the past four months on the Bradley group of mines, is closed down. It is locally claimed that while the ore carries gold in paying quantities, the mill is not making a good saving by the process in use.

COLORADO.

H. J. Stephens of Denver has sold the First Centennial gold mining property, at Black Hawk, to W. P. Bonbright & Co., for $127,500.

The Georgetown *Courier* of the 20th inst. says: "The Beam process mill at Empire proved a failure. The furnaces are being torn out and some other process will be tried.

An El Dora dispatch reports a strike in the Enterprise. A streak of bar sylvanite on the hanging wall at a depth of 85 feet is in lime rock, and the full length of the shaft.

The owner of the Lamartine mine, near Idaho Springs, says that in the future the mine would be worked for the production of gold and lead, and that the silver production would be a by-product. The silver leads will not be worked, but those which produce both metals will continue operation. There will be no development of the silver leads, but the gold-bearing ones will receive greater attention than in the past. Employment is given to about sixty-five men.

Philip Argall of the Florence Cyanide works explains to the Victor *Record* the recent action of the smelters: "The mills and smelters have been paying too much, and have just come to the conclusion that it is poor business policy to pay $20 for gold when they receive but $18. I don't believe that Cripple Creek gold will average over $18. None of the mills are making any money at the present schedule. There are two mills, one on each side of Florence, that are now idle simply because it does not pay to operate them. The mill men simply want to make a little money for a change."

To the question: If there is no money in the business as it has been conducted, why do people keep building new mills and enlarging the old ones? Mr. Argall answers: "They don't know any better in the first instance, and in the second they have so much capital invested that they must put in more or lose what they already have."

An Aspen dispatch of the 24th says the Smuggler mine fire is out, and the work of clearing the workings preparatory to breaking ore begun.

For '97 to date Colorado claims to have mined in gold $22,000,000. Denver places the value of the silver production at $12,300,000, lead $3,000,000, copper $1,500,000, and iron $3,000,000.

Telluride *Journal*: E. I. Field, resident manager of the North American Exploration Company, has control of ten more stamps of the Telluride Power Transmission Company's 120-stamp mill, in Bear Creek. In a week or ten days they will also be dropping on Nellie ore. Thirty stamps of the big mill have been stamping Nellie product for several months past, but so much mineral has been encountered in the mine recently that additional milling facilities had to be called into requisition in order to get it out of the way and make room for development.

NEW MEXICO.

In Grant county, at the Texas mine, Centra district, the shaft is 320 feet deep. A new hoist is badly needed.

At the Hanover mine, Silver City, for several months past the mine has produced thirty to forty tons per day of low-grade copper ore. About two weeks ago a large deposit of high-grade ore was encountered: native copper in a soft matrix.

At Mogollon the Confidence has seventy men at work. About sixty tons of ore per day is reduced at the company's mill at Whitewater. About fifty men are employed on the water-pipe line, trestle, riveting pipe and other work, utilizing the water power of Whitewater creek.

At Cooks the Kansas City Smelting & Refining Co. of El Paso is working the Othello and Desdemona mines and shipping twenty tons of lead ore per day.

ARIZONA.

At Graham the Detroit Copper Company closed down their works November 1st. New machinery will be put in place and the plant improved and enlarged.

The Milwaukee and Arizona Prospecting and Mining Company has incorporated. It is a Wisconsin incorporation. Capital stock $1,000,000. C. F. Schilling, Riverside, Pinal county, is resident agent.

A mill is being constructed at the C. O. D. mine, Mohave county. During October the Kingman sampler sold to the El Paso smelter over $28,000 worth of ore—product of Mohave county chloriders. The Model mine, in Weaver district, Yavapai county, is being worked under lease by C. Ryan. The ore runs $75 in gold per ton. A low-grade deposit is being developed by A. L. and G. McKesson, east of White Hills. The vein is 25 feet in width and goes $10 to the ton. White Picacho district, in Yavapai county, numbers several good mines, among them being one owned by G. Burnell, on which 30 inches of $280 rock has been struck at a depth of 110 feet. The vein at this point was reached by a 75-foot tunnel.

A twenty-five ton chlorination plant will be purchased for the Providence mine, in Yavapai county, on the recommendation of Prof. Saunders. The Copper Queen Company, operating at Nacosari, Cochise county, is building a narrow-gauge railroad, four miles in length, from the mine to the smelter site. The road will run directly under the mine, necessitating 5000 feet of tunneling, and chutes will conduct the ore to the cars.

A proposition for a smelter in Prescott, as submitted by B. F. Prichard, representing the Pacific S. & M. Co. of Los Angeles, Cal., is as follows: The Pacific S. & M. Co. will put in a copper bullion, matte and lead bullion plant with a capacity for each of the two smelters of forty-five to sixty tons for twenty-four hours in free smelting ores, the boiler to be 20 to 25 H. P., the engine 20 H. P., the main building to be 20x50 feet, two stories; the engine room 20x20 feet, one story; the plant to be supplied with bins for coke and ore and all other accessories necessary to operate successfully. The company agrees to sell such a plant outright to the citizens of Prescott for $15,000, taking as part payment $3000 in the stock of the company organized and incorporated for said purchase, with the proviso that B. F. Prichard be retained as manager at $200 a month.

The second proposition was that, for a bonus of $5000, the Pacific S. & M. Co. would bring the above-described plant to Prescott and operate it upon their own responsibility—$3000 to be paid on arrival of the plant and $2000 when completed.

Prescott people prefer the latter proposi-

(Continued on page 510.)

Electrical Progress.

The Newest Great Power Project.

Written for the MINING AND SCIENTIFIC PRESS by ORRIN E. DUNLAP.

The St. Lawrence Power Company is making good progress on their project for the development of power at Massena, St. Lawrence county, in New York State. At Long Sault rapids the St. Lawrence river has a fall of over 50 feet, and to the south of these rapids there extends a comparatively level plateau of about three miles, where it meets the valley of the Grass river, the water in which, at this point, is all of 45 feet below that of the St. Lawrence above the rapids. The volume of water passing through the Grass river is small, and it enters the St. Lawrence below the rapids. A canal is now in process of construction, designed to carry the waters of the St. Lawrence from a point above the rapids across the plateau above referred to to the valley of the Grass river, where it will be delivered upon turbines at a head of about 40 feet. After passing through and actuating the turbines, this water will return to the St. Lawrence below the rapids. Thus the head race of this power project will be the St. Lawrence river and the three miles of canal, while the tail race will be the Grass river.

The point of operation presents a busy scene, and work on the canal is well under way. In width the canal will be about 225 feet, and its depth about 25 feet. It runs is a northerly straight line from the St. Lawrence to the Grass river. The amount of material to be excavated will, of course, be very great, but it will be all earth, but little rock being encountered. The head of the canal on the St. Lawrence will be just below a promontory, which will serve to deflect the ice and drift of the river to the opposite shore. Where the canal will enter the Grass river the banks of the later are about 40 feet high.

The Lehigh Construction Company of South Bethlehem, Pa., have the contracts for the construction of the canal and power house, and they are pushing the work with great vigor. The dirt conveyor that is being used on the work is of a new design, modeled after the plans of John Rice, who is the engineer of the Lehigh Construction Company. From an engineering point of view it is most interesting, as it is quite unlike anything used on such contracts before. In appearance it resembles a huge derrick, its length being 230 feet and its height 60 feet. It is operated on trucks, which run on a temporary railroad laid on the bed of the canal. Buckets attached to an endless chain traverse the entire length of the machine. Four steam shovels will be used to loosen the earth, which will be taken up in the buckets and carried to the far end of the conveyor, where it will be dumped well outside the line of the canal.

The power house will be 130 feet wide and from 500 to 600 feet long. It will stand on the rock bed of the Grass river, which will be excavated deep enough to allow of the free passage of all the water from the turbines. The arrangement of the apparatus in this power station will be somewhat novel, inasmuch as the turbines will be vertical mounted on horizontal shafts, and four of them will be necessary to operate each of the 5000 H. P. generators. The generators will number fifteen, and they will be mounted on the same shafts as the turbines, but 80 feet distant from them. The generators are to be made by the Westinghouse Electric and Manufacturing Company, and of them Mr. B. F. Warren, vice-president of the Westinghouse Company, says:

"The machines for the St. Lawrence Power Company are not only of large sizes, but they involve a new design and are in many ways different from other machines. Each of these great machines will weigh about 350,000 pounds, the weight of one piece being as much as 125,000 pounds. They will stand 22 feet high above the top of the foundations, and each machine will occupy a floor space 22x18 feet. They will have horizontal shafts, which will be in line and directly connected with the shafts of the water wheels by which they will be driven. The shaft of a dynamo carries a great steel ring which is very similar to a large and heavy flywheel. This steel ring carries at its circumference twenty external projecting pole pieces. The ring and the pole pieces are one solid casting of steel. The ring has an extreme diameter of 15 feet and it is about 3 feet wide. It is supported from the shaft by a massive cast iron hub, with ten radial arms or spokes. The steel for the rings is designed for very great strength. It revolves at a speed of nearly two miles a minute, and the centrifugal force is such that each pound at the circumference tends to fly outward with a force of nearly 100 pounds. The speed of the machines is 180 revolutions per minute.

"This great steel ring with the projecting poles revolves inside of a large stationary ring or cylinder, whose inner surface is made of plates of thin, soft steel on edge. These thin steel plates are held by a massive outer ring of cast iron, which has a total height of 22 feet. The thin steel plates which form the inside of the stationary part have slots in which are laid copper bars parallel with the shaft of the machine. These bars are insulated with mica, and in them are generated the currents which the machine produces. These currents are produced by the revolutions of the poles or projections on the revolving inner steel ring. Around each of these projections there is a coil or copper strap, of which each turn is insulated from other turns and from the steel pole by mica. A current is sent through the coils on these polar projections, which strongly magnetizes the poles. The revolutions of these magnetic poles in front of the copper bars in the outer part of the machine induces currents in them. These currents are alternating currents which are continually reversing in direction at the rate of 3600 times per minute. Three conductors are carried from the machines, which are wound for giving three phases. The currents in the different conductors do not occur at the same time, but have their maximum values in regular succession."

The St. Lawrence Power Company was organized under the laws of New York State, with a capital stock of $6,000,000. The officers of the company are: President, Walter C. Lane; vice-president, S. H. G. Stewart; secretary, Carlton H. Reeve; treasurer, William C. Cox.

It is expected that the power house will be supplying current by December 1, 1898. Lord Kelvin, the famous English electrician and scientist, visited the site of the work on October 2, and was well pleased with the project.

IN Santa Ana, Cal., canyon the Southern California Power Company is spending $150,000. The waters of the Santa Ana will be diverted at the junction of Bear creek by a small dam into tunnels and flumes, having a carrying capacity of 11,000 inches, and conveyed three miles down the canyon to Keller creek, where the power house will be located. Of this distance half will be tunnels through the hills and half flumes. There are eighteen tunnels, some of which are already through and ready to be cemented or bricked, as the formation of the hills through which they pass may demand. The power house will be built of concrete and iron. The dimensions are 130x40, the walls 2 feet thick. The six machines, any one of which can be operated alone, will generate 22,000 H. P., which the transformers will increase to 33,000 volts. The receivers will be 30 inches of steel. The water wheels into which the water will be sent at a pressure of over 300 pounds will be 82 inches in diameter, six large ones and three smaller ones. For the head used this plant will have, it is claimed, a greater volume of water than any plant now in existence. The line from the power house to Los Angeles will be eighty miles long, thirty tons of wire and over 4000 poles being used in its construction. The insulators, which will number 144,000, will be tested and none that will not stand a voltage of 66,000 volts will be put up. About a third of them have already been tested at Colton. The poles and wire are now being distributed along the line and the work of putting in the poles and stringing the wire will be begun in a short time. There will be two substations, one at Pasadena and one at Los Angeles, and most of the power will be used for lighting and running the electric cars in Los Angeles and Pasadena.

Mechanical Progress.

Great Power Wheels.

Few realize the energy which is stored in a running flywheel, commonly run at a rim speed of a mile a minute; each square foot of the rim weighing about seventy-five pounds if it were two inches thick, more in proportion if it were thicker. A single segment of a big flywheel will often weigh a ton. Imagine it flying about at the rate of 80 feet a second. It would hit as hard and do as much damage as though dropped from a height of 120 feet. While the wheel is revolving at the rate of a mile a minute there is a strain of about 750 pounds in each square inch of its section; were a piece detached and thrown off at an angle of 40° it would strike 240 feet from where it started if it encountered no resistance. This is, under normal conditions, the capability of a mass revolving at a speed which is well within the limit of sound and ordinary practice.

With increasing speeds, however, the effects increase at a rapid ratio. At two miles a minute each square inch of section is submitted to a tensile stress of 3000 pounds, a piece of the rim would be thrown into the air to a height of 480 feet, and in whatever direction it flew would have the same velocity and destructive capacity as though it had fallen from that height, and starting at 45° would strike the ground at the same level, 960 feet away.

But this is not a bursting speed. It is only twice the normal, and imposes a strain of only 3000 pounds per square inch on the section, while cast iron tests all the way from 13,000 to 30,000. Supose the weakest section had an average strength of 10,000 pounds per square inch, in order to burst from centrifugal force the wheel would have to have a rim speed of 321 feet per second, 3.6 miles a minute, and each fragment would have as much energy in it as though it had dropped 1600 feet. If one will imagine ten or fifteen tons of cast iron he will have an idea of the capability of a wheel that weight to do damage if run up to its legitimate breaking speed. A 10-ton wheel breaking at speed which will develop 10,000 pounds per square inch of rim section will set free 32,000,000 foot-pounds of energy. A 100 H. P. boiler exploding will only liberate about 80,000,000 pounds altogether. Most of this is exerted in pushing back the atmosphere and very little in putting solid bodies into motion, while the energy of the flywheel is entirely represented by flying masses of iron.

To do this the wheel is running at only 3.6 times the normal speed, *i. e.*, so far as speed is concerned it has a factor of safety of 3.6, while, considering the ultimate rim stress at 10,000, it has at a mile a minute an apparent factor of safety of over thirteen.

The device which controls and keeps within limits the speed of the flywheel is often simple to crudeness, and when it is realized what a danger attaches to loss of control, it is probable that owners and engineers will be less easily satisfied. Systems are in use in which an auxiliary governor trips a device which shuts the engine down upon an acceleration of ten per cent or so. The device can be operated by electric push buttons from all over the works, so that the engine may be quickly stopped in case of accident to the machinery or employes in any department. This may be considered unnecessarily elaborate by some power-plant owners, but any of them can afford a quick-closing valve in the steam main which can be operated by a man out of the line of flywheel. Such a simple arrangement would often save lives.

Scheme to Supersede Railroad Traffic.

J. E. Russell, member of the national deep-waterways commission, has come to the conclusion that railroads, which surperseded canals, have reached their best estate, and that in the near future canals are to be restored to the first rank. But it will not be the old canal. He sees in the development of engineering the practicable means of construction for immense channels through which ocean steamships will enter and traverse this country from end to end.

He says the days of removing rocks under water by blasting are gone by forever. Gen. Newton and his extensive works for the removal of rocks at Hell Gate are antiquated. One of the rock-dredging machines which he saw in his explorations had a grappling apparatus weighing seven tons. The operators did not blast at all, unless to make a face for the beginning of work, but put their dredger directly upon the ledge 20 feet under water and wrenched off immense masses at once, so that at times they had to be broken up before they could be deposited upon any of the conveyances for carrying away the debris. The consequence of improved invention is that the cost of removing a cubic yard of rock has been reduced in ten years not less than two-thirds. He describes work now in progress in Canada where $80,000,000 has already been spent in the St. Lawrence valley, and it is already a profitable investment. This is more than six times the expenditure of the United States in improving communication between the Great Lakes. The least depth in the Canadian line from Lake Ontario to the ocean by the St. Lawrence route will soon be 14 feet. This means that vessels of small carrying capacity can be brought across the ocean directly into the heart of the country. The saving in the cost of long-distance transportation of bulky freight over the cost by land carriage will be enormous. Railroads cannot compete with deep waterways, and there will be a revolution in the business of through transportation.

The carrying capacity of the large vessels which will be used on the canals of the future will give them an immense advantage over the freight cars. The time is not distant, he says, when canals will be constructed with a depth of 30 feet and a corresponding width. There is no doubt that large ocean vessels will be brought into the heart of the country, and that transportation will be vastly promoted and cheapened. The great drainage canal which is being built in Chicago, to his mind, will be a waterway connecting the Illinois river and Lake Michigan. With a depth of 30 feet, with sufficient width and with protected sides this will be used for the passage of vessels from the lake into the Illinois river, and that brings them into the Mississippi.

The use of water transportation from the West to southern ports has greatly affected the trunk lines of roads east and west. The creation of deep water at New Orleans and Galveston has led to shipments of grain from there, which have reduced the freights of railroads. More grain is going by steamers from the mouth of the Mississippi, and the nature of freight business in the South has been materially modified. The entire course of the Mississippi and of the Great Lakes will be connected with the St. Lawrence and with the Atlantic at New York, and will be used for ocean vessels of greatest tonnage.

The canals will have to be prepared for large vessels, and steam will be used for motive power, and much more speed will be secured than was ever possible in the old days. The banks of the canals will be riprapped so that the wash from the steamers will not destroy them, but this can be done easily

and a good freight speed can be secured across the country. Vessels will start from the ports of the Great Lakes for foreign ports.

What Invention Has Done.

What is it that enables an operative to day to produce so much more in a less number of hours than he could thirty or forty years ago? It is simply invention, as embodied in the improved machines, tools, processes and appliances that American inventors are constantly furnishing to American manufacturers.

Near Baltimore there was recently erected one of the largest plants in the world for the manufacture of Bessemer steel in all its forms; and, as recently stated by its superintendent, by means of the inventions and improved appliances they have adopted, they are enabled to produce a ton of steel with but one-third of the manual labor required at their other establishment, built twenty or twenty-five years before.

In 1866 steel rails cost $165 per ton. In 1884 they had dropped to $34, in 1893 they were $21 to $24 per ton and in 1897 even less. See how that has expedited the building of railroads, which now cover the country like a network, and without which modern enterprise could not be carried on; and the same is true of steel in all its forms. So that to-day we build steel bridges, steel vessels, steel cannon, steel frames for our buildings and for farm implements and use steel nails.

Inventions and improvements have so reduced the cost of steel rails that already, during the year 1897, the United States has sold 100,000 tons to Europe.—Engineering Magazine.

Scientific Progress.

Like Unto the "Zymean Metallurgy."

J. W. Worsly writes the London *Mining World* that when in the United States he met with many auriferous lodes cropping out to the surface, chiefly of the sulphide class, but they were not valued because the assay showed them to be under 1 oz. per ton of 2000 pounds, and this was in a State where both fuel and water were not over plentiful.

"Within the last year my attention has been called to a process (patented), the principal agent in which is S^2Cl^2, whereby all sulphide ores that contain metallic value can be both easily and cheaply treated, recovering all the metallic contents at one operation and almost at the one cost. Into an eight-ounce flask pour, say, six ounces of a 25 per cent solution of chloride of sodium, and heat to 160° Fahrenheit, adding about thirty grains of sodium nitrate. Place into the flask, say, about one ounce of the sulphide ore to be treated, so finely powdered as to pass through a 30 to 40 mesh sieve; slightly shake, so as to thoroughly mix. Now add about one teaspoonful of sulphur dichloride (S^2Cl^2), and note the effects produced. Sulphur dioxide, hydrochloric acid and chlorine will be evolved. Very gently stir, and, when quiescent, which it will be in about ten minutes, add another like quantity of S^2Cl^2 and again note effects. In about fifteen minutes a small sample may be taken out and filtered for testing with the usual re-agents for Au., Ag., Cu., Pb., Stahn., Zn., etc., when it will be seen how far the solution of these metals has been effected, and so determine whether further digestion is needed or otherwise. If satisfactory, the chemist will know how to proceed to precipitate the metallic contents after he has skimmed off the sulphur, which, by the way, can all be recovered, refined, and sold at a good price. This experiment, if well done, will give an idea of what the basis of the 'Zymean Metallurgy' is like, and it may be tried on any sulphide ore, no matter how refractory, and all the valuable metals separated.

"I have tried it on quite a number of ores with unvarying success, from one pound to as much as five cwt., and always when practice has familiarized me with the ore the treatment was as stated. With ores containing sulphide of zinc—the terror of the smelter—I find no trouble when submitted to the action of sulphur dichloride in the above-named menstruum. It is worthy of note that, after separating the metals from the salt solution, it can be used again for dissolving, being still salt water, and not sodic sulphate, as might be expected. This was a puzzle to me at first, till I found out that at an electric chemical works near by a similar thing occurred. Here salt solution was decomposed by large dynamos, worked by powerful engines, and soda and hydrochloric acid formed in one part of the vessel, to be again united before the acid could be separated and leave the decomposing tank, the result being a solution of common salt; and so it goes on, separating and uniting all the week over. The essential points in effecting a complete solution of sulphide ores by the Zymean metallurgy are: 1. Proper strength of the salt solution; 2. Temperature not too high; 3. The ore to be sufficiently fine; and, lastly, due care in adding dilute hydrochloric acid where needed by alkaline ores, and stirring well after first introduction of S^2Cl^2, which is easily and inexpensively obtained on the spot from the otherwise waste products of sulphur and hydrochloric acid gas. But nothing but practice can teach perfection of manipulation in even a most simple metallurgical operation, such as this must be acknowledged to be."

A New Illuminant.

I have the honor to report an important discovery which, it has been claimed, will in time do away with the present system of illuminating public places, etc., with the electric arc light. The details, briefly, are as follows: Mr. Ernest Salzenberg, director of the gas works of the city of Crefeld, has invented an improvement in incandescent gas burners, which relates to the production of incandescent gaslight, based upon the discovery that, when the pressure of the gas is considerably increased upon the incandescence body, the said body emits a golden-yellow light, very agreeable to the eye, displaying objects in their natural colors. The gas is supplied to the burner at a pressure of about 3½ atmospheres, the burner, to withstand this high pressure, being of special construction. A single incandescent jet of the ordinary size can emit a light of much more than 1000 candle power. The light is of such intensity that a person is enabled to read the finest print at a distance of 100 to 150 feet.

The inventor claims that the cost of his incandescent light of 1500 candle power is only 4½ cents per hour, while that of the ordinary electric light of 400 candle power is (in Germany) 14 cents per hour. In the apparatus constructed by Salzenberg a hydraulic pressure of 3.5 atmospheres, and even more, may be forced through the improved Auer burner. The invention is, however, only applicable where waterworks exist. Mr. Salzenberg has already applied for letters patent in the United States.

P. V. DEUSTER, Consul.
Crefeld, Oct. 29, '97.

New Patent Rules.

Acting Commissioner of Patents Greely has made a number of important amendments to the rules governing the practice of the Patent Office, and they have been approved by Secretary Bliss. These rules will apply to all cases filed after January 1st, all cases filed prior thereto being subject to the old rules. The new rules provide that no invention submitted is patentable if it has been described in printed publications two or more years before the filing of the application. Heretofore if a foreign patent has been taken out before an American patent the term of the latter was limited to the expiration of the foreign patent, which often resulted in the practical loss of many valuable patents by giving them a very short life. The new rules do not make the limitation, but if the period between the two patents is over seven months no American patent will be granted. One year is named as the period within which failure to prosecute will be held to constitute an abandonment of the application for a patent.

Coast Industrial Notes.

—Coast lumber dealers on the 20th inst. advanced the price $2 per M ft.

—The Santa Fe railroad is arranging to equip its passenger cars with electric lights.

—The Pacific Steam Whaling Company is putting on a regular line of steamers to Copper river and Prince William sound.

—F. H. Seymour is building the Torres & Prietas railway from Torres, Sonora, Mexico, to the mining camps of Minas Prietas and La Colorado.

—Secretary of War Alger still refuses to advertise for the San Pedro, Cal., harbor work, for which the $2,900,000 was recently appropriated.

—The orange crop of southern California last year amounted to over 7000 carloads, and for the coming season it is estimated at about 12,000 carloads.

—The Southern California Electric Supply Company has organized in Los Angeles; R. H. Ballard, D. B. Kearney, G. P. Curtis, W. L. Percy, A. C. Jewett; capital stock, $50,000; subscribed, $20,400.

—The total catch of seals in the North Pacific for the present season was 38,700, against 73,000 last year. The catch in Bering sea—that portion of the North Pacific in which the United States is interested—is 16,650 for the present season, against 29,500 last season. Of the catch in Bering sea, British vessels took 15,600, American vessels 1050.

—For Washington and Oregon hemlock timber there is no market. Five years ago cedar logs were nearly worthless. Ten years ago spruce, now the choicest lumber on the coast, was in no demand. To-day both of these timbers are subjects of much concern for fear of their exhaustion. There is one use to which hemlock ought to be put and that is for piling.

—Statistics of the foreign trade of Mexico show that, while the imports were practically the same in value in 1896-7 as in 1895-6, there was a considerable increase in the exports from $105,016,902 to $111,346,494. It is also worthy of note that, while England, France, Germany and Spain did less business with Mexico in the past year than in the year preceding, the United States both sold to and bought from Mexico more largely. The appended statement shows Mexico's imports and exports in 1896-7 in silver values:

	1896-7—	
Country.	*Imports.*	*Exports.*
United States	$22,593,860	$ 86,742,951
England	6,881,701	14,280,527
France	4,989,082	1,873,522
Germany	4,003,263	4,416,744
Spain	1,983,794	1,192,328
Total (45 countries)	42,204,095	111,346,494

Similar figures for 1895-6 are given below:

	1895-6—	
Country.	*Imports.*	*Exports.*
United States	$20,145,763	$ 79,651,695
England	7,905,016	16,467,149
France	6,099,183	2,080,802
Germany	4,303,229	2,968,792
Spain	2,174,298	813,162
Total (45 countries)	42,253,938	105,016,902

The distribution of the foreign trade of Mexico among the principal ports and border towns is a matter of some interest. Last year's trade was divided thus:

	1896-7—	
Port.	*Imports.*	*Exports.*
Tampico	$ 8,773,275	$ 29,952,441
Vera Cruz	14,036,136	22,484,633
Juarez (El Paso)	2,910,359	17,929,521
P. Dias (Eagle Pass)	4,710,415	2,888,535
Laredo	4,693,818	3,701,086
Progreso	1,463,515	8,443,130
Mazatlan	1,572,568	5,808,036
Nogales	944,312	5,776,575
Total (33 ports and cities)	42,204,095	111,346,494

Personal.

F. A. WADLEIGH, the Utah representative of the R. G. W. in San Francisco, is impressed with the probable magnitude of the Klondike travel of '98 and believes nearly 200,000 people will head that way.

W. M. IRELAN and Prof. Ogden are examining the Brunswick lode, Nevada.

EDWARD N. LINDSAY has returned from southeastern Alaska, where he has been examining quartz properties.

MAJOR W. H. HEUER, corps of engineers, has been reappointed a member of the California Debris Commission.

SUPT. FISHER succeeds Col. Ewing at the Diamond Hill mine, Townsend, Montana. Discussion continues as to how to secure power for the new 120-stamp mill.

J. R. MCDONALD of Milwaukee, Wis., is the newly appointed manager of the Golden Scepter mines at Quigley, Montana.

Book Notice.

"*Manual of Assaying; Gold, Silver, Lead and Copper:*" By W. L. Brown; seventh edition. E. H. Sargent & Co., Chicago, Ill., November, 1897. Price $2.50. The fact that a manual of assaying reaches the seventh edition is evidence of its possessing merit. The latest issue of this work, which is largely a compilation of standard authorities, is well issued, and deserving of place in an assayer's library. The book can be sent postpaid from this office on receipt of price.

Commercial Paragraphs

THE Jeanesville Ironworks Company has opened an office 1116 Seventeenth street, Denver, Colo., with A. Middlebrook as manager.

THE Baker Iron Works, Los Angeles, are sending stamp mill outfits to Miguel Latzy Hermano, Magdalena, Sonora, Mexico, via Nogales.

THE General Electric Company during the months of June, July and August received orders for 278 generators, aggregating nearly 14,000 kilowatts, for lighting purposes alone.

BUTTE COUNTY, CAL., SUPERVISORS want to buy 7500 feet of 2-inch black iron pipe and 2500 feet 4-inch black iron pipe, with fittings, to be used in Road District No 2. Bids received up to December 7, 1897.

THE Norwegian Mica Company, office Christiania, Norway, is working mines of mica in Norway. The board of directors are the professor of mineralogy at the University of Christiania, Yohan H. L. Vogt, and the civil engineer in Christiania, Henry E. Mohn, the latter being president.

A CLEVELAND, O., dispatch says that on the 21st a company including ex-Governor Flower, J. W. Hinkley, Anthony Brady and Perry Belmont of New York, purchased the entire property of Walker & Co., electrical manufacturers. Walker & Co. have extensive factories and foundries in that city, covering many acres. Abner Doble & Sons are the local agents.

Recently Declared Mining Dividends.

Gold Coin, Colo., 1 cent per share, $10,000; Nov. 25.

Mt. Rosa, Colo., 1 cent per share, $10,000; Nov. 25.

Mt. Rosa Company, Cal., 1 cent per share, $10,000; Nov. 25.

Commodore Company, Creede, Colo., 2 cents per share, $20,000, Nov. 25: for the year $120,000: a silver property.

New Idria Q. M. Co., Cal., dividend No. 8; payable Dec. 1.

Ætna Con. Q. M. Co., regular quarterly dividend, No. 12, of 10 cents; payable Dec. 10.

Hope M. Co., St. Louis, Montana, 10 cents per share; Nov. 21; a total to date of $732,252.

Recent California Mining Incorporations.

Alaska D., M. & P. Co; C. R. Puchaber; J. McDermott, J. J. Howell, P. Glendon, J. Howland, C. McAlester; capital stock, $250,000; subscribed, $4500.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING NOVEMBER 16, 1897.

593,731.—GAME—J. Adler, Salem, Ogn.
593,633.—FRUIT PARER—B. C. Allen, Saratoga, Cal.
593,956.—STATION INDICATOR—S. E. Bisbee, So. Pasadena, Cal.
593,919.—ELECTRICAL SWITCHBOARD—J. L. Blodgett, Los Angeles, Cal.
593,959.—PAPER WRAPPER—H. B. Clark, Florin, Cal.
593,928.—CHAIN LOCK—H. C. Domeyer, Sauvie Island, Ogn.
593,801.—OIL BURNER—J. J. Hull, Los Angeles, Cal.
593,803.—ELECTRIC BATTERY—Hanscom & Hough, S. F.
593,886.—REFRIGERATOR CAR—C. S. Hardy, San Diego, Cal.
593,692.—MIMEOGRAPH—Lindley & Coggins, S. F.
593,855.—WINDOW—Proll, Depew & Hawley, S. F.
593,690.—CORNET—F. J. Richmand, S. F.
593,693.—TIRE TIGHTENER—Sager & Alvis, Los Angeles, Cal.
27,851.—DESIGN: EYEGLASS TEMPLE—S. G. Marshutz, Los Angeles, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

REVERSIBLE WINDOW.—Louis Proll, Charles M. Depew and Eugene W. Hawley, San Francisco, Cal. No. 593,855. Dated, Nov. 16, 1897. This invention relates to an attachment for windows by which they may be turned or reversed about pivots centrally disposed on opposite sides, thus allowing the sashes to be turned at right angles with the position of the line in which they ordinarily slide. It consists essentially of pieces fitting in the channels between the vertically slidable sashes and the parting strips, pivot pins by which the sashes are connected with the slides and turnable about the pins, grooves or channels made in the slides and the edges of the sashes in line with each other, vertically slidable strips fitting into said grooves or channels and movable by means of diagonal slots so that when the strips are moved upward or downward upon the pins which pass through these slots they may be either projected to engage the slides and sashes and lock them together or to separate the sashes from the slides so that they may be turned about their pivot pins. In conjunction with these devices are locking levers, fulcrumed upon the top of the lower sashes, having projections adapted to engage with the lower rail of the upper sash and inclined lugs upon the locking strips adapted to engage the lever and turn it to unlock the sashes when the strips are raised to disengage the sashes from the slides, and a spring by which the lever is actuated to again lock the sashes when the strips are allowed to drop and connect the slides and sashes.

Mining Summary.

(Continued from page 507.)

tion, and suggest that when the smelter is erected the subscribers to the enterprise pay $2.50 per ton for every ton of ore smelted, until the full sum of $5000 is paid.

MICHIGAN.

Ishpeming Correspondence *American Manufacturer*: Active operations have begun at the Cliff shaft, preparatory to the resumption of mining at an early date. The task of opening a large mine which has been idle several years is one of a magnitude scarcely to be understood except by those who have actually performed the work. Even before the first gallon of water is taken from the mine much work must be done—boilers, engines and pumps overhauled, buildings repaired, and work of many kinds performed. Once the pumps are started, there will be many weeks' work before the great caverns underground are drained, so that it will be well toward February 1st before the mine will be working again. The Cliff shaft is very dry, consequently an exceptionally clean mine, and its ore, foot and hanging walls are of adamantine firmness, no timber being required underground, except for guides and ladders. Even the largest stopes are untimbered, there being 60-foot chambers unsupported by a single stick. This mine with the possible exception of the Republic, is the most interesting which strangers can visit, being clean, perfectly safe and as easy of access and egress as the top floor of a city sky scraper, cages running in the vertical shafts as rapidly and safely as express elevators. Few miners who have worked in the Cliff shaft would not prefer to go back again, wages and other considerations being equal. The Cliff shaft, with its high, airy openings and vaulted chambers hewn from the living rock, with its dry, sparkling floors and underground passages winding in and out after the ore, apparently without premeditated plan, offers a striking contrast to such a mine as the Lake shaft of the Cleveland-Cliffs Company, where drifts and crosscuts are laid out at right angles with the monotonous regularity of a Western prairie town of a few years and great expectations; with muddy floors and open gutters beneath single plank walks, oozing air and water pipes overhead, and on every hand a monotonous vista of mine timbers—"square sets" mortised, tenoned and plumb-bobbed with a precision delightful to the soul of the carpenter, but stifling to the stranger who first visits the iron mine.

The 1897 ore output will fall but a trifle short of 13,000,000 gross tons for the entire Lake Superior district.

ALABAMA.

(Special Correspondence).—The production of minerals and manufactured products therefrom for Alabama during the month of September, 1897, as reported by the producers to Dr. Eugene A. Smith, State Geologist and secretary of Alabama Industrial and Scientific Society, is as follows:

Material.	*Amount.*
Coal	518,759 tons
Coke	92,969 "
Pig iron	70,703 "
Iron ore	259,566 "
Limestone for flux	34,000 "
Bauxite	837 "
Building stone	3,500 cu. ft.
Total number of employes	13,446

WM. M. BREWER.

Birmingham, Ala., Nov. 15.

AUSTRALIA.

T. A. Rickard of Colorado writes: "The condition of the mining districts is generally bad with the exception of the Kalgoorlie gold field. The mournful wail of the wildcat is the only voice raised to disturb the gloomy silence of the bush. There has been a woeful amount of reckless promotion and holes in the ground have been sold for a prince's ransom. Hence many collapses, besides others yet to come. At Kalgoorlie, however, very valuable veins of telluride ores have been discovered, and there is a likehood of this district developing into another Cripple Creek. Outside of this particular locality there is so much in evidence of rotten financiering and charlatan engineering that one wonders at times if mining be not one great insanity. It is evident even to a casual observer that the industry is not on the solid business basis which we know in Colorado."

A report from Kanowna, near Kalgoorlie, says that good placer ground was struck on October 15th, "the miners being able to pick up nuggets representing $250." The excitement in Kalgoorlie was increased October 21st by the arrival of two men who lodged sixty-five ounces of gold in the Bank of Australasia, which cleanup represented only two days' work. Many business men outfitted prospectors. On October 23rd men came in from Kanowna, bringing news that one of the miners filled two 1-pound tins with coarse yellow gold in one morning. No gold is struck nearer than 25 feet to the surface. Mining Commissioner Pilman of New South Wales has visited these fields, and is said to have declared that "they promise great yields for deep mining."

The *Record* says £1000 awaits the man who can persuade the Victorian Mines Department that he has a cheap and efficient method for ventilating the mines in that colony.

The Mount Morgan mine, in Queensland, has produced 1,631,981 ozs. of gold, valued at £6,712,186, and paid dividends to the amount of £4,400,000 since the company was formed in July, 1886. The Royal Commission report that gold has been found in various formations which the ordinary miner would never imagine to be gold-bearing. The cost of chlorination has been reduced from £2 8s 2d per ton in 1892 to 15s 7d per ton in 1897, this saving being the result of the erection of newer and more complete works, and the consequent saving in handling and treatment of the ores.

Queensland has an area of 427,838,080 acres, and the Royal Commission on Mining states that the area of the gold and mineral fields is 40,611,840, while the area held under gold mining leases (exclusive of ground held as claims or prospecting areas) is only 5,324 acres. The total amount of gold produced is set down at 11,198,900 ozs., valued at £3 10s per oz: equal to £39,196,465. There were 12,809 miners in the colony in 1896, and the gold produced was 640,385 ozs., giving a value per miner of £216 5s 3d.

NEW GUINEA.

Brisbane advices received say that the New Guinea gold fields, to which hundreds of Australian miners rushed in July and September, have proved a failure. At Mambare the natives were very savage, and a Brisbane syndicate of miners were rescued by Sir William McGregor after being besieged for three months by a large party of blacks.

At Mambare and at Normanby Island only medium finds were secured. There was gold in all the river sand and on the bars, but not in sufficient quantities to pay the heavy expenses. The Government is asked to help the stranded miners back to Australia.

Pacific Amalgamator.

PATENTED APRIL 20, 1897.

Why this Machine should be used in Gold Mills and Placer Mines: 1. It will make a large saving over the ordinary Plates, or any other Amalgamator. 2. It will catch float gold or quicksilver that may escape from the mortars or sluice box. 3. It requires less attention than the ordinary Plates. 4. It costs but little more than the common Plates; no other Plate required. 5. It is simple, durable, and the only sensible plan of amalgamation. **A Special Machine built for Klondike and Alaska.** Agents wanted. Address PACIFIC MINING MACHINERY CO., 127 First St., San Francisco, Cal.

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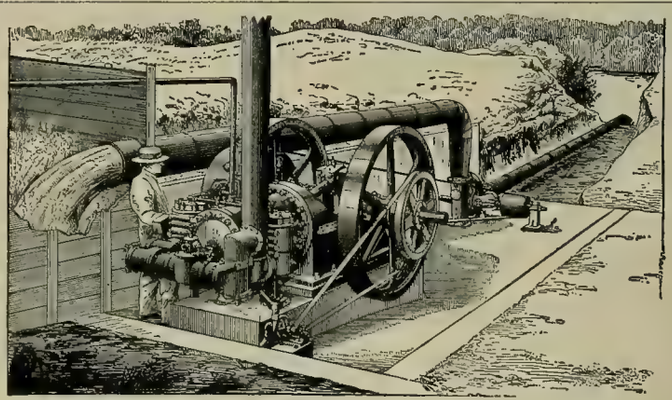

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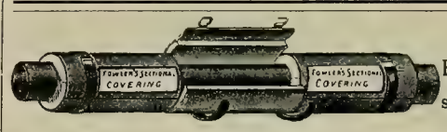

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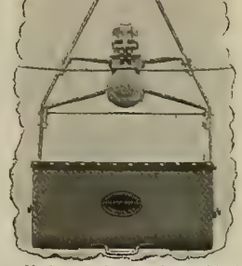

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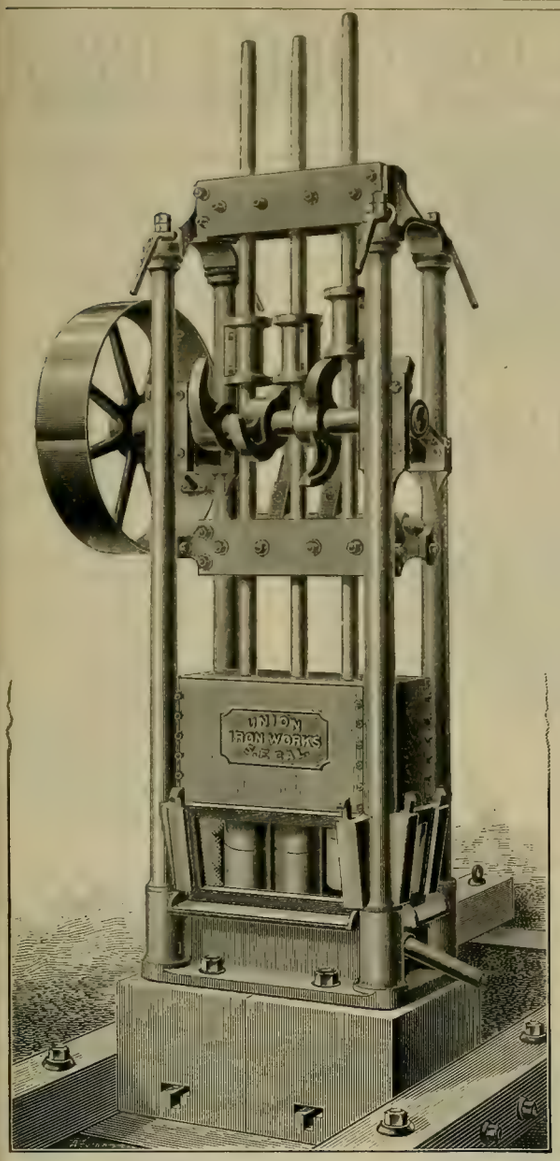

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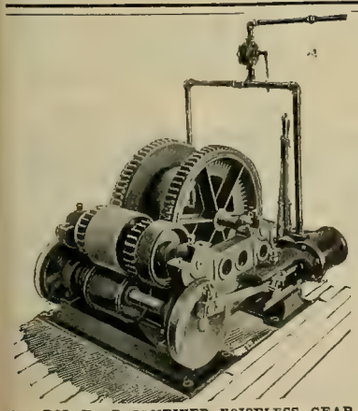

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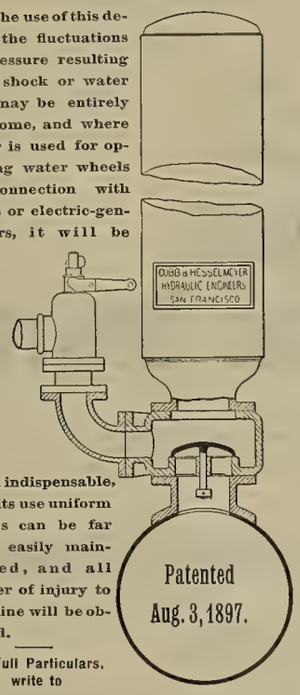

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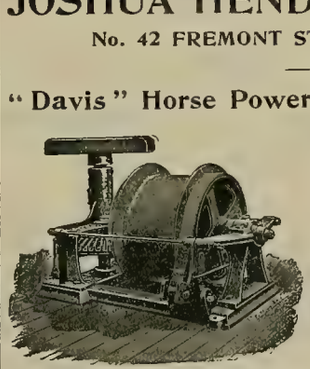

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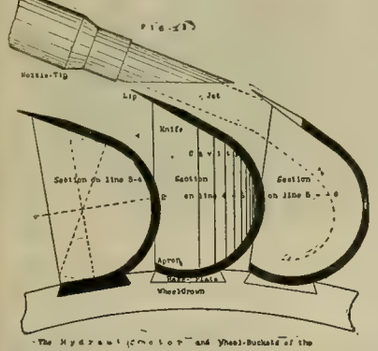

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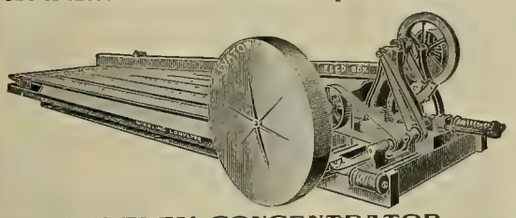

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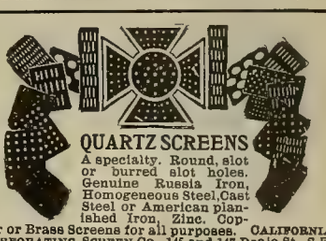

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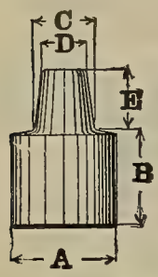

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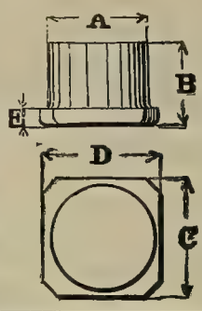

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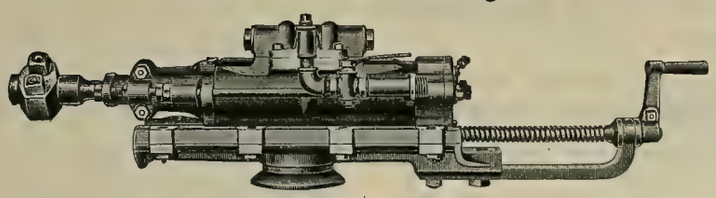

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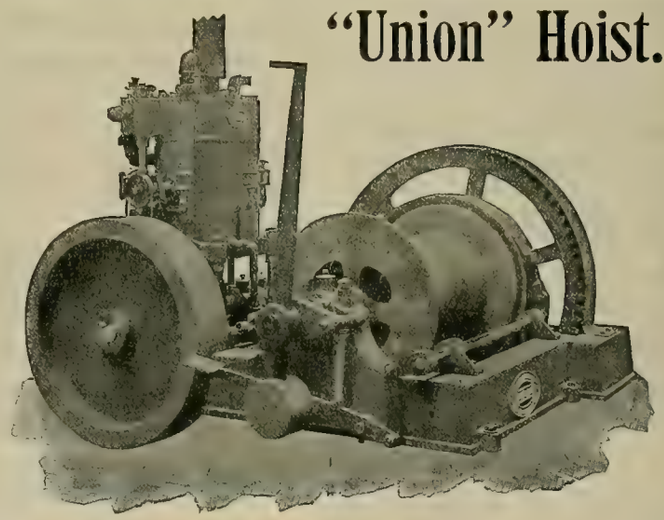

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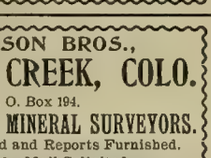

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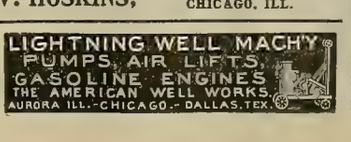

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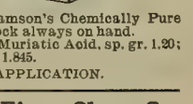

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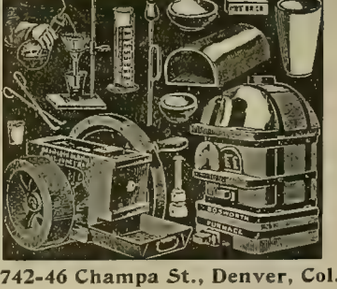

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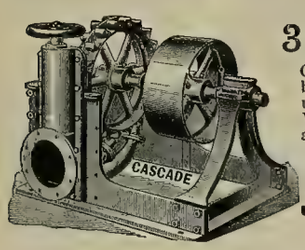

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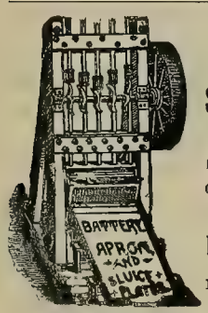

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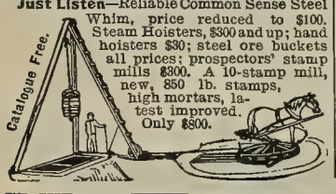

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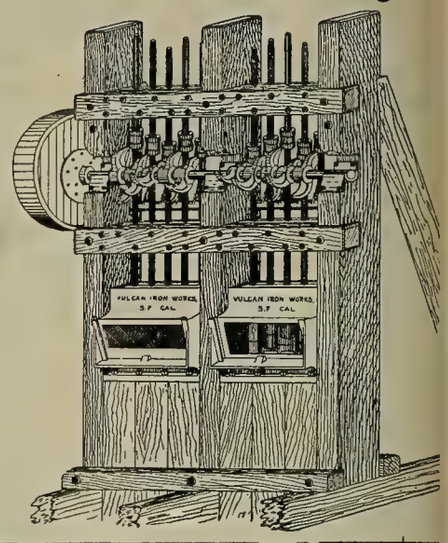

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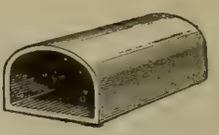

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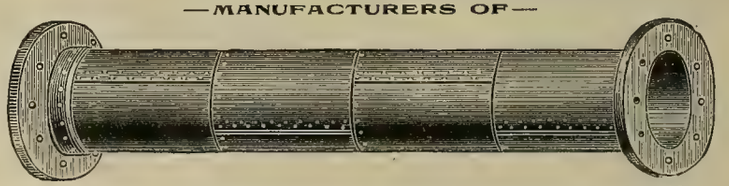

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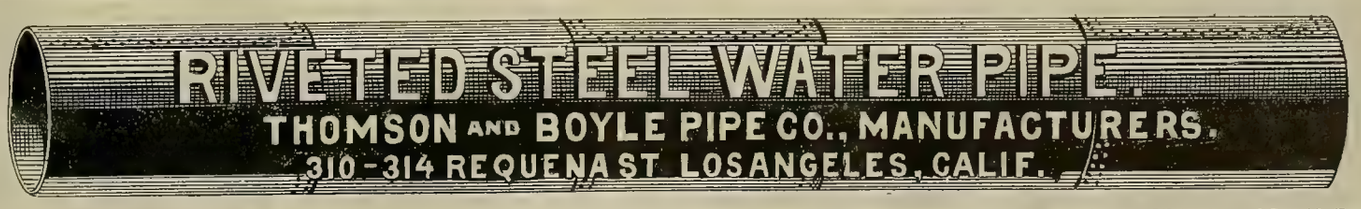

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Market Reports.

The Markets.

SAN FRANCISCO, Nov. 24, 1897.

As usual to a holiday week trade has been quiet. It is worthy of special note to state that general business in this month has been larger than ever before in the corresponding month. It is prevailing belief that business the remainder of the winter will be larger than before known during the corresponding time. While some of the older established houses complain of business not being in excess of last year yet they evidently forget that more firms are in business which naturally draw from them. The tendency of prices is to weaken all lines not influenced by higher freight rates from the East. This is largely due to market prices having been advanced too rapidly and also to consumers not taking so freely as had been expected. Persons returning from the East report active markets with the improving times working towards this coast. As a rule, all depressions and also all improvements are felt first in Europe, then at the East and last of all on this coast.

The local market is easy with a scarcity of commercial and other desirable paper. Although funds in bank are accumulating, still there does not appear any desire to press for loans; but with the turn of 1898 this is expected to change and lower rates of interest rule on unquestioned security. It is also stated that banks will not scrutinize so closely owing to the future holding out the promise for decidedly more prosperous times. When this obtains money seeks new avenues for investment, which will stimulate business in all directions. The East reports a plethora of funds, with a scarcity of commercial paper. Notwithstanding the large supplies at New York, funds continue to seek that city from central Western States. It looks very much as if there will be a big revival in speculation at the East when Congress' course on monetary affairs becomes assured.

New York Silver Prices.

NEW YORK, Nov. 24.—Following are the closing prices for the week:

	Silver in— London.	N. Y.
Friday	26¾	58
Saturday	26¾	58
Monday	26 15-16	58¾
Tuesday	27⅛	58¾
Wednesday	27	58¾
Thursday	....	....

	Copper.	Lead.	Iron.	Tin.
Fri.	10 75 @11 00	3 82½	10 00@12 25	13 70
Sat.	10 75 @10 90	3 85	10 00@12 25	13 70
Mon.	10 75 @10 90	3 87½	10 00@12 25	13 72½
Tue.	10 75 @10 85	3 87½	10 00@12 25	13 75
Wed.	10 75 @10 85	3 87½	10 00@12 25	13 75
Thur.	....	....	....	....

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	12½c Prem
New York Telegraphic Transfer	15c Prem
London Bankers' 60 days	$4.83¾
London Merchants	$4.82½
London Sight Bankers	$4.86½
Refined Silver, per oz. 1000 fine	58¾
Mexican Dollars nominal	46½@47

SILVER.—The market has been strengthened the past week, with the tone apparently towards still better figures. The firming up has been due to fairly free purchases abroad to meet the minting demand from one or two countries, chiefly Russia, which country seems to be preparing to put out silver coin to replace a considerable quantity of its paper currency. It looks as if there will be a large demand next year, owing to improved crops in silver-using countries.

MEXICAN DOLLARS.—The market continues fairly active, with China still taking large quantities. Dealers have strengthened prices slightly.

COPPER.—The market continues weak, with concessions obtainable on asking prices. The East reports slow markets, with an offish domestic and export demand. It looks now as if the European consumption will assume large proportions again. A circular letter from a leading New York house reports: "While some leading copper producing interests are not particularly anxious to press sales just now on the basis of present market values, nevertheless sufficient copper is procurable at 11c to meet the present demand. Inasmuch as Calumet & Hecla guaranteed their own price of 11½c on previous sales to their customers, they cannot be expected to enter the market until after the expiration of their outstanding contracts this year. Manufacturers have been quite busy of late, and this fact is a very encouraging feature of the situation, but on manufactured copper prices are very low compared with the former margin existing between the raw and manufactured article. European consumption keeps up to a healthy level, and statistics show an apparent increase in the consumption of copper in England, France and Germany. Official returns for Germany estimate the consumption of copper in that country for the first eight months of this year at 41,361 tons, against 32,175 tons during the same period last year. According to estimates, the current combined consumption of the three above-mentioned countries is at the rate of 189,024 tons per annum. European deliveries of 20,900 tons of copper in October are the largest of any month this year. The building of electric railroads in Europe is increasing, and some heavy contracts for equipping these roads have lately been placed with American manufacturers."

Our market is quoted as follows:

Ingot casting, jobbing	13 @—
Ingot " wholesale	12½@—
Sheet copper	— @16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½

QUICKSILVER.—The market is fairly firm. Exports the past week to Mexican ports aggregate 125 flasks.

Our market is quoted at $39 for domestic consumption and $35@36 for export to the west coast of Mexico.

LEAD.—The market is practically unchanged both on this coast and at the East. The past week there was shipped by sail to New York 3660 pigs.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	4 75	@	5 00
Sheet	6 30	@	6 80
Pipe	5 60	@	6 10

On January 1, 1898, the Western Union Telegraph Company will discontinue its present system of New York lead quotations. After that date these quotations will be forwarded only as private messages. All ores have been and are sold to smelters on the basis of the New York lead quotations as sent out by the telegraph company. For the last few years several large producers in the West have expressed dissatisfaction with the system in vogue. They claimed that the Eastern smelters who made the quotations did not represent the actual sales or real market value of lead, and that the New York figures on which sales were made in the West were often below the price which could actually be obtained in the New York market.

The Eastern smelters have positively denied the allegations of the ore producers, and, as a result, no satisfactory conclusion has been arrived at.

SHOT.—The market is steady.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 40
Drop, B and larger sizes, " "	1 65
Buck, Balls and Chilled, do, " "	1 65

TIN.—The market is easy for both plate and pig. Sales of foreign plate have been made on the way from England. American is offering.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

COAL.—The demand continues quite firm for all kinds at unchanged prices.

Receipts of coal for the week ending with Tuesday were as follows in tons: Puget Sound 2060; Swansea 10,523; Coos Bay 2000; Newcastle, N. S. W., 17,712; Nanaimo 6533; Baltimore 4000; Cardiff 1858; Sydney 841; Hull 1179. Total 46,706 tons.

COKE.—Imports the past week aggregate 1661 tons from England. The market is steady.

The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	— —	@	— —
" spot, in bulk	11 00	@	— —
" in sacks	12 00	@	— —
Cumberland	10 00	@	— —

IRON.—The market is essentially unchanged. The consuming iron shows a slight falling off in this city, but it is expected to set in towards March of 1898 in increasing proportions. The East does not report any material change.

AMERICAN.	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50
ENGLISH.		
Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

PLATINUM.—The market is firm.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

BORAX.—The market is fairly firm.

The market is quoted as follows:

Refined, in carload lots, in barrels	5½
Refined, in carload lots in sacks	5¼
Powdered, in car lots	5½
Concentrated, "	5

POWDER.—The market is steady.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9 to 11c, according to strength and quantity.

ZINC.—The market is firm.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

ANTIMONY.—The market is firm.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 8c for Cookson's, 7¾c for Hallett's and 7c for Japanese.

Chemicals.

The demand continues slow in every line, with no improvement to look for the remainder of this year.

SULPHURIC ACID.—The demand is quiet.

We quote in a jobbing way at 1¾c per lb for 66%.

ACETIC ACID.—The market is firm at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported steady from store at 6¼@7c per pound in carboys.

BONEASH.—There is a slow demand at unchanged quotations.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

BLUE VITRIOL.—Our market is steady, with better inquiry.

We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is firm.

Our market is quoted in a jobbing way at $1.40 a pound.

PHOSPHORUS.—The market is steady.

We quote in a jobbing way at 70 to 75 cents per pound.

SODA ASH, 58% (LeBlanc process).—The market is steady at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is weak at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—The market is quiet at 2½c a pound from stores.

NITRATE OF SODA.—The market is easy for spot and shipment.

Our market is quoted from store at 3⅛@4c for 95%.

Mining Share Market.

SAN FRANCISCO, Nov. 24, 1897.

The past week has witnessed a continuance of the strong depression which has characterized the market for some time. The way in which the manipulator for the moneyed inside pool is handling the market creates the belief with experienced and successful outside operators that two or more bodies of ore have been found on the Comstock, and until the shares of these particular mines are well in hand no big move will be made in shares. While the share milking process is under way by the manipulator, there will be moves in individual shares by outside combinations provided these moves do not interfere with his game of beating outsiders out of their holdings. This, probably, accounts for the erratic moves at higher prices proportionately for some of the shares of the mines not thought much of. One of these mines has been examined by persons the past week who are said to be quite bullish. While they guarantee bull reports from the mine, the public would like to know who will guarantee them. Past experience has proven that under such a condition the shares go down to almost nothing, provided gudgeons buy. It is an open question as to how long the manipulator for the inside moneyed pool will keep the market down. It may be that lines of assessments and bear points put out will help in concentrating shares for the bull campaign which will come in 1898. The history of the Comstock is that after every strong depression extending on the down grade for many long, weary months, then a bull movement is inaugurated and prices carried up to good figures. The last big up-move was in 1888, when Confidence sold to over $60 a share; but the 1886 deal was the most successful, for the aggregate value of the shares of over twenty mines on the Comstock sold at less than $3,000,000 before it started, and in December of 1886 they aggregated over $60,000,000. The Sierra Nevada deal some years before this was also a great success, for from a total value of about $2,500,000 they went up to over $110,000,000. Before all deals of the above character, when prices were the lowest, bear points were as thick as blackberries during fruit season, and the old Comstock had no friend. Who knows but history may repeat itself within the next two years?

The news from the Comstock mines is far from discouraging to those informed on what is going on. In some of the mines the work is largely of a kill-time character. The intention seems to be to discourage holders of shares and make them sell at low prices. Persons in position to know assert that the entire complexion of things can be changed on the Comstock as soon as desired by insiders and that district made to hum again with general activity. From Utah and Andes nothing new from that heretofore published comes to hand. In Sierra Nevada they are still working on the Layton tunnel level. They are about ready to stope from the fourth floor. Returns from 155 tons of ore milled aggregate $2108 in gold and 1525 ounces silver. They are still pushing the Riley tunnel ahead.

They are still pushing the north lateral drift ahead from the 900-foot Union shaft level. In Union the work is confined to the 900-foot level, while in Mexican it is the 1000-foot level that receives attention. There is nothing new reported from either mine. In Ophir they are still crossdrifting west on the 1000-foot level and also central tunnel levels. The showing in the former shows an improvement, and therefore it is expected that it will be stopped soon. Attention is being directed to Con. Virginia. The work in this mine is on the 1550-foot, 1650-foot and 1750-foot levels. Those in position to know have faith that considerable ore will be uncovered before long. The last official letter is quite encouraging, although more time will be required to show what the result will be. They are still extracting and milling low grade ore from Gould & Curry. It will require the final cleanup and sale of bullion to show if it will pay. Fairly active work is being done in Savage. Nothing is being done in Hale & Norcross. In Chollar the work is the same as reported last week. They are going south on the tunnel level in Potosi. They are running a north drift for connection. It is stated that when ready a large increase in the quantity of ore can be extracted from this mine. In Alpha they continue to fool around on the 500-foot level. It is shares, not ore, that is wanted. From Overman and Alta nothing new comes to hand. A strong effort is being made to sell Justice shares, and for the occasion big bull points regarding what it will sell for are put out, and bull reports come from the mine.

From the Brunswick lode there is nothing of particular interest to report. It is stated that a leading mineralogist will inspect one or two of the mines, but unless he goes down and examines the lode on the Comstock tunnel his opinion will not be worth much. In Occidental they are still pegging away on the 550-foot, 650-foot and 750-foot levels. It will take well towards the close of December before they expect to reach the ore on the 750-foot level found above. In Chollar and Potosi the work reported last week is practically unchanged. It will take two or more weeks yet for practical results to be known from the most important work. From Savage, Gould & Curry, Best & Belcher and Con. Virginia nothing new comes to hand, although there are those who look for good results in the latter two before long.

The following illustrates the changes of the week:

MINES.	Nov. 18.	Nov. 25.
Alpha	....	....
Alta Consolidated	....	$ 10
Andes	....	24
Belcher	$ 32	33
Best & Belcher	37	35
Bodie	....	....
Bullion	12	10
Challenge	....	26
Chollar	....	50
Confidence	94	85
Consolidated California and Virginia	1 15	1 20
Consolidated New York	....	....
Crown Point	23	17
Exchequer	....	....
Gould & Curry	29	24
Hale & Norcross	1 70	1 65
Justice	61	55
Mexican	41	38
Ophir	78	80
Overman	08	....
Potosi	51	46
Savage	37	28
Sierra Nevada	65	68
Union	34	30
Utah	10	07
Yellow Jacket	41	3

San Francisco Stock Board Sales.

SAN FRANCISCO, Nov. 18, 1897.

9:30 A. M. SESSION.

300 Alta	10	100 Ophir	80
150 Belcher	23	200 Seg Belcher	08
100 Best & Belcher	35	200 Sierra Nevada	68
100 Con Cal & Va	1 20	100 Standard	1 80
300 Gould & Curry	24	100 Yellow Jacket	37
100 Mexican	38		

SECOND SESSION—2:30 P. M.

150 Ophir	78	300 Belcher	23
300 Gould & Curry	24	50 Confidence	85
400 Best & Belcher	33	600 Utah	07
450 Con Cal & Va	1 15	100 Bullion	10
800 Savage	28	1150 Justice	55
400 Chollar	50	650 Union	30
400 Potosi	46	500 Alta	10
100 H. & N	1 65	200 Challenge	26
800 Crown Point	17	100 Andes	24
700 Yellow Jacket	35		

WILL NEGOTIATE with owners or their duly authorized agents only

WILL INVESTIGATE only thoroughly bona-fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

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Marquette, Mich., U. S. A.
Operator and Dealer in
Mines, Mining Properties and Mineral Lands,
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MONEY LOANED ON BONA-FIDE MINES

WILL EXAMINE on reasonable terms all kinds of Mines, Mining Properties and Mineral Lands as to their value, method of working and the condition of their titles.
WILL GIVE Options, Leases, Bonds and Contracts on all kinds of Mines, Mining Properties and Mineral Lands.
Assay and Chemical Work Done on Reasonable Terms.
Have best of bank and other references. Use McNeill's or A B C Telegraphic Codes.
DO ALL OUR OWN EXPERT AND CHEMICAL WORK.

Working Capital for Mines.
PACIFIC EXPLORATION COMPANY
Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

QUICKSILVER!
—FOR SALE BY—
The Eureka Company,
OF SAN FRANCISCO.
ROOM 1, - 426 CALIFORNIA STREET, SAN FRANCISCO.

INVENTORS, Take Notice!
L. PETERSON, MODEL MAKER,
226 MARKET ST., N. E. Corner Front (Up Stairs), SAN FRANCISCO. Experimental machinery and all kinds of models. Tin and brasswork. All communications *strictly confidential*.

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Belcher S M Co, Nev	57	20c	Nov 20	Dec 24..Jan 14	C L Perkins, Mills Building
Best & Belcher M Co, Nev	63	25c	Nov 2	Dec 7..Dec 28	M Jaffe, 309 Montgomery
Caledonia S M Co, Nev	47	10c	Oct 6	Nov 10..Dec 2	A S Groth, 414 California
Con Cal & Va M Co, Nev	10	25c	Nov 3	Dec 8..Dec 29	A W Havens, 309 Montgomery
Crown Point G & S M Co, Nev	72	20c	Nov 10	Dec 15..Jan 5	Jas Newlands, Mills Building
E Best & Belcher S M Co, Nev	6	15c	Oct 30	Dec 3..Dec 18	E W Sichel, 337 Pine
Exchequer M Co, Nev	40	5c	Nov 1	Dec 6..Dec 30	C E Elliott, 309 Montgomery
Gold Ridge Con M & M Co, Cal	5	4c	Aug 3	Sept 18..Dec 2	H Sylvester, 43 Sixth
Gould & Curry S M Co, Nev	82	20c	Nov 2	Dec 7..Dec 29	A K Durbrow, 309 Montgomery
Hale & Norcross S M Co, Nev	11	10c	Mar 20	Dec 28..Jan 18	R R Grayson, 331 Pine
Kentuck Con M Co, Nev	14	5c	Oct 27	Dec 1..Dec 22	A Waterman, 309 Montgomery
Marguerite G M & M Co, Cal	8	10c	Nov 4	Dec 13..Jan 15	F Mettmann, 337 Twelfth
N Gould & C rry G & S Co, Nev	19	10c	Nov 13	Dec 17..Jan 3	E W Sichel, 337 Pine
Overman S M Co, Nev	78	5c	Nov 17	Dec 22..Jan 12	G D Edwards, 414 California
Thorpe M Co, Cal	8	2½c	Sept 28	Nov 27..Dec 20	A F Frey, Phelan Building

Assessment Notices.

GOULD & CURRY SILVER MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 2d day of November, 1897, an assessment (No. 82) of 20 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of December, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 29th day of December, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room 68, Nevada block, No. 309 Montgomery street, San Francisco, California.

BEST & BELCHER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 2d day of November, 1897, an assessment (No. 63) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to to secretary, at the office of the company, room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of December, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 28th day of December, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

M. JAFFE, Secretary.

Office—Room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

CONSOLIDATED CALIFORNIA & VIRGINIA Mining Company.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3d day of November, 1897, an assessment (No. 10) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of December, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 29th day of December, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAENS, Secretary.

Office—Room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

MARGUERITE GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 4th day of November, 1897, an assessment (No. 8) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 237 Twelfth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 13th day of December, 1897, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on SATURDAY, the 15th day of January, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

F. METTMANN, Secretary.

Office—237 Twelfth street, San Francisco, Cal. The secretary will also receive payments from 12 to 5 P. M. at his business office, 225 Sansome street.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of September, 1897, an assessment (No. 8) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of November, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 29th day of November, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Thorpe Mining Company the day of delinquence in the above assessment notice has been postponed to November 20th, 1897, and the day of sale to MONDAY, December 13th, 1897.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Thorpe Mining Company the day of delinquence in the above assessment notice has been postponed to November 27th, 1897, and the day of sale to MONDAY, December 20th, 1897.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

SPECIAL MEETING OF STOCKHOLDERS.

Notice is hereby given, that a Special Meeting of the Stockholders of the New El Dorado Gold Mining Company will be held at the office of the Company, No. 310 Pine Street, Rooms 15 and 17, San Francisco, Cal., on MONDAY, November 29th, 1897, at 3 o'clock P. M., for the purpose of considering the sale of the stock now in the treasury, and approving a contract for the development of the Company's property. By order of the Board of Directors. J. W. PEW, Secretary.

Office—No. 310 Pine Street, Rooms 15 and 17, San Francisco, California.

MINE BELL SIGNALS.

Adopted, Used and in Force in Accordance with State Law.

For the convenience of our readers in the mining counties we print in legal size, 12x36 inches, the Mine Bell Signals and Rules provided for in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS, 330 Market St., San Francisco.

DELINQUENT SALE NOTICE.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 5) levied on the 3rd day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows.

Name.	No. Cert.	No. Shares.	Amt.
John A. Heninger	16	250	10 00
Nils Johnson	120	100	4 00
Nils Johnson	121	100	4 00
Hattie E. Gray	124	100	4 00
Wm. Westhoff	144	250	10 50
A. O. Lindstrom	148	240	10 00
Wm. Westhoff	177	500	20 00
Richard Phelan	188	5	20
Wm. Westhoff	200	100	4 00
Wm. H. Lillie	202	10,500	420 00
Mark Strouse	208	5	20
P. E. Robertson	215	250	10 00
Sarah Spalding	218	100	4 00
Abe MacCreadie	220	500	20 00
Alfred H. Hogg	221	300	12 00
Abe MacCreadie	222	250	10 00
J. W. Brown	231	4,099	163 96
C. D. MacNeill	236	200	8 00
Paul Muller	239	50	2 00
Paul Muller	240	100	4 00
Paul Muller	242	1,000	40 00
Chr. W. Heyer	243	755	30 20
Chr. W. Heyer	246	606	24 24
Abe MacCreadie	247	200	8 00
Wm. Westhoff	250	200	8 00
Mary Ann Robertson	251	250	10 00
Mary Ann Robertson	252	250	10 00
R. H. Daley	268	1,000	40 00
C. M. Howe	272	1,000	40 00
C. M. Howe	274	500	20 00
R. H. Daley	275	1,500	60 00
Francis Brady	277	700	28 00
R. H. Daley	278	100	4 00
Dr. H. Sylvester	280	51,278	1,971 12
(2,000 shares of this cert. have been paid by H. Sylvester, being part of his stock.)			
L. V. Merle	286	10	40
J. T. M. Kelly	289	500	20 00
R. H. Daley	290	100	4 00
R. H. Daley	294	750	30 00
R. H. Daley	295	185	7 40
E. Swenson	296	1,750	70 00
Mark Strouse	297	5,000	200 00
Mark Weil	299	750	30 00
C. W. Heyer	300	400	16 00
Mark Strouse	301	100	4 00
Geo. Day	302	1,000	40 00
Dr. H. Sylvester, Trustee	305	1,105	44 20
Dr. H. Sylvester, Trustee	306	5,000	200 00
R. H. Daley	307	250	10 00
R. H. Daley	308	240	9 60
F. Heard	309	125	5 00
Mark Weil	310	125	5 00

And in accordance with law, and an order from the Board of Directors, made on the 3rd day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Rooms 12 and 13, No. 43 Sixth St., San Francisco, California, on SATURDAY, the 9th day of October, 1897, at the hour of 12 o'clock M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

The day of sale of the above delinquent stock has been postponed by order of the Board of Directors to THURSDAY, October 28th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, the 4th day of November, 1897, at the same hour and place.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, November 11th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to TUESDAY, November 16th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to TUESDAY, November 23rd, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, December 2nd, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No 43 Sixth St., San Francisco, California

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—FOR—
Mines and Cyanide Plants.
Patent Non-Shrinking WATER TANKS.

The Only Tank that will stand the Desert and Hot Climate.

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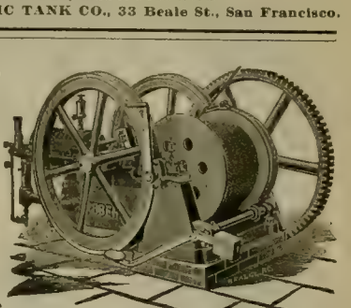
Weber GASOLINE HOISTING ENGINE.



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Costs to run One Cent per Horse Power per Hour. No Coal or Wood and very little water required.

This cut represents our 10, 15, 20, 30, 40, 50 H. P. Geared Hoist.

Saves $12.00 Per Day.

CHAPAREL, ARIZ., June 7, 1897.

WEBER GAS & GASOLINE ENGINE CO., KANSAS CITY, MO.—GENTLEMEN: The 10 H. P. "Weber" Geared Hoist you sent us has been in constant use since May 23rd, and is doing everything guaranteed by you with perfect satisfaction. Besides hoisting the ore and waste from the shaft with three 8-hour shifts sinking, it is kept very busy hoisting water, and has never been cooled off since we put it up and started it going. We were then 53 feet deep and we are now 108 feet. It will consume about ten gallons every twenty-four hours of 65 deg. gasoline, but I think when we can procure the 74 deg. gasoline, the consumption of fuel will be less. The engine was put up, started and has been run without our ever having seen a gasoline engine in operation before. Neither of the parties now running the hoist had ever had any experience with gasoline, and neither are professional mechanics. The engine hoists the loaded bucket with two men on top with apparent ease, starting loaded as easy as any engine can possibly do. I consider the hoist a complete success, and should I again have use for another engine, this would be my choice. Respectfully yours. GOPHER GOLD MINING COMPANY. Per H. B. Hanna.

WEBER GAS AND GASOLINE ENGINE CO.,

430 S. W. Boulevard, KANSAS CITY, MO.

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As Applied to the Handling of Freight, Grain, Ores, Raw and Manufactured Products.

MALLEABLE IRON BUCKETS, Approved Pattern and Weight; ROPE POWER TRANSMISSIONS, SHAFTING, PULLEYS, GEARING, CLUTCHES, ETC.; ELECTRIC COAL MINING MACHINERY.

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BOILER AND STACK PAINTS, ROOF PAINTS, ROOFING ASPHALT.

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Cal. Anti-Caloric Company,

507 MARKET STREET, S. F.

(U. S. Patents.)

Rainfall and Temperature.

The following data for the week ending 5 A. M., November 24, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

CALIFORNIA STATIONS.	Total Rainfall for the Week.	Total Seasonal Rainfall to Date.	Total Seasonal Rainfall Last Year to Same Date.	Average Seasonal Rainfall to Date.	Minimum Temperature for the Week.	Maximum Temperature for the Week.
Eureka	2.96	8.57	12 33	7.44	40	70
Red Bluff	1.32	4.11	5.24	4.51	40	66
Sacramento						
San Francisco	.57	2.65	6.76	3.69	46	64
Fresno	.18	1.42	2.66	1.44	36	78
San Luis Obispo	.06	.92	3.74	"	40	88
Los Angeles	00	2.47	2.27	2.32	50	92
San Diego	00	1.07	1.45	1.27	52	82
Yuma	00	.81	1.14	1.23	44	86

DEWEY, STRONG & CO. SCIENTIFIC PRESS PATENTS PATENT AGENCY 330 MARKET ST. S.F.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from D. D. Allard et als., in the Cambridge Mine near Plymouth, Amador Co., to deposit tailings on a flat; from W. O. Corbett and A. W. Carmichael, in the McMartin Mine near Onion Valley, Plumas Co., to deposit tailings behind the dam of the Good Hope Mining Co in Onion Valley Creek; from Geo. W. Mohler, in the Mohler Mine near Pike City, Sierra Co., to deposit tailings in a ravine below the mine; from Manuel Silva and Joseph Enos, in the Manuel Silva Mining Company's Mine near Cherokee, Butte Co., to deposit tailings in Spring Valley Creek; from J. H. Kneeland, Jr., in the Colfax Gravel and Pierce claims, near Colfax, Placer Co., to deposit tailings in Long Ravine; from L. L. Sherrod et als., in the American Gravel Mining Company's Mine near Centerville, Butte Co., to deposit tailings in ravines below the mine; and from the Kate Hayes Mining Co., in the Manzanita Mine near Sweetland, Nevada Co., to deposit tailings in the impounding basin of the old Manzanita Mine, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on November 29, 1897, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from A. A. Pond, in the Red Hill Mine at Todd's Valley, Placer Co., to deposit tailings in Todd's Valley Canyon; from Ralph Farnham, in his mine near Indian Diggings, El Dorado Co., to deposit tailings in Farnham Creek; from John Spaulding, in the Red Dog Mine at Red Dog, Nevada Co., to deposit tailings in Greenhorn Creek; from George Standart, in the Grizzly Mine near Pike City, Sierra Co., to deposit tailings in Grizzly Canyon; and from Thos. Wayman, in the Sunshine Mine near Pike City, Sierra Co., to deposit tailings in a ravine below the mine, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on December 13, 1897, at 1:30 P. M.

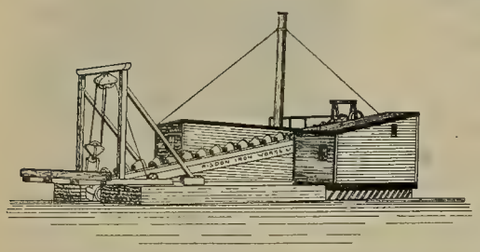
RISDON IRON WORKS,

MANUFACTURERS OF

Gold Dredging Machinery

FOR

★ YUKON ★ and ★ KLONDIKE. ★



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Shipped knocked down and, if desired, erected in running order.

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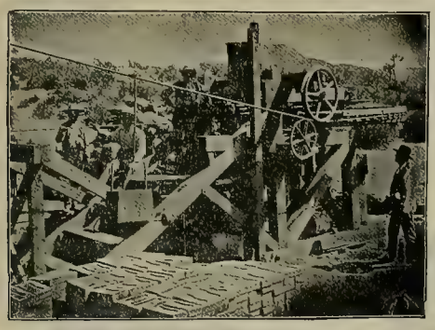
BOSTON, Exchange Building. ✦ PHILADELPHIA, Girard Building. ✦ SAN FRANCISCO, Mills Building.
BUFFALO, No. 1130 Guaranty Building. ✦ PITTSBURG, Westinghouse Building. ✦ SYRACUSE, N. Y., Bastable Building.
CHARLOTTE, N. C., 36-38 College Street. ✦ ATLANTA, GA., Equitable Building. ✦ TACOMA, WASH., 102 South Tenth Street.

WESTINGHOUSE ELECTRIC CO., Ltd. :: 32 Victoria Street, London, S. W., England.
For CANADA: Address Ahern and Soper, OTTAWA, CANADA.



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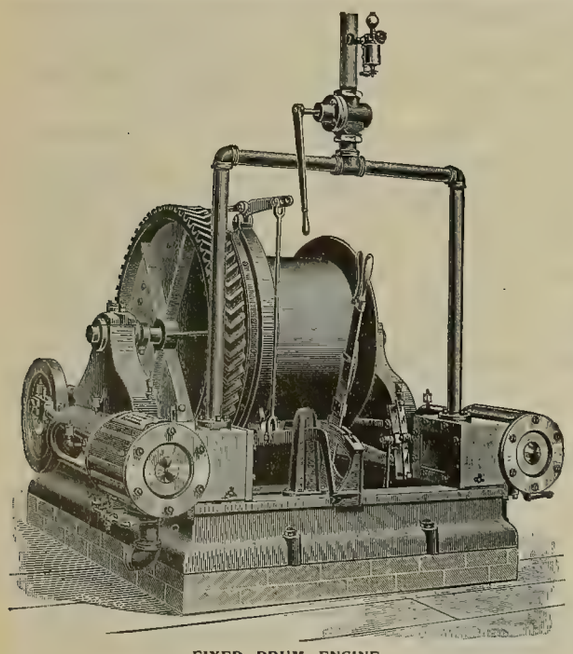

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MINING AND SCIENTIFIC PRESS.
AND PACIFIC ELECTRICAL REVIEW.

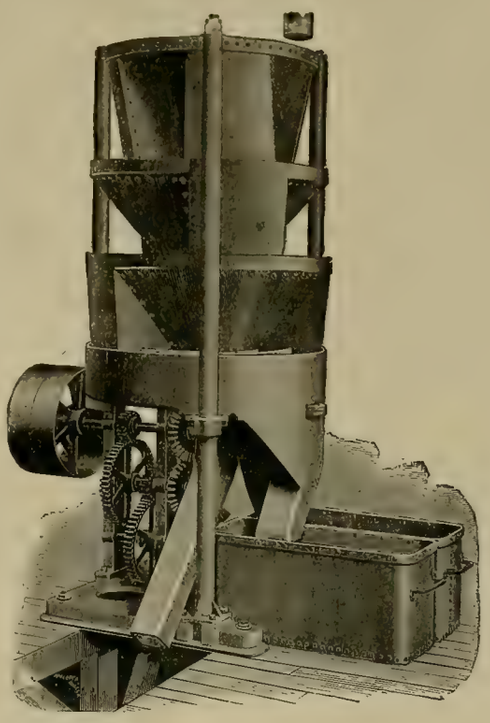
No. 1952.—VOLUME LXXV. Number 23. SAN FRANCISCO, SATURDAY, DECEMBER 4, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Double-Cylinder Gasoline Engine.

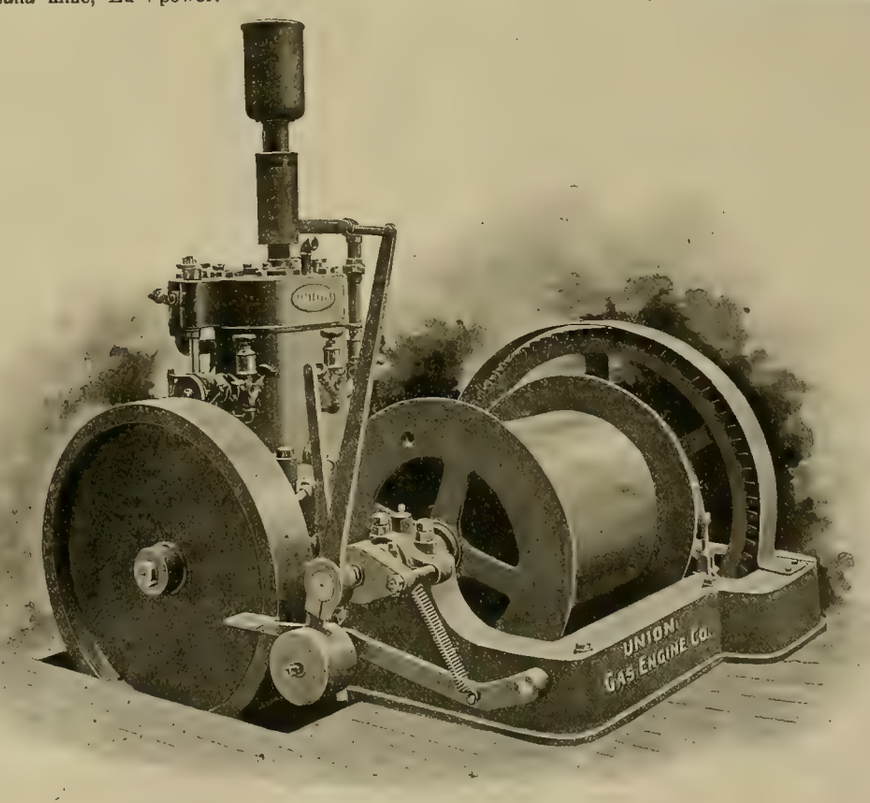
In the past reference has been made several times to the use of gasoline engines in mines on this coast. Herewith is illustrated a self-contained hoist, made by the Union Gas Engine Company of this city. This company has been building hoists for mining use for eight years. Within the last two years this self-contained hoist was put on the market, since which time it has been put in service in this country, Mexico, New Zealand and Australia. Previous to designing this hoist, the ordinary horizontal stationary engine with pinion and gear was used to drive the drum.

The illustration shows a 10 H. P. double-cylinder engine fitted to run on gasoline, naphtha, benzine, or distillate. The drum will hold over 700 feet of ⅝-inch cable, and it is intended to work to a depth of 600 feet. The makers guarantee it to raise one ton at a rate of 125 feet per minute. It can be started and stopped instantly, is equipped with a sensitive governor and uses gasoline in proportion to the amount of work it is doing; as hoisting is intermittent work, it is evident that this governing is of importance. The California Exploration Company has a 10 H. P. Union hoist at the Golden Hill mine, in Calaveras county, Cal., which, it is stated, costs only 45 cents per day of twenty-four hours. The one at the Belle mine at Tuttletown runs twenty-four hours per day on two gallons of gasoline. One at the Limpensil mine near Placerville costs 55 cents per day of twenty-four hours. These hoists have also been purchased by the Iron Chief mine, Pittsburg Coal Mining Company, S. S. Bradford, E. J. McEllin, Boundary Line mine, Plumbago mine, Crœsus Gold Mining Company, North American Exploration Company, Continental mine, Santa Rosalia mine, Eureka Mining Company, L. Booth & Sons, North Star mine, and Keystone mine. The Sterling Mining and Milling Company also has four Union engines, two of 60 H. P. and two of 25 H. P. The Pacific Coast Borax Company has six Union engines, five of which are hoists. The Pioneer mine has four engines, three of which are hoists. The Mammoth mill near Panamint is operated by a 25 H. P. Union engine.

The Union Company says over 2000 of these engines have been put out. The gas engine was originally a European invention, and is to-day much more generally in use in England and on the continent than in the United States. The pioneers of the Union Gas Engine Company claim the invention and development of the gasoline engine, which is essentially the same as the gas engine, excepting that it uses liquid fuel, which is turned into gas just before being drawn into the cylinder. In the Union engines no more is turned into gas than is needed to produce the required power.



BRIDGMAN'S ORE SAMPLING MACHINE.



UNION 10 H. P. DOUBLE-CYLINDER GASOLINE ENGINE.

Automatic Ore Sampling.

Recently was illustrated herein an ore sampler built by Supt. Chapman of the Idlewild mine, El Dorado Co., Cal., which works satisfactorily. The necessity of correct sampling, the need of accuracy therein is universally conceded. Several automatic ore samplers have been devised—the Bridgman, the Bradford, the Collum, the McDermott, the Constant, the Taylor & Brunton, and others. So many elements of error may possibly enter into hand sampling that a machine system of securing impartial work meets with much favor, any objections being outweighed by the many manifest advantages of the latter method. Herewith is illustrated Bridgman's ore-sampling machine "A," built by Fraser & Chalmers, Chicago, Ill., which gives double samples and three cuts (quarterings) on each sample. It is intended for original samples of any size, and gives final samples of about 1 or 2 per cent of the original weights. It requires a floor space 3 feet by 4 feet, and has a height over all of 7½ feet. Its average capacity is about twenty tons an hour. It is self-contained, requiring only to be bolted to the floor and to have feed, discharge and belt connections made. Fig. 1 on this page shows the machine as it is built. Fig. 2 on page 529 gives diagraphic sections and details. The machine consists essentially of three apportioners, I, II and III, all driven by the one pulley, X (usually tight and loose pulleys), and three stationary, concentric receptacles, R_1, R_2 and H, so constructed that any material falling into them will pass out through the spouts T_1 and T_2 into sample buckets Z_1 and Z_2 or through the spout S, which discharges the rejected portion of the sample. Apportioners I and III revolve in the same direction, apportioner II in the opposite direction; I at about 5, II at about 15 and III at about 45 revolutions a minute. The upper apportioner, I, consists of two concentric rings, divided by 8 partitions into 8 equal topless and bottomless compartments, L, from each one of which leads an adjustable spout, either as M–1, or as M–2, or as M–D. Set in rotation, spout M–1 would describe a certain circular path, 1–1; spout M–2 a certain other path, 2–2, and spout M–D a third path. The intermediate apportioner, II, merely a conical funnel, having, besides the large outlet W, four vertical shoots, N_1–N_1 and N_2–N_2, through its sloping sides; each one of these shoots forms one-eighth of the circular paths covered by the spouts M–1 and M–2 respectively. The lower apportioner, III, is of the same construction as II and bears the same relation to it that II bears to I.

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J. F. HALLORAN.....General Manager

San Francisco, December 4, 1897.

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THE third quarterly meeting of the Pacific Coast Electrical Transmission Association will be held in San Francisco Feb. 20 and 21, '98.

SO FAR as known, W. P. Blake, now at Prescott, Arizona, put up the first rock breaker in California in the Benton mine, Mariposa county, in 1861.

AS NEARLY as can be estimated, there are at present about 6750 stamps in operation in California—about 1100 of these being in southern California. In Nevada county there are 760 at work.

THE principal transfer reported this week is that of the Royal Consolidated Mining Co., I. R. Wilbur, general manager, which has sold the Royal mine, about two and one-half miles northwest of Copperopolis, Calaveras county, Cal., to an English company for $400,000—$50,000 down, the balance in three installments.

IT would be in accordance with the eternal fitness of things to give a prominent place in the exhibit connected with the Mining Jubilee Fair in San Francisco next January to the original gold nugget discovered by Marshall. That historic little chunk is believed to be now in the possession of Mr. W. W. Allen, 323 Phelan Building, S. F.

LATEST authentic reports from Dawson City are dated Oct. 16. There were then 4500 people there with scanty provision for 3500. About 500 had then started down the Yukon to places where food was reported to be obtainable, and other wholesale departures were planned. Tales of starvation and suffering are not uncommon, and it is probable that extreme privation will be the lot of all in that region this winter.

THE proposition to have the Government build pipe lines from the California hydraulic mine districts watered by the Sacramento and San Joaquin rivers and their tributaries, to carry the debris into the tule lands, made many years ago, is again revived. The scheme is an extensive one and much may be said in favor of the idea. The tremendous cost, however, precludes present serious discussion of the project.

MR. R. W. RAYMOND, secretary American Institute Mining Engineers, states by circular that the 74th meeting of the Institute—its 28th annual meeting—will be held at Atlantic City, N. J., beginning Feb. 15, '98. It is intended at this meeting that excursions, entertainments, etc., shall be subordinated to the presentation and discussion of practical papers on mining and metallurgical topics. It is under consideration to hold a meeting of the Institute in Mexico, next October, in case a sufficient number of members signify intention of going, to warrant preparation for reception, entertainment, etc.

Very Unusual.

The Santa Fe Pacific Railroad deserves commendation for doing something so unusual in the history of California railroads as to be a matter of wonder, namely, issuing a booklet descriptive of a portion of California's great gold fields. The little volume is entitled, "Gold at Randsburg, California." It is handsomely issued and is being widely distributed.

It has been so long the policy of California railroads to hush up, so far as possible, any mention of the gold mines of this State, and to ignore their existence, that such unusual action on the part of any railroad in California borders on the wonderful. It is possible that some time in the next century, even the Southern Pacific may realize that it would be worth their while to follow the example of railroad companies in every other great mining region of the world and devote some effort to increasing business in that direction.

The railroads in Montana, Utah and Colorado—more especially the latter State—spend tens of thousands of dollars annually in issuing handsomely illustrated pamphlets, setting forth the great mineral resources of the regions they traverse; how they can be best reached; and, in many cases, giving exact geological and scientific information as to the character of the country and the chances for miners and prospectors. So far as has come under our observation, these pamphlets have not exaggerated the facts, but have been of practical value; and that they have aided the railroads in getting business and incidentally aided their respective commonwealths, goes without saying.

WITH regret is noticed, in connection with the State dredging, an avoidance of work authorized by the appropriation, and a continuance of the folly heretofore cited. It is now nearly nine months since the California State Legislature appropriated $300,000—the appropriation providing for the purchase of one or more large dredgers, to be under the direction of a Commissioner of Public Works, and to deepen the channels of the Sacramento and San Joaquin rivers. Since then, all the State of California has to show for it is a Commissioner of Public Works, at a salary of $3000 a year, a secretary and two engineers, at a salary of over $700 a month; and a contract to straighten some curves of the San Joaquin river, at a cost of $13,000, and to build some jetties at the Newtown shoals, at a cost of $17,000, making a total so far of over $40,000 for the money that was appropriated for the purchase of a dredger. The appropriation in no way, directly or indirectly, alludes or refers to any contract for "jetties," or "easements," or "straightening channels," etc. Everyone in and out of the Legislature understood just what the $300,000 was appropriated for, and so far nothing has been done but the maintenance of certain gentlemen in office at salaries at least as large as they could earn elsewhere. The thing is now degenerating into a farce. In the early part of the twentieth century we may have some jetties and a file of cashed State warrants—but nothing else—to show for the $300,000 appropriation in March, '97, in accordance with the urgent requirements of the case under the auspices of the miners and farmers alike.

A RECENT article herein, referring to the noncompliance of certain mining companies in Butte, Montana, with the law recently passed by that State Legislature requiring safety cages in mines, elicits the reply by the Montana Mine Inspector that the reason a few of the mines in Butte are not equipped with safety cages is that they would probably change from cages to skips at an early date; and because that he officially had not pressed the matter. It is further claimed that the new safety cages are not working successfully in some of the shafts of the Anaconda property; that the miners prefer to take their chances with the open cages; it is also claimed that, should a shaft be inclined to get out of plumb, the cage would become a death trap. If the law be obnoxious it should be repealed; but it would appear that because a few miners here and there object to riding in such cages, or that an occasional mine shaft, by reason of the swelling of the ground, etc., gets out of plumb, is not considered sufficient excuse on the part of officials, who have sworn to do their duty, to be recalcitrant in that regard. If the new devices are in reality "safety cages," they create additional protection; if swelling ground causes departure from the vertical, it shows that the timbers need easing. A shaft out of plumb is unfit to have any kind of a hoisting cage going up and down, "safe" or unsafe.

THE report of the Commissioner of Patents upon the business of the Patent Office for the fiscal year ended June 30, 1897, shows that there were received within that year 43,524 applications for patents, of which 23,994 were granted, including reissues and designs. The number of patents which expired was 12,584. The number of allowed applications which were by operation of law forfeited for non-payment of final fees was 5034. The total receipts were $1,343,779; the expenditures, approximately, were $1,026,644, leaving a surplus of $317,135. The moneys covered into the Treasury of the United States on account of receipts from fees, etc., in patent cases, from July 4, 1836, in excess of the cost of the management of the Patent Office, amount to $5,093,614. The accommodations are inadequate, and the niggardly policy of the Government in this matter is a constant subject of adverse comment. The nation owes it to its inventors to cease considering the Patent Office as a source of profit, and bestow some of the surplus upon requisite improvements at Washington.

THE Denver, Colo., *Mining Record* of Nov. 27th intimates that a New York mining journal and a Colorado mining journal are decrying the Beam Process because the proprietors of that process refused to advertise in those publications. Such a charge is a serious one. It is scarcely possible that the appearance or non-appearance of an advertisement of a "mining process" should influence any reputable mining publication in its criticism or judgment of the merits of such process. Such prostitution of editorial utterances is incredible. Readers of a mining journal are entitled to an intelligent and unbiased discussion of all matters connected with the mining industry, and an impression that its editorial opinions are purchasable, or influenced by the appearance or non-appearance of an advertisement, is and should be immediately fatal to that journal's influence. The two publications specified in the *Record's* remarks owe it to themselves to at once show that the charge is undeserved.

TO WARN the unthinking thousands who are preparing to rush to the Klondike next season has so far been a useless and thankless task. Those who are afflicted with acute Klondicitis must doubtless run their course even should the malady terminate fatally. Among their many mistakes one of the greatest is that they have educated themselves to the belief that the only obstacle between them and the coveted gold is that which is overcome by making the long and tortuous journey. They forget that the beginning of the search is only reached after they have arrived at the Yukon, and that as much intelligence is required in prospecting the gold belt in Alaska as is required in that which exists in the States. The idea that a fortune is to be picked up on the surface is one that many have erroneously embraced, and the disappointment will be accordingly intensified.

A COLORADO JUDGE this week made a decision of interest to miners of that State, to the effect that the workmen in or around a mine who are employed by a lessee have no claim against the property. Heretofore, in Colorado, it has been held that the workmen employed by lessees had a claim against the owner of a mine, and the result has been to work against the leasing system. It has been decided in California courts in case of a working bond or subleasing that where the owner or owners of the property gave due public notice of the fact that he or they disclaimed any obligation or responsibility for labor or supplies that the property could not be attached for any debts contracted by the bonder or lessee in connection therewith.

THE Secretary of the Treasury has advised collectors of customs at ports where works of manufacturers engaged in the smelting or refining of metals

from imported ores are bonded that, as the tariff act of July, 1897, differs from the act of 1894, it is deemed advisable to require the rebonding of such works. Under the new law it is provided that each day a quantity of the refined metal, equal to 90 per cent of the amount of imported metal smelted or refined that day, shall be set aside.

M. E.'s, E. M.'s and Experts.

Some remarks in the issue of Nov. 6th, discussing mining engineers, their requirements, qualifications, etc., have been widely reproduced. A writer in a recent issue of the British Columbia *Mining Record* speaks thus on the subject of "M. E.'s, E. M.'s and Experts:"

"That there are many men practicing as mining engineers in this province and elsewhere who have never had the necessary training is unfortunately too true. Real estate men, drummers, fishermen, insurance agents and so forth are all to be found here and elsewhere in this western country posing as M. E.'s or E. M.'s, and in more than one of the prospectuses which have been issued for the purpose of obtaining subscriptions from the British Pacific, the statements made to influence subscribers are those of men belonging almost entirely to the classes above. Should failure await such enterprises, can any one wonder? Only at the stupidity and gullibility of the subscribers. The so-called mining engineers may be to blame; as a rule there is an absence of evidence on that point, but the subscribers we know are to blame, and much more than they—the promoters who, in cases of the kind named, are only anxious to put before the public opinions that will induce subscriptions, altogether regardless of the merits or demerits of the properties offered.

In this connection let me repeat a story which may or may not be literally true. I give it as told to me. Within a hundred miles of the town of Rossland is a so-called mining engineer or expert who, when approached by a client as to the making of a report on any mining property puts the very pertinent question: "What do you want, a report on the facts or only a favorable opinion?" Asked as to his fees, he says: "A report on facts will cost you $500, a favorable opinion $2000." So long as there are people who want merely favorable opinions which will enable them to sell their "wildcats"—and unfortunately such people are not rare—so long will experts of the stamp alluded to find a vocation."

There is no effect without a cause, and where there is a supply it is almost invariably in response to a demand. To give a favorable opinion on a mining property it is not necessary to have the elaborate training of a mining engineer. Those most unfamiliar with mines can give a favorable opinion, and generally the appreciation is inversely proportional to their knowledge. The opinions so given need not necessarily be dishonest, for the so-called expert who has probably never seen the inside of a mine, or, at most, only been in a few short tunnels driven into the hillsides, is as easily gulled as the most ordinary layman who does not affect the expert's garb and initials. "Salting" for such men would be a waste of time.

Other types of so-called mining engineers are they whose vocation is, or has been, more or less associated with mines. It may have been as assayers or surveyors. Both these classes of men may, some day, make engineers, with other and more varied experience, as both of them have had part of the training necessary for a mining engineer, but to speak of either of them as a mining engineer would be as inaccurate as to call the tail board of a violin an instrument of music. This class of men usually realize, to some extent, their weakness, and by way of safety, if not prepared to sell favorable opinions, they "turn down" most of the properties inspected.

Of course, between mining engineers, who have had the necessary training, there are great differences; some have had much more experience than others, and even between those having equal experience there is frequently great disparity. A man's ability is compounded of two factors—heredity and environment. The latter includes education or experience, the former those mental and physical qualities which, in absence of a better name, are often called natural ability. "We do not come into existence as sheets of white paper on which the world can write anything it pleases"—either technically or morally.

Let us see what is required of a mining engineer. He may have to make topographical, geographical and mineralogical surveys, for which purpose it is necessary that he should have a thorough knowledge of surveying, stratigraphical geology and mineralogy. He frequently has to say whether certain ore deposits are or are not workable commercially, and to do that he must have a thorough knowledge of stratigraphical geology, mineralogy, the various operations of mining, the several processes of ore-treatment, the nature and uses of mining machinery, and the average life of different kinds of deposits. Or, again, he may have to conduct the operations of a mine already partially or wholly opened out. In that case, it is necessary that he should be a good stratigraphist, have a thorough knowledge of mining operations, the processes of ore-treatment, the uses of mining machinery, and also of the numerous subsidiary books required about a mine.

Of all the various kinds of work that a mining engineer is called upon to do, there is not one which demands such a wide range of knowledge as that of reporting on undeveloped properties, and yet that is the very kind of work so-called experts, who have had no experience in mining, profess to do. "Gall" alone could not brace itself to such presumption. Ignorance might, but ignorance and gall combined assuredly could and do.

It is of the first importance that a mining engineer should be practical, and that there may be no mistake about this statement we will define. By practical, as here used, is meant the facility of aptitude that comes to a man from constant practice of the particular pursuit in which after proper training he is engaged. A mining engineer cannot be produced in a college or chemical laboratory, although in both these places he will obtain part of his preliminary training; but it is on the mountain sides and in and about the mine and workshops that he learns those branches of his profession that are of the greatest commercial value. And let it never be forgotten that the mining engineer who is a commercial failure cannot be more than a very partial technical success. The man who cannot make his mining pay had better become an expert—at something else. It is sometimes contended that the best person to direct the operations of a mine is a practical miner. Let us see what truth there is in this contention. The experience of a practical miner is confined to pounding a drill, shot firing, driving a shovel and setting up timbers. These operations bear about the same relation to the complex requirements of a mining engineer that unconnected bolts, rivets and plates do to a finished steamship. If by a display of extra ability, or for any other reason, the miner finds himself acting as the foreman of a mine, his experience is a little widened, but not much; and if in later years he should chance to become a superintendent, he has then an opportunity of familiarizing himself with one or more of the various processes of ore treatment and the erection and use of machinery. But it will readily be seen that his experience even then falls far short of that necessary to the mining engineer. Not only so, but his preliminary training is altogether insufficient to enable him to discharge the duties of the latter. A mining engineer's general training should include—besides a good ordinary scholastic education—mathematics, physics, chemistry and geology."

MESSRS. BRICE of Chicago, Emmons of New York, Brazelle of St. Louis and Marshall of Nebraska have each declared their ability to manufacture gold, thus obviating the necessity of mining it. Mr. Brazelle alleges that "from common clay" he can "turn out gold, silver, iron, calcium, aluminum, and a number of other metals as yet unknown to science." His investigations have demonstrated that "there are but three primary metals—copper, lead and iron—which cannot be separated into component parts." He believes that by his process gold and silver will be turned out in such large quantities that all Governments will be compelled to demonetize them. The company which has been formed to work Mr. Brazelle's process will, however, considerately confine its operations to the manufacture of aluminum, calcium, glacium, and zerium, one of the new metals, which Mr. Brazelle says is destined to take the place of steel. According to the dailies Mr. Brice is about to begin the manufacture of gold in Chicago in such quantities as to destroy the vocation of the miner. Duly mindful of the requirements of the situation, Mr. Brice has begun contracting for antimony and has already engaged three carloads a week from Utah. There are possibilities in that direction in the Cœur d'Alenes, and, if Mr. Brice is financially able to purchase all the antimony offered, he may at least occasion increased market for that useful metal.

THE London *Mining World* of the 6th ult., in an unusually wise vein, discussing mining investments and advising against investments "in mines that principally come from the United States," says in answer to its own question, "Is There Any Mine That Can Be Called an Investment?" that the only approach to a mining investment in its judgment is the Rio Tinto, "where the quantity of ore seems limitless, and the duration of the company's existence so sure as to be outside of the calculations of this or the succeeding generation." If a limitless quantity of ore and a perpetual corporative existence be the two sole requisites that together make up a mining investment, such form of investment is, certainly, a very rare occurrence.

EDWARD ATKINSON, the distinguished American statistician who knows so many things that are not so, is now to the front with an assertion that "the average cost of mining silver all over the world is twenty-five cents per ounce," which is absurd. No man can anywhere determine the aggregate cost of mining silver. So many factors enter into that complex problem that those best acquainted with the facts hesitate to hazard even an opinion. It is only such as Mr. Atkinson who start with intent to make figures fit their prejudged beliefs that make positive assertions regarding this matter. When everything is taken into consideration it is probable that every ounce of silver produced "cost" and costs even more than the old time $1.29 per ounce.

PRESIDENT MCKINLEY'S annual message will be read to Congress next Monday. It is understood that in his policy of currency reform he will urge upon Congress the passage of a single simple measure to repeal the existing law which compels the Secretary of the Treasury to pay out greenbacks as fast as they are redeemed with gold, and also to provide that greenbacks, when once redeemed, shall not be reissued, except against deposits of gold equal in amount to the notes paid out. It is believed that such a measure, which has long been advocated in these columns, should receive Congressional approval. Its practical action would go far toward solving recent vexatious financial problems.

THE postoffice department at Washington has notified postmasters that newspapers and other periodicals containing advertisements of schemes offering prizes by chance, "missing word" and "missing letter" contests, etc., will be excluded from the mails. It is a matter of surprise that respectable journals have admitted such frauds. Even the *Scientific American* has given place to that species of advertisement. That class of advertising is rigorously excluded from the MINING AND SCIENTIFIC PRESS, which declines to aid in defrauding the public, whether it be by advertising bogus Klondike Transportation Companies, "missing letter" contests, or wild cat mining stocks.

THE traffic association at Hot Springs, Ark., declined to reclassify cyanide of potassium, and adhere to the old rate of $4.02 per hundred lbs. from the Atlantic seaboard. Manufacturers have reduced the old price to 25 cts., but the transportation companies propose to keep up the present tariff. That is a direct "cinch" on the consumer, and one that can be obviated only by the establishment of a factory nearer the cyanide plants of this west half of America. The New York companies that produce this article will see that it is to their interest that cyanide be laid down as cheap as possible. The consumption has increased twenty fold what it was six years ago.

Pyritic Smelting.*

By W. L. AUSTIN, Ph.D., Denver, Colo.

Under pyritic smelting is understood a smelting process which aims to utilize the calorific power of an ore. Pyrite (FeS_2), chalcopyrite ($CuFeS_2$), pyrrhotite (Fe_7S_8), aresecopyrite (FeAsS), blende (ZnS), galena (PbS), etc., are all ores which have calorific values as metallurgical fuels, and it is with the utilization of this quality in such ores that pyritic smelting has to do.

When a smelting ore contains in itself the fuel necessary for its concentration into a product which can be transported to market at a profit, a common practice is to destroy such natural fuels by calcination, and then smelt, with the help of coke, etc., the oxides thus produced. Why should we burn (roast) an ore which contains in itself a sufficient quantity of potential heat units to smelt it, and then smelt the burnt product itself with the assistance of more or less expensive fuel? Or, even when such an ore is smelted raw, why should we melt it down with coke—as if it were pig iron for foundry purposes—although we have dispensed with the preliminary roasting? In either case, such a proceeding must be considered as wasteful and extravagant if it can be shown that a heavy sulphide ore contains in itself a source of heat which, when properly applied, will suffice for maintaining a smelting temperature. When iron pyrites has been raised to a temperature at which its component parts are free to unite with the oxygen of the air, further use is as unnecessary as in the case of coal, which, when it has once been started, is self-sustaining. In the proper apparatus the same is the case with iron pyrites, which statement we see verified in the everyday practice of heap-roasting. In this process, and in the modern pyrites burners used by sulphuric acid manufacturers, the combustibility of the pyrites itself is relied upon to accomplish the end in view, and the carrying out of these processes demonstrates that, once ignited, pyrites will continue to burn till the sulphur is practically all eliminated and the iron is converted into oxide. It only remains to burn the pyrites more rapidly in order to produce a temperature high enough to fuse the whole mass, and this actually takes place unless care is exercised in restricting the amount of air admitted to the kilns.

Pure iron pyrites is a compound of iron and sulphur in the proportion by weight of 46.66 of iron to 53.34 of sulphur, and both of these elements may be burned in air when the proper conditions are provided to effect their combination with oxygen. The combination of iron and sulphur in iron sulphides of whatever class is not a combustible as long as the two elements are united. They must first be dissociated from each other in order to be free to enter into combination with another element; and it is only after such dissociation has been brought about, and the two elements find themselves *in status nascendi*, that their combustion may be effected. To dissociate these elements from each other, a certain amount of mechanical work must be done, and in the pyritic furnace this work is performed by heating the compound up to a certain point, when the elements separate from each other, and, if the proper amount of oxygen is then provided, they will unite with it. When means have been taken for supplying the proper proportion of air and pyrites in a manner conforming to the conditions under which they can best unite, the smelting will not materially differ, as far as the appearance of the furnace is concerned, from the usual operation with coke or charcoal, only in this case the pyrites supplies both the fuel and flux. That iron pyrites contains in itself the potential heat units requisite for its own smelting may be demonstrated by thermal calculations, or ocular evidence of the fact may be obtained by observing a Manlie's converter in operation. In the so-called bessemerizing of copper matte the molten iron sulphide is run into a converter, and air is blown through it until practically all the iron is burned off, the combustion of the iron (and incidentally of the sulphur connected with it) sufficing to keep the mass at a high heat and extremely liquid during the operation. If, then, iron pyrites contains in its combustible elements a sufficient quantity of potential heat units to support a smelting operation, then the use of carbonaceous fuel to smelt such ores is sheer waste, provided a suitable apparatus can be obtained for turning this quantity to economic advantage. Assuming that such an apparatus is at hand, deposits of this mineral so low in grade as not to permit of profitable treatment by metallurgical processes heretofore in use, may be handled economically at the mines themselves. In a well-managed mine the excavation of ore is controlled by assay, so that its value is known before it is mined, and thereby the cost of taking out worthless material is avoided. Such a preliminary assaying is all that is required where a fire concentrator is used, and there is no reason why the crude ore, just as it is mined, should not be dumped into the hoppers of a fire concentrator, as it is dumped into the rock breakers of a wet concentration mill.

Ores Adapted to Pyritic Smelting.—The first requisite in an ore to fit it for pyritic smelting is that it should contain enough iron combined with sulphur or arsenic to make an easily meltable slag, and to provide for a matte fall sufficient to cover the valuable metals contained in the charge. With regard to fusibility, practice has shown that the best slag for the purpose is a mono-silicate—one in which the oxygen of the silica is equal to that of the bases. To form such a slag requires different amounts of the various bases in common use. For instance, an iron mono-silicate calls for 29.41 per cent of silica to 70.59 per cent of ferrous oxide; a similar lime silicate requires 34.88 per cent silica to 65.12 calcium oxide. Substituting magnesia for the lime, we need 42.86 per cent of silica for 57.14 per cent of magnesium oxide; and for aluminum 46.68 per cent of silica to 53 32 per cent aluminum oxide, and so on. Now, to make a ferrous mono-silicate requires approximately four tons of pure pyrites to one ton of pure quartz, so we may say that for slagging purposes alone we need an ore mixture containing 80 per cent of pyrites and 20 per cent of silica; but that is using up all the iron on the slag, and does not allow for any matte fall. It is a well-established fact in smelting that a complex slag—that is to say, one containing a mixture of various bases—is usually more desirable than one consisting of only one base and silica. Therefore, where it is possible, we aim to make a slag containing several bases. If the ore charge is composed of pyrites and quartz in the ratio of 4 to 1, and we add to it limestone, we can form a lime-iron slag, still preserving our mono-silicate, and then have iron sulphide in excess, which is free to form matte. The addition of lime has another advantage; it lightens the specific gravity of the slag and renders it more easy to separate from the matte. If limestone is not available, then the same end may be reached by decreasing the amount of silica or by substituting some other base. When an ore is not of the desired composition—that is, when it does not contain 80 per cent of iron sulphide—other expedients must be resorted to; but it has been found in practical work that an ore mixture of the composition given will smelt readily without the assistance of carbonaceous fuel in the furnace, and will produce enough matte to effect a saving of 95 per cent of the valuable metals which it carries. It is seen, therefore, that pyritic smelting finds its limitation in the amount of silica contained in the ore it is desired to treat, and the opinion whether or not a given ore is suitable to the process is one which can be decided by chemical analysis. With practice, however, the operator can often determine by simple inspection whether his ore possesses the desired qualifications, but in cases of doubt a silica determination will set the matter at rest. Often simple panning will give all the information necessary. If a few pounds of the ore are ground up, the pulp weighed, and concentrated in a pan, the weight of the resulting sulphides will allow one to make a pretty close guess at the relative amounts of pyrites and quartz in the material under investigation. All that is necessary to be decided is: Does the ore contain enough iron in the form of sulphide or arsenide to flux off the silica, and form a mono silicate slag? If not, then are there other bases available in the neighborhood to make up the deficiency in iron?

There are various cements which can be utilized for cheaply and firmly binding even the first concentrates into forms suitable for blast-furnace work. The influence of zinc in pyritic smelting is one of considerable importance. The sulphide of zinc (blende) has nearly the same thermal value as the pyrites. Up to a certain point, any blende contained in the sulphide under operation assists the operation by its heat-producing qualities, the temperature resulting from the combustion of zinc sulphide being nearly as high as that of proto-sulphide of iron. In practice 14 per cent of zinc in the charge has shown no deleterious results. The zinc oxide, being a base, materially helps out any deficiency in iron, for the zinc is disposed to go into the slag rather than into the matte. Much of this metal is also carried off in the fumes, and in a properly constructed furnace every opportunity is given to assist its volatilization.

The arsenic, when arsenide of iron is used in the place of sulphide, separates from the iron readily under the influence of a pyritic furnace, and volatilizes, leaving the iron free to unite with oxygen. The results produced from burning arsenide of iron have been almost, if not quite, as good as where iron pyrites was used. The arsenic burns to arsenious acid and goes off in the form of heavy white flakes, which may be caught in suitable dust chambers. The burning of the arsenic yields also its quota of thermal units to the operation.

Any galena present in a pyritic charge is of assistance in producing heat, but the heat is difficult to save.

Style of Furnace.—In the experimental stages of pyritic smelting, circumstances compelled the use of whatever apparatus was at hand. For this reason blast furnaces were employed which had been built originally for other methods of smelting, and it is largely due to this precedent that furnaces intended for pyritic smelting continue to be built on similar lines, without sufficient consideration being given to the peculiar conditions under which they are to be operated. If results carried out in these furnaces do not come up to expectation, it will usually be found to be due to the fact that the experimenters have not a clear insight into the nature of sulphide fuels, and have attempted the impossible.

That furnaces built on the lines of those intended for lead-ore smelting are not adaptable to pyritic smelting purposes becomes all the more patent when the two classes of fuel used in the respective processes are considered. In the first place, coke is, for all practical purposes, a single element—carbon—and in the furnace it unites directly with the oxygen of the blast; whereas the sulphides are compounds of sulphur with some other element, and this union must first be broken up before the component elements can unite with oxygen. The author then enters in detail into the various changes which occur in the burning of coke and pyrites, and points out their respective differences of behavior while being acted upon by the action of the blast. To sum up, he continues, we have in coke a solid, consisting of a single element with a large surface exposed, which is retained in position until consumed; in the sulphides, heavy liquids of very limited surface, requiring dissociation of their elements before the oxygen can act upon them, and which rush through the charge in the briefest possible time. It is therefore unreasonable to expect that a furnace designed for burning the former class of fuel will be equally efficacious in the case of the latter. The products of combustion resulting from the two operations is a matter requiring consideration. In the case of coke, these are largely combustible gases, which pass upwards through the charge, carrying heat with them, and in this upward passage act upon the descending minerals. With sulphides, the products of combustion are principally heavy fluids, which drop downwards; the amount of heat carried upwards by the sulphurous acid gas and the nitrogen of the air being comparatively small. It is obvious, therefore, that the fusibility of the sulphides precludes the use of high smelting columns. In pyritic smelting, unlike lead smelting, there should be no carbonaceous fuel to burn away, nor oxides to reduce; any action of the ascending gases upon the charge is to be avoided, if possible. What is wanted is to melt the whole as quickly as possible without permitting a preliminary matting together of its component parts.

The best height for a smelting column in pyritic smelting is one which will present a sufficient resistance to the upward tendency of the blast to cause the latter to penetrate the center of the charge. This, of course, varies with different sizes of furnaces; a wide furnace requires a deeper charge than a narrow one. In order to be able to regulate the height of the smelting column and keep it stationary, recourse is had to an interior feeding cylinder. This contrivance is so adjusted as to deliver the sulphides at a given point in the furnace shaft, and at the same time protects them from the action of the escaping gases. In this way a constant height of smelting column is maintained, and the sulphides are delivered at a point where smelting takes place without permitting an incipient fusion, the heated gases being directed into other channels prepared for them. In order to make up the deficiency of heat which is absorbed in dissociating the sulphides before their component elements can combine with the oxygen, some auxiliary heat must be supplied; and in the Manlie process the air entering the tuyeres is heated by coming in contact with the molten mass, which has already been brought to a high temperature by the preliminary operation of melting the matte in a cupola before charging into the converter. This hot air then attacks the sulphides, and the burning of the sulphur and slagging off of the iron continues as long as there is any sulphide of iron in the vessel. All experiments, however, with low-grade ores, on the converter principle, have resulted in failure. There are various ways of giving the blast the necessary temperature before allowing it to enter the furnace—heating in hot-blast firebrick or pipestone, or in the tuyeres themselves. The first are costly methods, and the author recommends the gasifying of some cheap fuel by burning it in the tuyeres. The amount of heat necessary for the direct heating of the blast is comparatively small, and may be readily computed when the calorific power of the fuel and the volume of the blast are known. Owing to the charge column in a properly constructed pyritic-smelting furnace being of necessity low, and as the heavy globules of molten sulphide drop past the tuyeres very rapidly, the time during which the blast can act upon them is very short, so that it is necessary to use a higher pressure than ordinarily employed in Western blast-furnace practice. Care must be exercised that the volume of the blast is not too large, as if even a slight excess of air is blown into the furnace the cooling effect of the surplus air is very marked. What is wanted is pressure of blast, not volume. When the furnace is properly managed, the oxygen entering the tuyeres should be consumed to the extent that sulphur fumes will distill off from the surface of the charge, and may be collected and further utilized. In order to protect the workmen from the stifling gases given off by a pyritic furnace, and to provide for the regular charging of the ore and fluxes, the top of the furnace should be kept closed and a feeding device provided. Such an apparatus has been designed which is automatic in its action.

Concentration and Saving.—The degree of concen-

* Trans. N. of England Institute Mining Engineers.

tration effected in a pyritic-smelting furnace is in direct ratio to the amount of iron burned; hence, to make a good concentration the mono-sulphide must be retained under the influence of the blast until the desired quantity of iron has been converted into oxide. When no coke is used there is no reason why any desired degree of concentration should not be reached; but to accomplish this two smeltings are necessary.

The percentage of saving effected in pyritic smelting depends upon several factors, prominent among which are (1) the composition of the furnace-charge; (2) the amount of matte fall, and (3) the time given for the separation of the matte from the slag. The amount of the matte fall necessary to effect a given saving must be determined experimentally in each instance, for a hard-and-fast rule cannot be laid down which will cover every case.

When experience has been acquired in the operation of a pyritic furnace, and with the necessary amount of matte fall, a saving of from 95 to 98 per cent of the gold, silver and copper contained in a pyritic ore can, the author asserts, be realized in a properly constructed furnace.

The Estimation of Gold in Ore and Data on Dry Crushing Experiments.*

By FRANKLIN WHITE.

The following tables will show the possibility of assaying ore before crushing with sufficient accuracy to afford very useful information. One set of calculations refers to wet milling, one to a dry crushing test. I cannot give the name of the mine from which I obtained the first set, but the figures supplied to me, and which I am at liberty to use, are sufficient for my purpose. If we follow the usual system of taking the fine gold won together with the gold in residues (ascertained by assay) as equalling the total gold contents of the ore milled, we have the following:

NO. 1.

EXTRACTION.

	Ozs. fine gold.	*Per cent.*
Mill yield	13 095 14	67.61
Cyanide yield	2,655.27	13.71
Concentrates yield	1,138 74	5.88
Clean-up and slags yield	122.81	.63
Gold left on eight plates	200.00	1.03
Totals	17,211.96	88.86

RESIDUES, ETC.

	Ozs. fine gold.	*Per cent.*
Tailings residues	735.858	3.80
Concentrates residues	399.000	2.06
In slimes dam	1,020.188	5.27
Totals	2,155.046	11.13

	Ozs. fine gold.	*Per cent.*
Accounted for	17,211.960	88 86
Residues, etc	2,155.046	11.13
Totals	19,367.006	99.99

Making mineral worth 9.66 dwts. per ton. The mineral was assayed before being crushed, and the average value worked out at 10.3 dwts. per ton. When calculations are made on this basis we have the following:

EXTRACTION.

	Per cent of assay value.	
Mill yield equals	63.514	
Tailings yield	12.868	
Concentrates yield	5.518	
Clean-up, etc	.595	
Gold on plates	.969	
		83.464

RESIDUES, ETC.

	Per cent.	
Concentrates at 9 520 dwts	1.933	
Tailings " 0.515 "	3 567	
Slimes " 1.840 "	4.944	
		10.444
Unaccounted for		6.092
Total		100.000

Here we have a lower extraction to the extent of nearly 5½ per cent, and an unaccounted for 6 per cent, the latter figure clearly indicating that something is wrong. A glance at the assays of residue tailings and slimes will I think, show that they are too low. If the former were put at 1.1 dwt. and the latter at 2.5 dwts.—figures which would not discredit either the cyanide or battery manager—we should have an increase in the residue contents of over 1,100 ozs., and the "unaccounted for" would be reduced to a very small figure. Here, then, in the second set of figures, although the results given us do not absolutely check, we have a very clear indication of what was wrong. When once this was realized a remedy could be applied. In the former case, however, the manager would sleep comfortably in the persuasion that his extraction of 88.87 per cent was excellent.

NO. 2.

Test crushing (dry) of 917 tons oxidized from Botha's Reef.

CHARGES.

Tons crushed	917
Average assay	9 625 dwts.
Total gold contents	441.356 ozs.

RESIDUES.

Tons crushed	917
Average assay	2.708 dwts.
Total gold contents	124.245 ozs.
Theoretical extraction	317.111 ozs., or 71.84 per cent.

GOLD WON.

Bullion	374.3 ozs., equal to 290.3 ozs. fine, or 65.77 per cent.
In slags and sumps	13.6 ozs. fine.
Total accounted for	303.9 ozs. fine, or 68.91 per cent.

Fine gold recovered worth £1,203 8s 6d, or 26s 3d per ton.

The plant used was as follows: One No. 1 Gates crusher, three old vats holding 45 tons each, two 30-ton solution vats, and two zinc boxes—all second-hand. The vats leaked at first.

Treatment.—First 500 tons: Solution .25 to .3 per cent for 17 hours, then a weak wash of .13 per cent in all 24 tons per vat; final water washes 8 tons; total time, 38 hours. Remaining 417 tons (coarser stuff): Solutions .27 per cent to .32 per cent, standing for 72 hours, circulating the solution for 24 hours; weak washes and water washes as before; total time, 120 hours. Lime used, about 3 lbs. (unslaked) per ton. Cyanide consumed (leakage included), 11.2 ozs. per ton treated. The first 500 tons gave a theoretical extraction of 66.4 per cent; the remaining 417 tons gave 73.13 per cent, although the ore was very coarse, owing to the crusher head having worn. The ore was stoped and sent direct to the crusher, no drying being necessary.

Analysis of the Crushed Ore.—Samples from eight charges before and after cyaniding were separated into different sizes by sieving, and the resulting quantities dried, weighed and assayed, giving the following results:

Remaining on	¼-inch mesh	19.7 %; extraction	56.6 %
Remaining on	⅜-inch mesh	17 37 %; extraction	65.17 %
Remaining on	½-inch mesh	19 80 %; extraction	66 00 %
Passing	½-inch mesh	23.70 %; extraction	77.60 %
Passing	1-16-inch mesh	19.00 %; extraction	81.00 %

Some of the larger pieces would be 1½ inches in length. It is clear that if the ore had been crushed to ½ inch, which would not have been a very difficult or costly proceeding, a theoretical extraction of 79 per cent, or say 76 per cent actual, would have been obtained in one operation. The experience gained in the first 500 tons gave an increased extraction of 6.7 per cent in the second lot, so it is reasonable to assume that a second 900 tons would have given, if crushed to ½ inch, 82 per cent extraction at less expenditure of cyanide without amalgamation or slimes treatment. It is probable that more cyanide was used than was absolutely necessary, as in an experiment it is better to have too much than too little. Can the advocates of wet milling show a better result with the same expenditure in plant, work, and power? A sample of the same class of ore, but of better quality, so as to give more possibility for the presence of coarse gold if it existed, was crushed to pass a 400-mesh sieve, and submitted to Mr. A. F. Crosse to be tested. His report was to the effect that the ore assayed 14 dwts. 10 grs. fine gold per ton, the residues after five days' treatment 22 grs. per ton—equal to an extraction of 13 dwts. 12 grs., or 95.1 per cent. When calculated by the gold obtained from the cyanide solution, the extraction equalled 94.8 per cent. The free (undissolved) gold remaining was found to be 3 grs. per ton; therefore, no fear need be entertained that the coarseness of the gold would be detrimental to successful work. The decomposition of cyanide was equal to 11.2 ozs. per ton of ore treated.

Our president remarked during the discussion on treatment of battery slimes that in his works there was a difference between the theoretical and actual extraction, that the gold went in many different places, mostly lost around the works. No doubt there is loss in all methods requiring handling and mechanical treatment, but I think that the chief cause of discrepancy is want of precision in the weights taken; after that, errors in assaying. If once the gold reaches the vats, what is dissolved should be collected by the precipitation process or remain in the solutions, unless there is leakage, or loss in cleaning the slimes. Either of these cases represents an actual loss, the gold is neither in the residues nor in the bar. If our president is correct in stating that the notable difference between actual and theoretical extraction is due to loss, then the gold in the bar or slags plus the gold in the residues does not represent the whole of the gold originally in the tailings as received from the slimes separator, and Mr. Williams' contention that if you lose 100 ozs. fine gold in the residues, and have actually recovered 900 ozs. of fine gold in the works, it is fair to say that you have an actual extraction of 90 per cent, cannot be accurate. It is an extraction of 90 per cent of only part of the gold that was in the ore at the commencement of the operation. I am sorry not to be able to give to Mr. Williams a definite answer as to the cost per ton of the test crushing (dry) made at the Village Main Reef. The cost of such crushing, made with makeshift machinery, would be no guide to what could be done with a large and well-designed plant. The first 600 tons crushed was also experimental work, different meshes from 200 to 700 were used, and different strengths of solution and duration of treatment. Nevertheless, Mr. Feldtman's assays, carefully made, gave a theoretical extraction of 80.2 per cent, of which 64.4 per cent was accounted for, and I believe that had it not been for a leak in one of our ancient pumps that our actual extraction would have been fully 77 per cent. The remaining 400 tons, crushed to 500 mesh, which we found to be most suitable, was cyanided after I left the Village Main Reef, so I do not know what results were obtained; but charge No. 18, the first of the second series, gave a theoretical extraction of 89.25 per cent, the ore assaying 31 dwts. 20 grs. before, and 3 dwts. 10 grs. after cyaniding. In any case I do not consider that what we were able to do in any way exhausted the possibilities of the process we were testing for the first time on a reasonable scale. The perfection to which cyanide treatment has been brought here (members of this society have done a great deal towards this); the removal of financial obstacles, and the large quantities of ore of a remarkably even character with which we have to deal, are new elements which have to be taken into account in our endeavors to perfect a process for extracting the gold from the ore. We have to consider not only which may be the cheapest mechanical means of reducing this ore to a powder, but also and chiefly which is the method of crushing which will give us a product best suited to the subsequent processes of getting out the gold which are at our disposal at the present day.

Mr. Crosse, while thanking Mr. White for his paper, asked him if he would kindly put a postscript saying that the ore from the Village Main Reef is pyritic. He was sure the paper would be read with great interest all over the world, and he did not think he mentioned the fact that the ore was pyritic.

Mr. White: The ore was pyritic, and taken from a depth of 700 feet. The reason we took pyritic ore was, although there is a large amount of oxidized free-milling ore on the Rand, it is nothing compared with the amount of pyritic ore which will have to be treated in the future, so we preferred to make a test with pyritic ore, which some authorities considered untreatable by crushing and cyanide.

The Chairman: I am sure you will all agree with me that the paper is an interesting and most important one. In the first place, I think it is the first instance in which figures regarding dry crushing have been laid before us, and the thanks of this Society are due to Mr. White. I know that opinions regarding the dry crushing process are divided. Some are against it, while others claim that the process is going to have considerable success on the Rand; therefore I believe that the paper read by Mr. White will give rise to a good deal of discussion.

*Chemical and Metallurgical Society of South Africa,

Liquid Products of Wood.

Over 60 per cent of wood may be converted into liquid. The strongest hydraulic pressure would not squeeze one-half of one per cent of moisture from dry wood; but by putting the same material into an iron retort and converting it into charcoal by means of heat, the gases and smoke, to the extent of fully 65 per cent of the weight of the wood, may be condensed into pyroligneous acid, from which are obtained wood alcohol, acetate of lime and wood tars. A cord of wood weighing 4000 pounds produces about 2650 pounds of pyroligneous acid and 700 pounds of charcoal. The pyroligneous acid from one cord of wood produces nine gallons of 82 per cent crude wood alcohol, 200 pounds of acetate of lime and about 25 gallons of tar, besides 35 bushels of charcoal.

After the pyroligneous acid is neutralized with lime the wood alcohol is distilled off, the lime holding the acetic acid in solution. After the separation of the wood spirit, the remaining liquid is boiled down in pans to a sugar, which is dried, and becomes the acetate of lime in commerce. Acetate of lime is used for making acetic acid. Fully three-fifths of all the wood alcohol and acetate of lime produced in the world are made in the United States. A considerable quantity is also produced in Sweden, and at the exhibition now being held in Stockholm specimens may be seen. Over 15,000 acres of forest per year are cleared in the United States. Wood alcohol affords a perfect substitute for grain alcohol for manufacturing and mechanical purposes, and at less than one-third the cost. It is used principally as a solvent in the making of shellac varnish and in making celluloid and photographic paper. It makes beautiful dye tints, is antiseptic, and is used for liniments and for skin rubbing in bath-houses.

A NEW METHOD of smelting galena has been suggested. This consists of first treating the ore in an open-hearth blast furnace, and collecting the lead fumes, containing a large percentage of lead sulphide, driven off therefrom, treating the metal-bearing slag of the open-hearth furnace and the fume in a stack furnace, in which the temperature at the top is maintained at so low a point as to prevent the oxidation of the lead-sulphide fume generated in the furnace, and subsequently collecting the fume, containing a large percentage of lead sulphide, drawn off from the stack furnace, and smelting it in the same furnace, together with the slag from the open-hearth furnace. The results obtained from this process are said to have been satisfactory.

THIS gate requires only one pound of wire nails, 30 feet of lumber, and no tools except a square, handsaw and hammer. It is light, neat and strong, and does not require a carpenter to build it. To make a gate 5 feet high and 10 feet wide, take ten strips ⅞x3 inches and 10 feet long, saw two of them in the middle, lay two of these down, nail the long pieces to them, and clinch the nails; turn the gate over, nail the other 5-foot pieces on the other side and clinch nails. In the same way nail a piece on each way bias, for a brace, and a gate is made without any mortises to hold water. It can be made in an hour, out of dressed lumber, for 75 cents.

Mining Summary.

CALIFORNIA.

Amador.

The Argonaut mill was started on its initial run last week.

The *Record* says that W. Denis has sold the American mine to San Francisco parties for $30,000.

Butte.

At Forbestown the completion of the upraise from the big tunnel at the Gold Bank mine, believed there to be the longest upraise of record in the mining world, was celebrated by a public jollification. The raise is 1100 feet and the crosscut 1300 feet. Work on this tunnel began in August, 1894, and has been prosecuted almost continuously ever since. A prominent feature of the celebration was the presentation of a silver service to H. P. Stow, the mine superintendent.

In August, 1894, work was commenced on the tunnel, its mouth a mile and a half from the site of the Gold Bank mine. Work has progressed steadily ever since, night and day, and a tunnel 1900 feet in length has been driven through solid quartz. The object of the tunnel was to tap the main ledge of the mine at a lower level than that already reached. Thirteen hundred feet in from the main tunnel an upraise was commenced which was to connect with the main shaft. At its completion it measured 1050 feet.

Calaveras.

(Special Correspondence.)—At Murphys F. McNear has bonded the Heinsdorf Ranch and is sinking. On the Buckhorn he has let a contract to drive 300 feet on the vein. If the ore is satisfactory he will sink a shaft. Williams and Lane have stopped work on the Mexican. The tunnel on the Lady Washington, on Indian creek, has cut the vein. The old Wild Goose, Texas lead in the gravel channel at Douglass has just been reopened, and report has it is found as rich as formerly.

F. McNear of Oakland, operating the Buckhorn, is said to be getting high-grade quartz from the tunnel workings. He is also operating the Heinshoff mines on the townsite lines.

Cttizen: The Menareka mine near Camp Flores is being opened up by a Nevada company, J. Alcraz superintendent.

The Paragon has the mill nearly completed.

A strike of specimen rock has been made at the Greek mine, Eldorado district.

Prospect: At the Buckhorn, Supt. McNear, some quartz has been taken out of the tunnel workings. Mr. McNear is also operating on the Heinsdorff mines.

The Central Hill Gravel Compeny are waiting for water.

El Dorado.

There are 613 stamps; 304 at work.

D. H. Jackson has secured the Barbara quartz mine, in Gold Hill district, half by purchase and half by bond, from M. Varozza of Placerville.

At the Griffith Con., Diamond Springs, the ore in both shoots assays $16 per ton.

Democrat: W. R. Pearson recently examined the old Mt. Hope mine at Grizzly Flat; it has been decided to begin operations. A tunnel to tap the ledge much lower than the old one is already under way.

Gazette: Supt. Gayley is pushing work on the Bright Hope and adjoining claims. A 4-stamp double battery is expected to be in operation soon.

Nugget: At the Griffith Consolidated near Diamond Springs the ore in both shoots is reported assaying $16 per ton.

Humboldt.

The Standard Beach M. Co., at Eureka, has leased 125 acres of land for black sand mining, and purchased machinery. The results thus far are encouraging.

Inyo.

Register: The Molus is being worked. The main incline is down 180 feet, with drifts 30 feet westerly and 60 feet easterly. The ore showing is good.

Cowser, Fish and De Witt made a bullion shipment Tuesday, the result of a 20-ton run of ore from the Piute.

The Sagehen shows 6 to 8 inches of pay ore at its present depth of 50 feet.

Assessment work has begun this week on the Pine Mountain group. The Baltic mine gives average assays of 87 ounces of silver, 68 per cent lead, $9 in gold.

Kern.

The Kramer and Randsburg railroad camp is near Johannesburg.

In the Radamacher district a strike is reported in the Radamacher mine.

Miner: The Pinmore is taking out twenty-five tons of ore per day and milling it at Garlock. The first milling ran something over $8 per ton, and the second over $15.

A strike is reported in the Warrington mine, Havilab, a 9-foot ledge being developed on the 560-foot level. The Los Angeles G. M. Co. recently bonded the mine and has been developing it for the past month.

The new railway from Kramer, on the Atlantic & Pacific Railway, to Johannesburg will be opened for traffic December 5th.

Mariposa.

Gazette: The Merced Company have struck a rich chamber in the Mary Harrison mine.

G. L. Brown, for the Lafayette G. M. Co., has bonded the Gentry mine and has a crew mining the upper tunnel to tap the vein.

At Quartz Mountain F. Egenhoff, A. H. Ward and M. Wolfe have struck good quartz.

Napa.

The Vallejo Quicksilver Mining Company has levied an assessment 2 cents per share, delinquent December 18th.

Nevada.

(Special Correspondence).—Work in reopening the old Texas mine, a few miles from town, is progressing favorably. The property is owned by a San Francisco company. The two-compartment shaft has reached 120 feet. Hoisting works, office, the placing of machinery, shaft work, drain tunnel have been completed in a remarkably short time. The company has 120 acres and four parallel ledges within a radius of 500 feet. D. J. McFaull is the superintendent.

Nevada City, Nov. 29th, '97.

(Special Correspondence). — An enterprise of some importance, negotiations for which were closed here last Saturday, will add somewhat to the mining industry of California.

The St. Gothard M. Co., composed of S. F. people, most of whom are interested in the Champion mine near this city, in addition to the three claims on the old St. Gothard on which work was abandoned four years ago, have purchased the Delhi quartz mine (comprising three claims) which has likewise been abandoned for a number of years. The company acquires, in addition, a water right of 200 inches and 320 acres of timber. Work is already in progress reopening the tunnels of the Delhi, through which both this and the St. Gothard will be operated. The company contemplates erecting a mill of twenty-five to forty stamps at a point where they will have 1300 feet pressure. F. Zeitler is president, Gus. Katschoke vice-president and A. H. Bigelow superintendent.

Nevada City, Nov. 30th, '97.

Transcript: The Benton and the Murchie drift mining companies are engaged in running a tunnel between Big and Little Deer creeks. They expect to strike the channel at 1400 feet, and that from six to eight months will be consumed running it. The headquarters are in San Francisco, the president being G. T. Emery. Each company has a capital stock of $300,000.

Transcript: The La Belle, Willow Valley, is being developed by J. L. Postlethwaite. The tunnel is in 400 feet; from it are four upraises. The tunnel gives 700 feet of backs at the highest point, enabling work to be carried on without machinery and at moderate cost. The ledge averages about 18 inches in thickness and the crushings now being taken out will mill $25 a ton.

The new hoisting and pumping rig at the Texas mine in Willow Valley has started. The three-compartment shaft will be continued down and drifts run.

At the Maryland the developments on the 1600 level during the past week have been such as to warrant putting in place again the machinery that was taken out awhile ago. The present indications are very favorable for this mine.

It is stated on good authority that the last monthly clean-up at the Massachusetts Hill mine amounted to over $100,000.

Placer.

L. Waugh and F. B. Norton, who bonded the Hope, located between Auburn and Ophir, have struck some fine rock. The ledge is about 12 inches.

F. Chappellet of the Eureka estimates the distance of the main tunnel to be driven before making the upraise to tap the channel to be 600 feet.

Colfax *Sentinel*: An English syndicate, with E. W. Chapman manager, has acquired several miles of tailings between Colfax and Dutch Flat, which cover the river bed from 18 to 24 feet in depth.

The gravel in Bear river came from the rich hydraulic mines of You Bet, Little York, Lowell Hill, Gold Run and Dutch Flat. Much of the gravel in those large mines was cemented.

A flume taking water from South Yuba canal has been built 4680 feet. The water is then conveyed 3620 feet in a pipe line to the hydraulic elevator, giving a pressure of 450 feet. H. Quine is superintendent.

A French company has begun development of the Maus quartz mine, east of Forest Hill. They will sink a two-compartment shaft 200 feet, from which they will crosscut the ledge. F. Roumage is superintendent.

Plumas.

G. A. Hall discovered a small rich vein from which he extracted thirty-one tons of ore and realized $1125.

Independent: At the West Elizabeth mine between Popular and Nelson creeks, upon which thirty thousand dollars has been spent in prospecting by tunnels and otherwise, gravel prospecting well has recently been struck in the workings. The property is under lease to R. A. Gumbert, Pittsburg, Pa.

The Plumas Eureka Company have suspended mining operations for the winter, and leased the mine to their former employes.

The West Elizabeth mine, upon which $30,000 has been spent in prospecting, has been leased to R. A. Gumbert of Pittsburg, Pa.

San Bernardino.

Nearly 300 mining locations were filed from Jan. 1st to Nov. 1st. There are 220 stamps, of which 145 are dropping.

San Diego.

Receiver C. W. Pauly, in charge of the Free Gold Mining Company's mines and mill at Hedges, says that 200 men keep 100 stamps busy, crushing 400 tons of rock per day. The Cross, Crown and Queen mines furnish the ore. The stamps weigh 1000 pounds each, and the power is furnished by a double compound condensing engine of 300 H. P. There is a dynamo, and the mill is lighted by electricity. The deepest shaft in the camp is 600 feet. The ledges run from 8 to 40 feet in width, the rock entirely free milling quartz of low grade. The gold is very fine—so fine that much of it is lost in milling. It is estimated that there are $600,000 or $700,000 in the tailings. They are to be cyanided. A pumping plant, which cost $75,000, is at the Colorado river, twelve miles from the camp. October's clean-up netted $46,000.

Shasta.

(Special Correspondence).—In and about Redding within a space of fifteen miles there is considerable activity in mining circles, despite the lateness of the season. The historic little town of old Shasta, six miles from here, is demonstrating that it is strictly in a paying quartz region. The several roads leading to the smelter at Keswick are a continued scene of wagons laden with ore. The ready sale of ore for fluxing purposes has brought about the development of properties that were never supposed to be of a mineral character. The supposition that has erroneously gone abroad that Shasta is not a good county for successful mining is being rapidly disproven by actual ore productions in fair-sized ledges and of good value. It is true the ore is not all or everywhere of a free milling nature, but even as a smelting proposition ores that run from $20 to $300 per ton are certainly remunerative, and Shasta has an abundance of them.

Redding, Nov. 29th, '97.

About 3,000,000 pounds copper ore were fired at Keswick last week, piled up along the line of the Iron Mountain Railroad, the largest pile of ore ever fired at one time by the Mountain Copper Company. The fire will burn from sixty to ninety days, when the ore will be conveyed to the smelter. The sulphur smoke has killed vegetation for miles around Keswick; forest trees and orchards for three or four miles are dead. The smoke is evidence of the great industry that has made Keswick the liveliest mining camp in the northern half of the State. A payroll of $30,000 a month is the apology for the sulphur smoke.

Santa Barbara.

The Alcatraz Asphalt Company at its new asphalt works at Sisquoc has a tramway to the top of the mountain deposit of asphaltum. Boilers and tanks are on the premises, also hoisting apparatus and other machinery.

Sierra.

At the Primrose, from which $400,000 has been extracted, the Victoria Mining Company of Oakland proposes to resume work.

Siskiyou.

Journal: The Minetta B mine is in operation.

Several of the placer claims on the Klamath river have started up, the late rains having furnished them with a supply of water. The larger claims, however, cannot start up until the supply of water is sufficient to run their giants.

In the Oro Fino district, as soon as there is sufficient water, the Eastlick Bros., S. Gardner and Wright and Fletcher mines will all be in operation.

J. W. Wheeler has bonded the Bonnie and the Olga to W. E. Morris of Portland, Oregon; machinery is being placed on the ground. J. O. Rusby will have charge.

John Costello made a rich strike in quartz on Indian creek, uncovering a ledge 18 inches in width, which he estimates will go at least $50 per ton.

Trinity.

J. Travers, on the Advance mine, is driving a tunnel to cut the ledge. The tunnel is 160 feet.

Tuolumne.

(Special Correspondence).—"Surely there is a vein for the silver, and a place for gold where they fine it."

Ten years ago Tuolumne was called a pocket county and the capitalists would have none of her mines. To-day these same capitalists are offering for single properties what then would have secured all of the mines in the county, and are surprised to find their offers "declined with thanks" by the same owners. If Job were alive to-day he would correct his oft misquoted saying and change it to "the gold is where you find it, and that is in old Tuolumne." From timber line to the plains, from the Mariposa to the Calaveras side, the mines are all booming; everywhere the same satisfactory results are being obtained. The Sugar Pine district sends down news of old mines reopened and found richer than ever. The granite belt proves richer with depth, and the ore bodies not only live but widen out as the shafts go down on them. Along the mother lode there is an almost unbroken string of mines that vie with each other in the size and value of their ore bodies. Steam is wafting from every hilltop, while the roar of the stamps makes music for the fortunate Tuolumne miner. The county, as a whole, feels the impulse given to every branch of industry and the towns grow apace, while the railroad finds it policy to extend its lines to Tuolumne's mines, that it may, while adding to the general prosperity, secure its share of the general wealth. Tuolumne has awakened from her long sleep, and surprises, not only the visitor, but herself as well, with the wealth she is to-day unfolding to the fortunate owner of her golden lands.

Columbia.—Several companies have recently taken hold of the old gravel mines of this section—one of them from Circle City, Alaska—showing that Tuolumne can offer superior attractions to that frozen zone. To the east, the old Riverside is again running, with Dr. Plank in charge. Mr. Barnard has the Keltz in full swing. The Star is receiving new machinery and promises to reward the Willman brothers with ore as rich as that of the past. The Old Tuolumne, with R. G. Davis superintendent, is driving a tunnel to tap the ore bodies 1000 feet deep. At Summersville (now called Carters) the Dead Horse has awakened after a sleep extending from the 900 to the 1000-foot level, and is to-day in better ore at the 1450-foot level than at any time in the past history of the mine. It is the intention of Supt. C. H. Thomas to now put the shaft down to the 2000-foot level. At the present time the ore bodies are 8 feet wide on one wall and 6 feet on the other, with casing between. Between the 700 and 900-foot levels large ore reserves are still standing, that have been left to work out from below, and use the waste for filling the lower levels. The 20-stamp mill is running steadily.

Cherokee.—This section is coming to the front on account of the recent strikes in some of the old mines that have lain idle for many years. The officers of the famous Dutch mine have secured the old Easton or Yellow Jacket mine, together with the Ophir and Good Luck mines adjoining. The mines have been renamed the Dreisam by their fortunate owners. That "a good name is more to be desired than great riches" in mining, as well as in other pursuits, was shown in the Dutch stockholders subscribing for all of the stock of the company within twenty-four hours after the first call. In the past the mine when worked by Easton gave the owner $90 a ton in free gold, the sulphurets not being saved. In sinking the Cutter vein was encountered, which cut the vein off, and it was dropped. Recently a party of Italians reopened the mine and found that the Cutter vein had simply caused a throw or fault of the vein, and at 40 feet from its former position the vein was again found in place, the ore extracted by the Italians giving them $800 from six tons of ore. The present owners have sampled the vein thoroughly and find that it carries an average of 4 per cent of sulphurets of a value of from $200 to $700 a ton, while the ore samples $212 at the point now open. The vein at the present depth averages 26 inches. The vein is in granite, which accounts for the high values. The property is in charge of C. P. Grimwood of the Dutch mine, who has contracted for a hoist and is rushing work on the mine, to be in shape before the winter storms.

The Carlotta and Pennsylvania mines, D. Nagle, superintendent: These old mines laid idle since their old owner (Symonds) was killed in the mines. The new owners put the Pennsylvania shaft down 20 feet deeper and opened up an ore body that shows ore of a value of $700 a ton. On the Carlotta vein a few feet of sinking changed the character of the ore until it is now a good second to the Pennsylvania. Mr. Nagle very modestly says: "Call it a $40 proposition on the Pennsylvania and $20 on the Carlotta at this time," while admitting that the selected shipping ore goes $600 to $700 a ton and that 25% of the ore is shipping ore. The vein is in granite. The shaft on the Pennsylvania is now down 110 feet; that on the Carlotta 190 feet. The Carlotta vein at this time is 14 inches wide; the Pennsylvania 18 inches. The mine is said to be owned by some of the officers of the S. P. R. R. The Porto Fino is being developed under bond by J. Richards & Co. The ore in the Porto Fino is of the same character as that of the Carlotta, and is in granite.

Soulsbyville.—The Soulsby, W. Sharwood, superintendent: This mine is equipped with hoist to go 2000 feet, rigged for steam or water, and has a 15-stamp mill. All of the work on this mine is of the most substantial character. In the thirty years that Mr. Sharwood has been operating in the mines of Tuolumne it has never been necessary to take down or rebuild any plant that he has erected. The worst that his critics can say of him is that "he has the English habit of building for all eternity," which is the best recommendation any mining superintendent can have. In the past the Grizzly and Soulsby were the two first mines of importance in the county. The properties were owned by Soulsby and Donald Davidson, who vied with each other in the size of their bullion output; but the Soulsby with its $10,000 a week kept steadily in the lead of the Grizzly, as it followed after with its $7000 a week. The Soulsby has produced about $3,000,000, worked to a depth of 800 feet on a vein that averages 18 inches, with an ore value of $35 a ton. The present company has reopened the old Pennsylvania shaft, about 1200 feet south of the Soulsby shaft, and put it down 225 feet, the ore extracted milling from $35 to $75 a ton. The present company's property covers 6200 feet on the vein. At present the mine is closed down during a misunderstanding among the stockholders.

The Grizzly, W. Sharwood, superintendent, is being reopened. The new shaft is now down 220 feet and will be put down to 400 feet before drifting. The Grizzly is 3000 feet south of the Dead Horse, on the east bank of the North Fork of the Tuolumne river. The vein in the old works was all the way from 2 to 16 feet in width. The hoist is run by water power from a turbine with 24-foot head. The power is conveyed 300 feet by wire cable, which Mr. Sharwood states is very satisfactory when properly installed. Mr. Sharwood is placing piers in the river preparatory to erecting a bridge over the river. South of the Soulsby is the Junction, W. Storms, superintendent. Mr. Storms is here developing the Black Oak vein and is down 104 feet. The vein is showing up finely. In fact, the Junction is admitted to be richer at this depth than the Black Oak was.

The Black Oak, W. P. Scott, superintendent: The company's mines include the Black Oak, Live Oak, White Oak and Carrie. The shaft is now down 730 feet on the vein. At present the work is all on the north shoot, which shows a length of 500 feet on a vein 10 to 30 feet wide of ore that the owners ship 20 per cent of to Selby and realize an average of $90 a ton, while the remaining ore averages $21 a ton. The mill is of twenty stamps. The ore is heavily sulphureted, the average value being $200 a ton. The sulphurets are shipped to Selby's. The tailings from the mill are treated by the cyanide process and 75 per cent of the $4 value recovered. The mine has a new Rix air compressor, direct driven, of 100 H. P., and at this time the Angels Iron Works are putting in place a Cornish pump similar to that on the Rawhide, with 12-inch pipe and calculated to go 2000 feet. A Gates canvas plant is also being built. As will be seen, the Black Oak has the largest body of high-grade ore of any mine in the county, if not in the State. The vein is in granite.

The Gold Bug, Mr. Woodrow, formerly of the Santa Ana of Angels, in charge: The shaft is now down 80 feet on a vein 18 to 20 inches in width. Ore is said to be very rich. Vein in granite.

Draper, W. B. Moore, superintendent: The shaft is now down 350 feet and sinking. Vein 18 inches to 6 feet in width, with an average of 2 to 4 feet. The ore of the Draper goes

from $40 to $250 a ton; the sulphurets $500 a ton. Mr. Moore intends to sink to 400 feet and drive out levels both ways. As every mine that Mr. Moore has taken hold of in Tuolumne has proven a good one, and some of them the largest and best mines in the county, his friends predict that the Draper will follow suit. The Draper is in granite.

Over to the north of Soulsbyville is the Hazel Dell, owned by W. Sharwood. The shaft is down 80 feet on a vein 1 to 3 feet in width, with a value of $14 a ton. The ore carries a large per cent of $50 sulphurets. The mine is bonded at this time to a Mr. Easterbrook.

Sonora.—South of Sonora, J. L. Josephs has the shaft on the Gerrymander down 230 feet and drifting on a vein 9 feet wide and another of 10 to 14 inches. Ore from the small vein gives returns of $370 a ton. The company has just erected a 5-stamp mill. Mr. Josephs is also developing the Marble Point mine, eight miles above Summersville. The mine is opened by a tunnel 90 feet long on an 8 foot vein.

The Golden Gate mine, F. Littlefield, superintendent: Mr. Littlefield has been on the mine but three months, yet during that time he has remodeled the plant from one end of the mine to the other. The gallows-frame that is just completed is of timbers 18 inches square. The arrangement of the ore bins in the frame is such that all the space is utilized in bins for waste and ore, while the plan of the rock breaker is such that it feeds itself and can readily be got at on all sides. In the mine the work is now all confined to the upper levels, more being in sight there than can be worked out in many years to come. The vein averages 8 feet of $16 ore. The ore carries its values almost in sulphurets, which are chlorinated in the company's own plant.

The Mother Lode.—Jumper, M. D. Kelly, superintendent: The shaft is going from the 500 to 600 level. To the north the company is sinking an air shaft. At present they are working the center vein. The mine's mill is of twenty stamps. Other mines hint at their values, but on the Jumper they can always take those interested into their treasure room and show box after box of ore in which the gold is seen in solid streaks a quarter of an inch in width. The Jumper now embraces the Jumper and the New Era.

Golden Rule, O. N. Parvin, superintendent: The shaft is now down 500 feet, between the west and middle vein, with crosscut going to the west vein. The veins have been cut east, 9 to 21 feet in width. The mill is of ten stamps. This mine, like the Jumper, can show exceedingly rich ore in large quantity.

Santa Ysabel, E. A. Hardy, superintendent: The mine is opened by four shafts, No. 1 or south shaft is down 200 feet, No. 2, 300 feet, No. 3, 700 feet, No. 4, down 80 feet and will be continued to 1000, when it will cut the vein. The property consists of the Miller & Holmes, Knox & Boyle, Grey Eagle and Nyman No. 1 and 2. The company use electric power from their own plant and find it very satisfactory. The mill is of twenty stamps.

The App, W. Morehead, superintendent: The shaft is now down 1000 feet and a crosscut is being driven to the old Heslep vein which was worked by Bowman to a depth of 800 feet and showed a width of 125 feet. In the App the two veins have been developed. At present the mill is running on the west vein which is 35 feet wide of very good ore. The pitch of the veins is such that at 1200 or 1400 Mr. Morehead thinks the App and Heslep veins will join and make one immense ore body. The property embraces the App and Heslep.

The Dutch, A. Trittenbach, superintendent: The shaft is now down 500 feet and will be sent down to 1000 feet and crosscuts driven to the vein east. At present a crosscut is in at the 500 level 75 feet and no wall reached. In the Dutch all the veins of the mother lode are in it, within a width of 300 feet. In consequence the company can expect in depth to have a vein of at least 300 feet in width. The mill on the mine is of twenty stamps. The power is steam which will be materially cheap now that the railroad has made it possible to buy and use coal at low rates. The superintendent's residence on the Dutch is the finest on the lode, while all the appointments of the mine are up to it. The Dutch is without doubt one of the best mines on the mother lode.

The Sweany is idle.

The old Whisky Hill is now the property of the Santa Ysabel Co. and has been robbed of her old name and dubbed the Trio, with J. P. Munger superintendent. The shaft is now down 250 feet and sinking to 1000 feet. As is well known to all old-timers the Whisky Hill has been "gophered" for a width of over 600 feet. The surface indications were so good that the present owners paid $100,000 spot cash for the property to Hayward and Preston and will no doubt find a good property in the old "Whisky Hill."

Harris' old mine, the Gem, is idle, as is the Crystalline to the north. On the Alabama Supt. W. E. Nevills is sinking in the mine's old open cut and has the shaft down 320 feet. A crosscut will soon be driven on the vein.

The Rawhide, W. A. Nevills, superintendent: The mine is the property of Messrs. Nevills, Ballard and Martin. The shaft is now down 1200 feet. The reputation of the mine is that of a large ore body of average ore with frequent bonanzas that bring the mine's output well up. The mine has a 40-stamp mill and chlorination plant of ten tons capacity a day. The company has built a ditch, put up its poles, wired them, and expects to soon have its own electric power plant of 1000 H. P. from their electric plant on the North Fork of the Tuolumne. The power will be carried 12½ miles.

Rappahannock, W. Chute, superintendent: Mr. Chute has the shaft now down to 650 feet and is putting in place a hoist to go 2000 feet. As soon as it is complete the shaft will be continued to 1000 feet.

Alameda, B. McConnell, superintendent: The shaft is now down 500 feet on the foot wall vein, with a crosscut of 35 feet to the vein, and a crosscut of 135 feet in the vein, and no walls reached. The company intend to erect a mill next spring.

The Tarantula, G. H. Redding, superintendent: The shaft is now down 200 feet on the 23-foot vein, all milling ore, while the vein matter is over 150 feet wide. The vein on the surface was but 1 inch in width where it cropped. The ore values are high, and were so from the grass roots.

Tuttletown has leaped to the front as a mining center. The Golden Star, Thomas M. Park, superintendent: This mine is southeast of the Arbona. The property is developed by a crosscut tunnel from Mormon creek, which is now in 395 feet, and the vein is looked for with every shot. The tunnel will cut the vein 250 feet deep. The vein crops 30 to 40 feet wide on the surface. Should the crosscut show ore of good value, a shaft will then be put down.

Equitable, formerly Arbona, J. R. Sears, superintendent: The shaft is now down 180 feet on the vein, which has widened from 8 inches to 5 feet. Mill is of ten stamps.

The Gangnere, W. G. Long, superintendent: The company is operating the Gangre and Maryatt mines and the Patterson. The shaft on the Maryatt is now down 365 feet on a vein 5 to 11 feet in width. In the Patterson a crosscut shows the vein matter to be 100 to 200 feet in width. It is Mr. Long's intention to operate this mine by open cuts, quarrying the ore. On the Maryatt a 40-stamp mill is in course of erection by Mr. R. L. Chase, the millwright of Sutter Creek. The frame is very heavy and the work throughout first-class.

The Bell, George Blake, superintendent: The shaft is now down 300 feet and sinking. The walls are here 100 feet apart and the vein matter in Amador slate walls. Like the mines of Amador, the ore here is above the average of the lode.

Norwegian, Frank Enzensperger, superintendent: The mine was formerly best known as the Lawson mine. The ore showing in this mine was so very rich in heavy visible gold that the mine went begging for a customer for a long time, simply because the experts condemned it as a pocket mine. The shaft is now down 275 feet on the Norwegian vein, which is 12 to 18 inches wide. A crosscut is now being driven east 40 feet to cut vein No. 1, which is 16 inches wide, and will then be continued to No. 2, 62 feet east, which crops 5 feet wide. The ore of this mine is unlike that of any other mine on the lode in Tuolumne, being largely sulphurets, with galena and tellurium showing freely, and a sprinkling of free gold. The mill is of two stamps, triple discharge, and is intended to prospect the mine and work the ores taken out in the course of development. A 20-stamp mill will be erected in the spring. The ore carries an average of 7 per cent of $230 sulphurets, while the average value of the ore in the vein opened is $30 a ton. At the time of my visit an additional vein was just coming in in the face and showing the same rich character of ore.

In Tuolumne mines have advanced very rapidly in values. There are still a number of promising locations for sale in the county, but the operator must now expect to pay for his delay in not getting in when Tuolumne's mines were all called "pocket mines."

E. H. SCHAEFFLE.

Murphys, Cal., Nov. 25th, '97.

The thirty mills have 427 stamps, of which 140 are idle.

At the North Star and Black Warrior Consolidated mines, near Sonora, a 35-foot ledge is reported uncovered, showing abundant free gold.

Democrat: The Santa Ysabel has opened a good ore body on the 300. Drifting on the Knox & Boyle vein in No. 5 level of No. 3 shaft is opening good ore also. An electric pump is being placed in No. 1 shaft to sink 200 feet deeper. Ten stamps have been dropping whenever water for the batteries could be obtained.

Bottini Bros., who own the property two miles east of Sonora called the Potato Ranch, have developed a ledge which the Sonora *Democrat* thinks will prove one of the biggest bullion producers in the county. A shaft has been driven 120 feet, the ledge in the bottom being 7 feet of well-defined quartz, spangled with gold. The vein shows ore that will mill up in the thousands.

Jamestown *Magnet:* The Sierra Railway Company has announced a special rate on ores, concentrates and sulphurets from Chinese and Jamestown to San Francisco or the Selby works, of $4.70 per ton of 2000 pounds in carload lots of 24,000 pounds, where the value is not over $100 per ton. For ores, concentrates and sulphurets valued at over $100, but not more than $300 per ton, the rate is $5.04 per ton between the points named.

Ventura.

T. J. Harris, on Frazier mountain, has a 2-stamp mill crushing. Twelve tons produced 16¾ ounces. Mr. Harris says he has in sight 100 tons.

Yuba.

There are six men said to be at work east of Timbuctoo, under direction of H. Vischer, of the U. S. Debris Commission, surveying and taking measurements near Dear Creek narrows of the Yuba river.

NEVADA.

J. R. Church, a mining engineer from New York, is at Kennedy inspecting mines.

OREGON.

Ashland *Record:* Parham & Van Nane shut down their mill at the Braden mine last week to clean up and put in a new pump.

Oliver Jillson is erecting a 5-stamp mill on his mine near Henley.

J. C. Petters, of San Francisco, is developing the Old Coil mine.

C. D. Crane shipped ten tons of rock from the Oro Fino mine in southern Oregon to the Ashland smelter, and received a gold brick worth $515.

WASHINGTON.

A Colville report states that the Wells Fargo Mining Company has sold 30,000 shares of the treasury stock to push the 150-foot tunnel. The mine is twelve miles west from Springdale.

The Comstock Coal Company incorporated last week: W. L. Ziegiviel, M. Abel, W. Dougless, H. M. Williams, M. F. Mendenhall; capital stock $600,000. The company has a coal claim of 600 acres on which a 6-foot vein of coal has been uncovered.

The Enterprise mine on Ten-Mile creek near New Denver resumed work after two months idleness. Supt. Neal, with twenty men, went down from New Denver on Thursday's boat and fifty others have followed since.

Tacoma reports that the sale of the Lambert-Post group of five claims on Bear mountain, Whatcom county, is closed, H. Stanislawsky, representing Portland men, paying $5000 cash and $95,000 in one year from date of sale, the purchasers to have the privilege of developing the property without limit. Stanislawsky will be in charge, with headquarters at Whatcom. A stamp mill is to be built.

BRITISH COLUMBIA.

(Special Correspondence).—*The Coast:* The bond on the Lynn creek properties, close to Vancouver, has been thrown up. The ore is found to contain too much zinc to be profitably worked. This is not the case, however, with copper-gold properties on Taxada island and Phillips Arm, situated several miles north of Vancouver. Mining companies operating in these sections have shipped thousands of tons of ore as far away as Swansea, and with fair results.

The contention is held by many mining men here that United States smelters, while handling silver-lead ore to advantage, do not make the most of copper-gold ore, and the result is that copper-gold companies are making special efforts to have a smelter established here under the management of the Vivians of Swansea. These big metal people have intimated that if encouraged they may build a smelter and refinery here, but they ask for important concessions in freights, etc., from the Canadian Pacific Railway, and certain privileges from the city.

Fire Mountain Camp, Westminster District: The weather is very bad here, the snow deep and soft, and the heavy rains somewhat destructive to construction work, but the enthusiasm of the mining companies is overcoming all obstacles. The Jubilee Syndicate are getting their twenty claims in shape for development. They have arranged to buy out the charter of another company who are retiring from business. Enough money has been secured by the sale of syndicate shares at $100 each to place the combination in a solid financial condition.

Fairview Camp, Okanogan District: The Winchester Mining Company are studying the plans of a bigger stamp mill than any yet erected in British Columbia, and to this end are placing the rest of their treasury stock—50,000—on the market at 5 cents advance—30 cents. Besides the Winchester group they have a very large free milling claim known as the Stemwinder. The mill is to be erected on the edge of a natural lake, and water power will be ample.

The Comstock-Mammoth Company are sinking on the vein in their Mammoth claims and have proved up a large body of free milling ore on their Comstock property. The Comstock-Mammoth Company and the Fairview Consolidated Company are to combine in the erection of a 60-stamp mill. The Consolidated Company are selling their treasury stock at $1 a share very readily, mostly in England, and the seventeen claims of the company are to be at once actively developed.

In ten more days, or in less than a week after this statement is in print, the Tin Horn mine will have had their thirty-day cleanup and the statement will have been given to the stockholders in the States and eastern Canada. For the first fifteen days poor ore was purposely run through the mill, but for the last fifteen days a better class of ore was handled. This stock had a career on the market, having advanced from 25 to 80 cents in sixty days.

The Fire Mountain Company are still very busy on their mill. They claim that they will be in full running order by the first of January. They have been delayed by the difficult task of getting machinery up to an altitude of 7000 feet above the sea and establishing the mill on the steep side of a mountain. The ore still looks well and assays high. The work on the vein to date has proved up enough ore to last for several years.

Cayoosh Creek Camp, Lillooet District: The Golden Cache mill will clean up on the 3rd of December after a thirty-days' run. This stock is held all over the American continent and in England. It went begging at one time for 16 cents, but through a peculiar combination of fortunate circumstances for the company a craze to possess Golden Cache stock took possession of the public, and the fact that fabulously rich specimens of huge size were placed on exhibition further stimulated the demand, and the stock rapidly rose to $2.10 before an ounce was crushed. The stock is still quoted at $1.60, but will be very seriously affected by the cleanup, which will have taken place about the time this is in print.

In a measure the fate of the Excelsior mine is wrapped up in the results obtained from the Golden Cache's run. The Excelsior Company's claim adjoins the Golden Cache. The formation, quality and extent of the mineral in place is strikingly the same, and the same enormously rich assays are being obtained, while the stock of the Excelsior jumped 20 cents the first fifteen days it was placed on the market.

A. E. GOODMAN.

Vancouver, B. C.

J. B. Hobson, manager Cariboo Hydraulic Mining Company, under date of the 11th ult., states that operations have been suspended for the season and the final cleanup made, which amounted to 330 ounces, of the estimated value of $5707. The gold brick was shipped from the mine on the 12th ult. to San Francisco. The total yield for the season just closed amounted to $139,000. It is proposed to construct a new ditch, of a length of 7¾ miles, in time for next season's operations, and then no difficulty regarding water will be experienced. The Horsefly Hydraulic Company's works were closed down for the season about six weeks ago.

The result of a smelter test of twenty tons of ore from the Dundee at Ymir shows a profit of $12 per ton.

J. A. Harrington of Rossland has purchased the R. J. C. and Novak claims on Kettle river for $25,000.

The smelter returns of the Le Roi show that the ore from that mine is averaging 1.54 ounces in gold, about four per cent copper and in the neighborhood of three ounces in silver, making a total value of about $40.

Nelson *Miner:* The R. J. C. and Novak claims on Kettle river have been purchased by J. A. Harrington for $25,000, 25 per cent cash and the balance in payments. A 5-stamp mill is to be erected and in operation by July 1, 1898. Assays of ore run from $40 to $540 in gold. Work on a 75-foot tunnel is to be started at once.

THE KLONDIKE.

Observations of temperature in the Klondike were made daily by L. N. McQuesten of the Alaska Commercial Company and cover the winter of 1880-81. He reports that the Yukon froze over during the night of Nov. 2 and the ice was not broken until the 14th of May following. On the 17th of May it commenced to run and on the 23d he was able to start for St. Michaels, sixty miles away. The usual date for the ice to begin to break varies between May 31th and July 1st; June 10th is about the average. Commencing with the long nights of October the temperature sunk rapidly, and on Dec. 20th the thermometer touched 67° below zero. This intense cold lasted until the 1st of March, when the effect of the returning sun became evident.

At Dawson City flour is selling at $100 per sack and is difficult to be obtained. Fort Yukon, 400 miles below, is an Indian village, a store and six log cabins. The nearest settlement is Circle City, eighty miles up the river. The country between the two places is such that experienced Indian guides are lost. The steamer Weare reached Circle City about the last of September with 210 tons of provisions. The miners "held up" the boat with rifles, and, after inspecting the cargo, took from her about thirty tons. When the boat reached Dawson she unloaded 180 tons of supplies and returned to St. Michaels with passengers to her utmost capacity. The Weare was expected to make one more trip this winter to Dawson from St. Michaels laden with provisions. When the steamer Bella reached Circle City a few days ago she was also "held up," the miners paying for what they carried from the boat.

Men live in cabins at Dawson without windows. Glass cannot be had. Candles sold as high as $70 per box, or $1 a piece. Among the many at Dawson there is a large number classified as "riffraff," and they add to the seriousness of the situation.

Scarcity of provisions impedes prospecting for the present, but confidence in the richness of the field is not lessened by residents.

In the latter part of September a rush took place to Deadwood creek, which empties into the Yukon three miles below Dawson. The men claim that the rush was justified, and none are anxious to sell their claims.

The storing of food supplies at Fort Yukon and Fort Hamlin brings miners back to Birch creek and other diggings above Circle City, which were considered rich before the Klondike discoveries, but were abandoned for the new localities.

A letter to the Alaska Commercial Co. from Asst. Supt. J. E. Hansen at Dawson, dated Oct. 18th, received last Wednesday, estimates supplies at Dawson sufficient to sustain 3500 persons until the opening of the season next year. He advised as many men to leave as could get away from Dawson; and, following his advice, about 500 departed, some going down the river to Fort Yukon and others going out by the way of the passes to Dyea. According to the figures given to the company by Mr. Hansen, there will still remain in Dawson 4500 persons, while the supplies are only sufficient to subsist 3500.

The fact that Mr. Hansen counseled everybody that could get away to leave Dawson City as speedily as possible shows that he regarded the situation as critical.

Hansen confirms the story that flour is selling at from $2 to $3 per pound. The selling is confined to individual swappings. The company has no provisions to sell. When Hansen wrote, everything had been sold.

Supt. Hansen spent twenty-one days poling up the river from Ft. Yukon to Dawson, 400 miles.

Writing from Dawson City, M. B. Thompson of Seattle says: "I believe this will be the last year the country will be any good. Next year there will be such an awful crowd here that a man without a claim will be worse off than in Seattle. There are not over 250 good claims in the district, so far as known. There are about 3000 men working here in the mines now. Unless there are more rich strikes found newcomers will simply be disappointed."

UTAH.

Manager Dern of the Mercur mine reports the third chute of ore recently encountered 39 feet of excellent leaching material, and the footwall has not been encountered. The showing is one of the most remarkable in the diggings. This is the bonanza for which a London syndicate offered $1,000,000 spot cash.

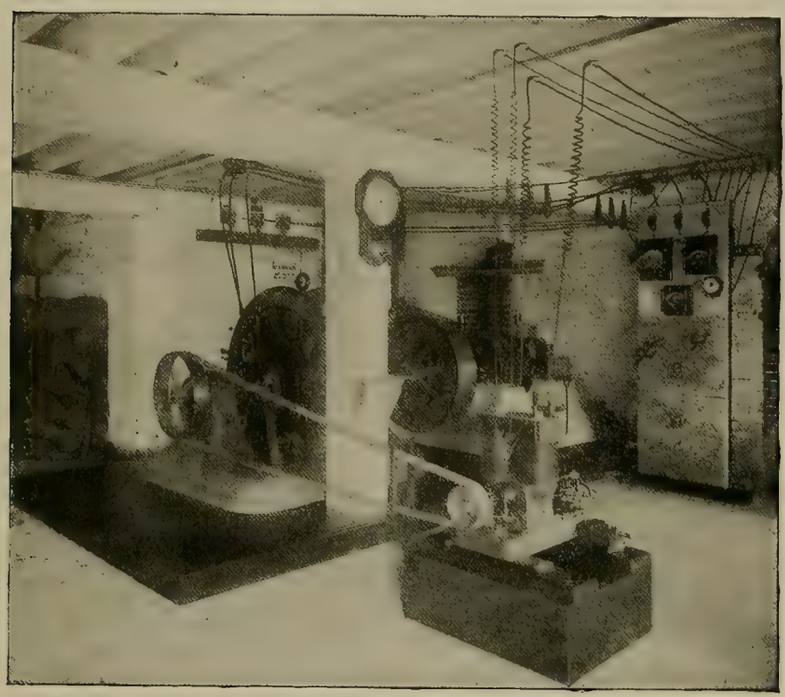
The Bullion-Beck at Eureka resumed operations last Wednesday. One hundred men, who have been idle since last October, will again have work.

(Continued on page 530.)

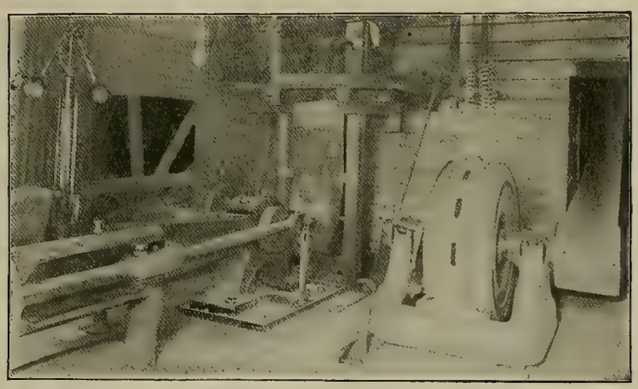
Electrical Progress.

Electric Progress on the Pacific Coast.

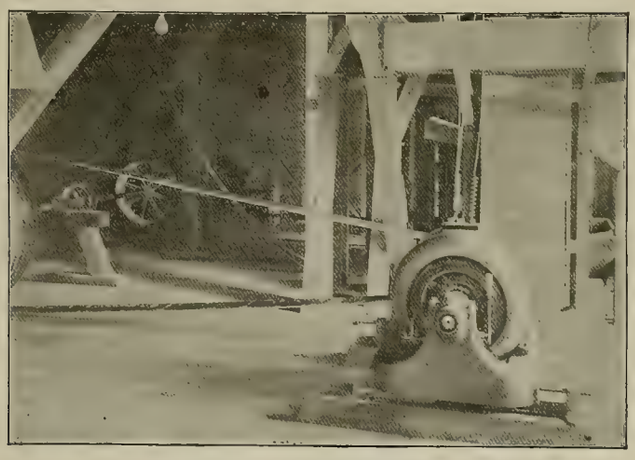
Since the completion of the three-phase electric power transmissions on the Pacific coast, between Folsom and Sacramento and the San Joaquin and Fresno, the use of electricity as a motive power has made great strides. Two of the most important flour mills are now added to the list of consumers. The first to place its dependence on electric motors was the Sperry Flour Mill of Fresno, Cal. This is driven by a General Electric synchronous motor of 150 kilowatt capacity running at 600 revolutions. The illustration shows this motor with a small bipolar motor to bring it up to speed, in the basement of the mill, whence the main belt passes to the rolling and grinding machinery above. The second mill is the largest flour mill in the United States using electricity instead of steam. Its electrical equipment consists of three General Electric three-phase alternating current induction motors operating at a pressure of 500 volts. The largest of the three motors has a capacity of 75 H. P. This is belted to the main shaft of the mill and drives all the flour-making machinery. It runs continuously for twenty-four hours and for three months without stop. The second largest motor is one of 30 H. P. This occupies a position on the second floor of the mill and drives all the cleaning machinery. It runs continuously for eighteen hours daily. The third is a 20 H. P. motor, and is placed in the basement near the 75 H. P. motor. This drives the roll for grinding the corn and the barley. Its work is intermittent and it runs from eight to ten hours per day only.



150 K. W., G. E. SYNCHRONOUS MOTOR IN SPERRY FLOUR MILL.



75 H. P., G. E. INDUCTION MOTOR, DRIVING FLOUR MAKING MACHINERY IN PHŒNIX FLOUR MILL.



30 H. P., G. E. INDUCTION MOTOR, DRIVING ALL THE CLEANING MACHINERY, PHŒNIX FLOUR MILL.

The power consumed by the motors is registered by means of recording meters which show the total horse power of current consumed. These meters register exactly the power used and allow the company to keep a careful watch upon their machinery and obtain the highest economy in operation. For instance, when the cleaning for the day is completed, and the 30 H. P. motor and all the cleaning machinery are shut down, all expenses for power in that department cease at once. No power is wasted in running idle shafting and belting. The same is true in a still greater degree in the corn and barley crushing department where the work is more intermittent.

In addition to the economy in the operation of the mill space has been saved. The present capacity of the Phœnix mill is 275 barrels of flour and 20 tons of rolled barley and feed every twenty-four hours, and the entire output of this mill is taken by local consumption, none of the product being shipped outside the State.

THE most powerful electric lighthouse in the world is at Penmarch Point, Brittany—the Eckmuhl. This light is to have an illuminating power of 3,600,000 Carcel burners or of 36,000,000 candle power, and will flash regularly at intervals of five seconds. The flashes will be projected from two lenses coupled together, each consisting of four separate pieces. They will be mounted upon a solid platform which rests in a trough of mercury and will revolve around a vertical shaft. It will take twenty seconds to effect one revolution. This will be accomplished by means of a clockwork mechanism driven by weights. In each of these lenses will be located an arc light provided with carbons of ten and sixteen millimeters diameter, thus enabling a large or small amount of current to be used. Alternating currents will be employed of 25 to 50 amperes at a pressure of 45 volts. They will be generated by two two-phase alternators. During clear weather it is only proposed to run one of the generators supplying current to the smaller carbons. In times of heavy fog both alternators will be set going and together will supply a current of 50 amperes to each of the 16-millimeter carbons.

A CO-OPERATIVE electric pumping plant has been put in operation at Arlington, near Riverside, Cal. The water flows by gravitation from the canal to the pump in an eight-inch pipe. From this point it is forced through a six-inch pipe to a point eighty feet above the level of the canal, and in a four-inch pipe to a point 100 feet above the canal. The machinery works perfectly, and the water flows into a flume at a fifty-foot level as steadily as if by gravitation. The plant consists of a 20 H. P. electric motor and a No. 7 screw pump. It will pump water enough to irrigate 200 acres. The cost of land and water above the canal is $12 more per acre than below the canal with $2.50 per year per acre added for operating the plant, which is now watering eighty-nine acres of fruit trees. The success of this experiment demonstrates what can be done in the way of irrigating foothill lands by electricity.

Mechanical Progress.

Regenerating Burnt Steel Tools.

Steel when heated too highly during glowing, hardening or welding passes into a condition in which it is usually called burnt steel. Such steel has suffered a remarkable change in its structure, the fracture surface showing according to the intensity of burning a more or less large, coarse grain of white luster. This grain is called in practice an open grain, because the single crystals are grouped so far apart as to be plainly distinguishable by the naked eye. By examining the fracture surface with a hardened needle it will be found that soft and very hard spots alternate with each other. It is well known that steel when in such a condition is of no practical use. By exposing steel for a longer time to too high a heat, with unobstructed access of air, the so-called dry welding heat, a gradual diminution of the carbon contents is caused, so that it is finally transformed to wrought iron, thus losing its hardening quality altogether. But if steel has occasion to absorb large quantities of carbon during heating, it changes to cast iron. These changes of steel regarding its carbon contents are of a chemical nature, and can be remedied by suitable treatment—by carbonization or decarbonization.

There are several means for doing this, says an article in the *Werkmeister Zeitung*, translated for the *American Manufacturer*. The so-called regeneration of burnt steel is most simply accomplished in the following manner: Heat the steel several times to a dark red, and quench after each heating in hot water. The steel finally recovers its former qualities. The first heating and quenching has the strongest effect, which gradually becomes weaker until after the fourth or fifth treatment the steel is affected no longer. From this it is evident that three or four temperings are usually sufficient. By examining the fracture surface of steel thus regenerated it will be found that its grain has become as fine as it was before burning; in fact, its structure is identical with that of similar steel hardened, but which had not suffered any previous burning. It is, however, always to be understood that the above mentioned chemical change of the steel in regard to its carbon contents has not taken place simultaneously with its burning. In this case the simple tempering method is of no avail, and the steel has to be subjected to a different treatment, according to the circumstances. If the steel has absorbed too much carbon, it should be heated slowly, allowing free access of air; if it has lost too much carbon, it has to be recarbonized before hardening. This is accomplished by putting the tools or other steel articles to be treated into boxes of sheet iron or crucibles and imbedding them either singly or collectively in powdered bone or charcoal. After the boxes or crucibles have been closed tightly, these, together with the contents, are heated for about one hour, when the articles are taken out and tempered in water. Frequently heating in closed vessels is dispensed with, and simple hardening means applied to the articles. In this case, for instance, ferrocyanide of potash can be sprinkled on the articles after they have been heated to a brown red, and they are then tempered in water.

A number of means for regenerating burnt steel are in use, and either one or the other is recommended by their respective champions. Some favor pure water, but others prefer stronger mixtures. Two recipes are given:

1. 10 parts of resin.
   5 parts of fish oil.
   3 parts of mutton fat.

When employing this mixture the steel is heated to a dark red and quenched in the molten liquid, after which it can be tempered in the usual manner.

2. 10 parts of mutton fat.
   10 parts of linseed oil.
   1 part of lamp black.

This mixture is melted and the

heated steel dipped into it for one minute.

Hydraulic Power.

The use of water under a high pressure imparted to it either from the fact of its source being at a high elevation as compared with the level where it is used, or by power derived from any other source, applied through some kind of pumping mechanism, in some respects, is the most simple and effective agent for transmitting power, and the most easily applied, where the application can be direct, for a great many of the purposes for which great concentrated power under absolute control is required.

I have a conviction, based upon my own experience, that water under high pressure, as an agent for the transmission of power, has latent possibilities yet to be developed, that will bring it into a more extended application as these possibilities become better understood.

It has not the capacity to produce the brilliant effects that are so readily obtained from electric power transmissions, but as a steady, faithful and reliable servant, it outranks, in my opinion, any of the newer agents for the transmission of power, when applied to any of the varied purposes that favor the conditions under which water must always be used, and, I am confident, that the field in engineering for the application of hydraulic power will become wider and more productive as engineers become better acquainted with the possibilities of its cultivation.

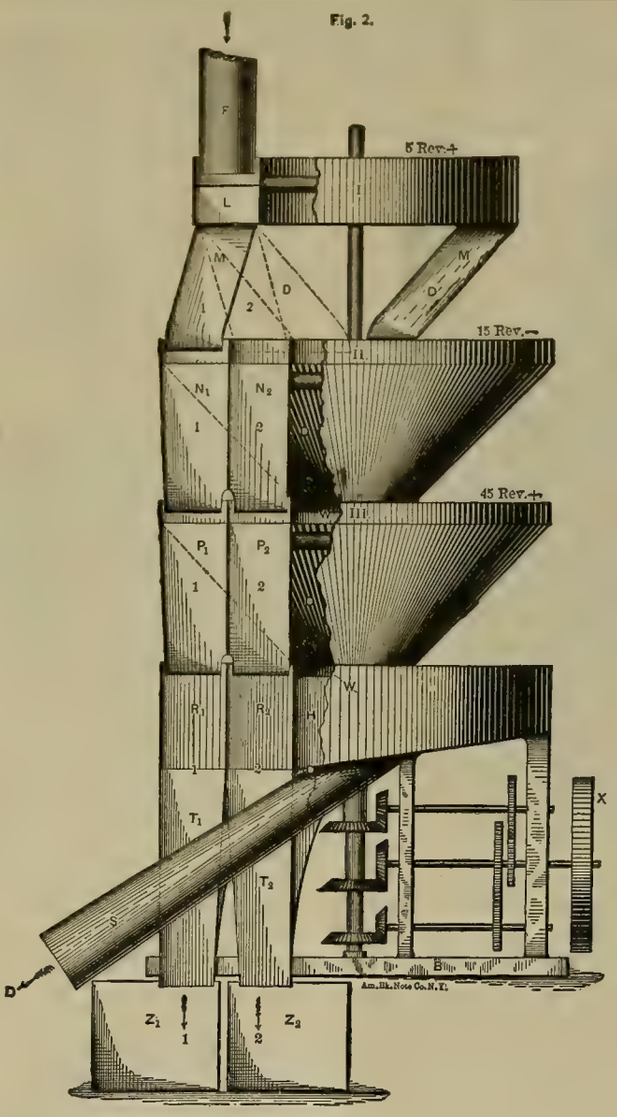
For the permanent source of power for a hydraulic plant I would never think of using ordinary, direct steam pumps, even if the steam cylinders are compound. The simplest form of pump, and the most effective, is a three-throw crank shaft operating three single-acting plunger pumps, with the pump valve area sufficiently large to admit of about 160 feet per minute speed of the plunger, with not more than 2½ per cent more pressure in the pump barrel than that in the accumulator. From 1,200 to 1,500 pounds per square inch is, in my experience, the best pressure to use for general purposes. It suits the ordinary extra strong, lap-welded pipe in the market. Hemp packing will give no trouble in stuffing boxes at that pressure. Ordinary fairly sound castings of brass or iron will stand the pressure indefinitely. At pressures much higher than that stated, castings, unless of steel, and these are hard to get sound, begin to fail on the inner surface by developing small cracks that gradually deepen until they reach a point where the solid metal outside of them will not sustain he load.

In cast iron or brass more than three or four inches thick, the outer portion of the metal does not appear to take its proportion of the load, and destruction works from the inside outward.—Geo. W. Dickie in Cassier's Magazine.

Solid Petroleum Fuel.

DURING the past few years specimens of solid petroleum fuel have been exhibited in Los Angeles, says the *Times*, but there has generally been some drawback to them, and they have not come into general consumption. A new fuel of this kind has just been invented by G. H. Fullerton. By the use of certain chemicals and peculiar treatment of the crude petroleum he makes a black solid mass, which in some forms breaks almost with a fracture. It burns as coal burns, does not fuse or run, without so much smoke as ordinary coal, costs at present price of oil less than $5 a ton, and gives out between two and three times the heat units that the same weight of coal will give. The material may be made into any form of brick, is much cleaner than coal in handling, has comparatively little of the petroleum odor; it can be stored in the sun without fusing or melting, and in other ways is a marked advance in the preparation of fuel materials for use.

Fig. 2.



MECHANICAL ORE SAMPLER.—(*See page 521.*)

Scientific Progress.

The Zerograph.

The zerograph is a direct printing telegraph machine, having keys operated like an ordinary typewriter. It is claimed that the faults inseparable from those instruments operated by the step by step system are avoided, and that, instead of short distances, very long distances—at least up to 500 miles—can be worked over with ease at very rapid rates. The zerograph is entirely automatic in its mechanism and synchronism, and it requires no attendance when messages are received. Messages are given in duplicate; that is to say, the message is printed at each respective apparatus, each acting in turn as transmitter and receiver. It has no type wheel and no clockwork, as hitherto chiefly employed, nor does it work by a series of intermittent currents, set apart for each letter or character to be recorded. One improvement is in the construction of a mechanism with an electro-magnetic arrangement, employed to produce a motion, and necessitating only two intermittent currents or impulses for each letter or character to be recorded. The first current starts the synchronous motion and the second current arrests the same at the proper letter. All other necessary mechanical actions are brought about through a system of electro-magnets and by a local source of electricity. A second improvement is in the construction of the electro-magnetic, and also in the mechanical arrangements employed to produce the motion necessary for printing in columns, and the automatic control of the same.

In each apparatus a series of finger keys are employed as in a typewriter, with which keys are connected spring pins, arranged in the arc of a circle. The center of this circle is the axis of an arm, which is termed the synchronizing arm, and which is adapted to be swung by an adjustable weight above the spring pins until arrested by any one pin moved into its path by a finger key. The spindle on which the synchronizing arm is mounted carries a governor or loose weight actuated in one direction only by a pawl connected to the spindle, which weight determines the speed of the arm. The spindle also carries a series of spring types arranged in the arc of a circle and corresponding with the finger keys, a plunger being employed to move each type when in position against a roll of paper upon a carriage; a suitable inking device, such as an ink ribbon, being employed for gaining a face impression. The synchronizing arm also carries two projections adapted to be moved by the armature of the synchronizing magnet, one of which is designed to be projected between the spring pins, while the other is engaged by a hook on the armature of an electro-magnet, so as to hold the arms in its initial or zero position. This magnet, which is termed the starting magnet, is energized by the first electric impulse or current produced by the closing of a local electric circuit when a finger key is depressed; the armature in its movement also closes the line circuit connected with the synchronizing magnet at a distant or receiving apparatus, which magnet attracts its armature and withdraws the projection on the synchronizing arm engaged with the hook of its starting magnet. Both synchronizing arms are thus released simultaneously, and, being similarly constructed and adjusted, move at the same speed. The synchronizing arm of the transmitting apparatus then makes contact with the projecting spring pin, operated by the finger key, thus closing another local circuit and energizing an electro-magnet, which is termed the second contact magnet, the armature of which in its movement again closes the line circuit through a contact screw, and produces the second electric impulse or current. This current again energizes the synchronizing magnet of the distant or receiving apparatus, the armature of which moves the other projection so as to stop the synchronizing arm against the spring pin corresponding with that operated by the finger key in the transmitting apparatus, and thus closes a local circuit as in the transmitting apparatus. These local circuits in both apparatus then operate each simultaneously an electro-magnet, which is termed the printing magnet, and which operates the plunger and causes the type to print, to feed the carriage along, carry the paper roll, and close another local circuit, on which circuit is an electro-magnet which is termed the zero magnet, and which is energized to return the synchronizing arm to the zero position. To feed the paper on its roller so as to start a fresh line or column, another electro-magnet is provided, which is termed the column magnet, which is energized by allowing the synchronizing arm to travel farther than the row of spring pins extend, where it is stopped by a fixed pin (which is in the same local circuit as the spring pins), and also causes a contact to close the circuit containing this magnet.

Mystery of the Sun.

Well might McPherson's ancient and half mythical Gaelic poet, speaking, eighteen hundred years ago, from the mists of his stormy hills, wonder at and rejoice in the sun. Nor has Ossian's early question ever yet been answered: "Whence are thy beams, O sun! thy everlasting light?" Modern science has wrought damaging discussions about the reality of the alleged "miracles," and done much to establish the universal reign of inviolable law; but of all miracles, what greater one is there than the calm persistence, through so many millions of years, of this unfailing fount of light and warmth? We no longer deny or question the doctrine of Kant and La Place concerning the origin of our family of planets—for science admits the truth of the conclusion that, one after another, but at vast ages apart, they were thrown off from the sun—once a nebulous object filling all the space to the farthest verge of Neptune's orbit (and perhaps farther), and then a slowly condensing body, from which the planet Mercury, or possibly a still nearer one to the sun, was the last to be thrown off, each and all obeying the omnipotent magnetic law that compels every planet to circle around the parent orb—the controlling center ever keeping, like an earthly parent, his youngest child nearest to him.

THE practicability of transmitting a long distance a given amount of steam is illustrated in an account recently given by Mr. Coxe before the Society of Mechanical Engineers. At a colliery it was desired to carry steam to a water works about 4500 feet over a hill from the boiler plant. To do this a trough was made by nailing the edges of two boards together, so that they formed a right angle, the trough being supported by two stakes driven in the ground and crossing just beneath the trough; the pipe was laid in the trough, resting on cast-iron plates, the pipe surrounded by mineral wool, and a similar inverted trough placed at the top. To allow expansion a bend was made to one side at the top of the hill, and then it was turned back to its original direction; a large receiver was introduced in the pipe at the pumps, made of three boiler sheets, and having a diameter of 34 inches, and serving also as a separator. As the elevation was some 1800 feet above the sea excessive cold was experienced in the winter time, the arrangements, however, fulfilling the desired purpose, costing nothing for maintenance and giving no trouble.

Mining Summary.

(Continued from page 527.)

IDAHO.

A Murray dispatch says: The season for prospecting has ended in the Cœur d'Alenes, and a few more locations will be recorded until after the coming of the new year, when the usual number of properties on which assessment work was not done will be jumped.

MONTANA.

Manager Thofehrn, of the Manhattan and Montana properties, in Granite county, has gone to London, where capitalists have agreed to purchase a large block of the stock company to develop the mines.

The October report of the Consolidated Tiger-Poorman Co. shows a net profit for the month of $12,327.48.

The Pardee mine, on Rock creek, Grants county, twenty-five miles from Philipsburg, is to be provided with a 10-stamp mill. This property is owned by County Treasurer Pardee of Granite county, and his son. It is a medium grade gold quartz, assays of the ore running from $8 to $17 per ton.

WYOMING.

Douglas & Adams, in the Northern Belle mine, Sandstone mining district, fifteen miles west of Grand Encampment, are erecting a 10-stamp mill, with power for twenty stamps, and expect to have the plant in operation January 1st, '98. A general average assay of Northern Belle ore shows $66 to the ton.

MISSOURI.

At Joplin last month $24 per ton was paid for zinc ore in the bin.

Lead ore declined $1 on the 1000 pounds and sold at $32 per 1000 pounds in the bin. For the corresponding week of last year lead ore brought $15 per 1000 pounds, and the best grade of zinc ore $24.50 per ton.

COLORADO.

Were it not that it is positive of the truth of the statement, the *Telegraph* would hesitate before publishing the report that any mine, much less any lease, in Cripple Creek, had produced ore to the amount of $37,000 net in a single week. This was the production of the Johnson lease on block 1 of the Half Moon claim, belonging to the Matoa Company. Last week the Johnson lease shipped thirty-four cars of ore to the smelters, and this week word was received at the company's office from their agent with the ore at the smelters, that the shipments would bring net returns of $37,000. This ore ran from 3.4 ounces to 6.6 ounces, the larger amount being at the latter figure.

The Enterprise, at Rico, employs seventy-five men and a number of leasers. The Enterprise and Rico-Aspen ores run about an ounce in gold to every hundred ounces in silver, and even at the present price of silver yield a profit.

K. Benson sold his Terrible and Butterfly properties near Ophir to the A. C. G. S. of London, for the sum of $190,000; $25,000 has been paid.

Wabash, Ind., men are developing the Gettysburg mine in Gilpin county.

The output of the Nevadaville properties on Quartz hill, operated by the Gold Coin M. Co. for the past month reached a total of $23,000.

The New York and Indiana G. M. Co. is building a shaft-house on the Star of the West property, Lake district. A force of men is drifting and stoping in the east 165-foot level, taking out a fair grade of smelting ore.

The Orizaba Leasing Co. sent out fifty tons of mill ore from Victor. The Beacon hill chute has proven continuous to the depth of 140 feet.

The Marinette Co., Cripple Creek, is producing twelve tons smelting ore daily.

A Victor dispatch of the 1st inst. says the total tonnage for November shows an increase of about 3000 tons; 1000 in mill ores and 2000 in higher grades treated with the smelter.

NEW MEXICO.

The Lone Star group, Cochiti district, comprising six claims, was sold recently to McFarland & Greenwood.

S. H. Elkins, receiver of the New Mexico Mining Company, has given the McGee Milling & Mining Company of Summerfield, Kas., the privilege of putting a plant on the mill site connected with the Cunningham mine at Dolores, with the understanding that they would treat Cunningham ore.

The Gold Standard mine at Golden has been bought by J. A. Davis, of the Galisteo Placer company, under a $60,000 working bond.

ALABAMA.

(Special Correspondence).—The production of minerals and products manufactured therefrom in the State of Alabama during October, 1897, as reported by the producers to Dr. Eugene A. Smith, State Geologist and Secretary Ala. Ind. and Sci. Soc., are as follows: Coal, 480,416 short tons; coke, 101,615 short tons; pig iron, 73,242 long tons; iron ore, 153,044 long tons; limestone, 51,118 long tons; bauxite, 1181 long tons; silica, 140 short tons; building stone, 4500 cubic feet; total number of employes, 12 627. WM. M. BREWER.

Birmingham, Nov. 27.

ARIZONA.

Average samples of ore from the new strike on the Six Mile Hill mine assay $216 gold and fifty ounces silver.

The Jerome Copper Co. has bonded four claims in Yavapai county, increasing its territory to 160 acres. Work has begun on the tunnel to be run 2000 feet.

MEXICO.

The American-Mexican Mining Co., Sonora, Mexico, has incorporated; capital, $500,000; principal office, Kansas City; incorporators, J. Doherty, J. C. Duncan, T. H. Ijams, L. C. Friend, A. Shanklin.

A City of Mexico dispatch says: The sale of the copper mines in the State of Michoacan to Paris Rothschilds is not formally completed, but may be within a month, the price being, it is stated, more than $5,000,000.

SOUTH AFRICA.

The Rand gold output in October was 274,175 ounces, an increase of 74,286 ounces over 1896.

Coast Industrial Notes.

—Inyo Co., Cal., has marble sufficient in quality and quantity for the new San Francisco postoffice, all statements to the contrary notwithstanding.

—Fifteen vessels are reported to have left the Atlantic coast in the last few weeks for Alaska. All of them have arranged to call at San Francisco to complete their outfits.

—General Manager Bancroft of the Oregon Short Line has contracted with the Illinois Steel Co. for 15,000 tons of No. 18 70-pound steel rails, delivery in January and February next, with the privilege of making the order 35,000 tons.

—Nearly 3000 men are employed at the Union Iron Works of San Francisco building ships. The battleship Wisconsin is on the ways at the Potrero works. Her length is 368 feet; beam, 72 ft. 6 in.; tonnage, 11,500 tons. Next month the new Japanese cruiser Chitose will be launched.

—President Kerr of the Manufacturers' and Producers' Association proposes to find out if the law permits the California State Prison Commissioners to conceal their official acts from the public, and, incidentally, if that body can evade the plain mandate in purchasing coal, etc.

—A. S. Hallidie, president of the California Wire Works, Philip Rowe and other San Franciscans are developing the coal properties at Coal Harbor, Quatsino sound, B. C., recently illustrated and described in this paper, and expect to produce shipping coal in commercial quantities next year.

—The Los Angeles oil producers' trustees have received their first storage tank. Another will be ordered at once; the two will give a total storage capacity of 70,000 barrels. The oil wells that have been closed down have resumed operations to-day. The Santa Fe Railroad Company is consuming nearly 900 barrels of oil daily, and the Southern Pacific about half as much.

—It is calculated that it will take 500 days to put through the Rodeo tunnel of the San Joaquin and S. F. railroad. During its construction the main line from Stockton to the eastern end of the tunnel will be built and the wharves, depots and warehouses at Point Richmond will also be constructed. It is expected that the entire ferry system will be in operation by that time.

—The El Dorado Light & Power Company proposes to manufacture and produce electric light, power and heat by utilizing the waters of the South Fork of the American river, Cal., in generating electricity; capital stock, $300,000; subscribed, $25,000; E. F. Smith, W. C. Hendricks, R. C. McCreary, T. A. W. Shock, J. G. Cunningham, of Sacramento. The present proposition is to exchange $100,000 of the stock for bonds.

—Turner, Finch & Campbell of Spokane, Wash., are directors in a company organized in New York city this week, capital $1,000,000, to develop the water power of the Pend d'Oreille river, near its confluence with the Columbia, and deliver electric power into Rossland, Trail and other camps of the Kootenay district. It is proposed to develop 2000 H. P. and to utilize the present works of the Goodhugh syndicate of New York, which developed 750 H. P., to work placer deposits at the south of the Pend d'Oreille.

—Port Angeles, on straits of Juan de Fuca, Washington, opposite Victoria, B. C., has raised a bonus of $75,000 in cash and lands for a tinplate manufacturing company, having its headquarters in Pittsburg, and said to own processes by which tinplates can be made cheap, to build a black sheet and finishing mill at that point. Coal of coking quality is reported "within a few miles." Iron ore is known to exist in the Olympic mountains; the new works will procure their ore from Barclay sound, Vancouver Island.

Catalogues.

CATALOGUE "A" just issued by the Vulcan Iron Works, 505 Mission St., S. F., gives full details of the Vulcan refrigerating and ice machinery made by this old-established firm. Considerable of interest and value is given concerning the different systems of artificial ice making, etc., clearly and intelligently arranged and handsomely illustrated. The pamphlet gives just the kind of information wanted by any one contemplating the use of a refrigerating or ice-making plant.

THE 1898 catalogue issued by Hendrie & Bolthoff Manufacturing Company, of Denver, Colo., is at hand and presents an excellent showing of the mining, milling and smelting machinery handled by that house. The illustrations which accompany the descriptions and price lists are of the best. The book will be in demand by that company's large number of patrons.

Personal.

C. A. MOLSON is visiting Salt Lake City, Utah.

W. E. HENDRY is now manager Northern Light, Utah, mill.

W. J. BRYAN is in Mexico, studying the financial situation.

JNO. W. MACKAY leaves for the East this week and thence to Europe.

GEO. E. AMES of the Union Iron Works has returned from a Montana trip.

C. A. HAMILTON of San Francisco will leave for Mexico about the 18th inst.

M. L. HEWETT has resigned as general manager of the G. M. M. Co. of Basin, Mont.

E. T. HALE succeeds Eugene Fechet as manager Old Glory mine, Oro Blanco, Ariz.

J. O. RUSBY is superintending operations at the Bonnie and Olga mines, Fort Scott, Cal.

W. H. THOMAS of California has gone to Bingham, Utah, to take charge of the Niagara mine.

ON the 1st inst. C. E. Nivens took charge of the Tom Boy, Colo., mine, succeeding Supt. Adsit.

THOS. B. EVERETT has returned from Denver, Colo., to Clarksville, El Dorado Co., Cal.

W. M. IRELAN has returned to San Francisco from an inspection of the Brunswick, Nev., lode.

H. W. TANGERMAN has been appointed superintendent of the American mine near Sutter Creek, Cal.

CHAS. G. YALE, who has been seriously ill with pneumonia since his return from the Yukon, is convalescent.

L. J. HANCHETT still thinks that Jno. W. Mackay and associates will buy the Blair mines at Silver Peak, Nev.

SIMEON WENBAN of San Francisco has bought the Golden Hope mine near Townsend, Mont., for $35,000 cash.

GEO. D. GREENWOOD, manager California Electrical Works of San Francisco, has returned from the Atlantic coast.

GENERAL MANAGER BUCKMINSTER of the Santa Ysabel, Cal., mine, arrived in San Francisco from Boston yesterday.

H. C. BROWN, owner of the Brown Palace Hotel, Denver, Colo., is sojourning in San Francisco, his first visit since '57.

A. P. BRAYTON SR., president Pelton Water Wheel Co., who is sojourning in Honolulu, is reported much improved in health.

W. H. THOMAS of the Niagara, Utah, M. Co., who has been examining some California properties, has returned to Utah.

D. H. JACKSON, owner of the Salisbury mine, El Dorado county, Cal., has secured a bond on the Pacific group, Placerville.

J. HARVEY succeeds H. Endey as foreman of the Zeile mine, Amador county, Cal. Mr. E. filled the position for seventeen years.

H. QUINE is the new superintendent for the English company that has secured the tailings in the Bear river near Colfax, Cal.

J. D. GRAHAM, Provincial Gold Commissioner at Revelstoke, B. C., has resigned to accept the management of the Waverley mine.

H. P. GORDON, who has been for some months superintending mining operations in Colombia, S. A., is about to return to California.

RICHARD A. PARKER, general manager of the California Exploration Company, has returned to San Francisco from Calaveras county.

A. J. BOWIE, Alf. Tregidgo and J. D. McGillivray of San Francisco reached Dawson city, N. W. T., last October. Of nearly 900 who left San Francisco for the Klondike, via St. Michaels last summer, but forty-five reached their destination.

JNO. S. WHYTE leaves Globe, Arizona, to superintend operations at Linares, Nuevo Leon, Mexico, for the American Exploration Company.

J. O. HARRON, vice president and general manager of the Parke & Lacy Company of this city, is expected to return next week from a six months' sojourn in Australia.

E. A. WILTSEE of San Francisco has bought the yacht Aggie, considered the fastest on the coast. She originally cost $25,000, and it is probable will figure in a Yukon cruise next spring.

E. W. CHAPMAN, Supt. of the Taylor mine, El Dorado county, Cal., is managing four additional properties, the Zantgraf, Channel Bend, Three Stars and Bear River Hydraulic.

R. C. READ, foreman Occidental mine, Virginia, Nev., is organizing "a dredging, transportation and mining company to operate in Alaska," and is locally credited with extensive financial backing.

H. BRATNOBER is credited with a good many enterprises "backed by the Rothschilds," as usual. The latest is the organization of a New York company to build a railroad "under Canadian auspices" from Skaguay to Dawson city.

WALDEMAR LINDGREN will take the chair of Metallurgy and Mining at Stanford University early in '98. He is at present engaged in Government work in Idaho. Mr. Lindgren has contributed considerable to this paper, his most recent article being on the mica deposits of Idaho. He is a graduate from the Freiberg School of Mines, has familiarized himself for the past fourteen years with mining and metallurgical methods of the Northwest, and is well and widely known in California.

Recent California Mining Incorporations.

McKinley M. & M. Co., San Jose, Cal.; capital stock, $100,000; $1001 subscribed; T. E. Johnson, A. Friant, J. B. Hammon, G. W. Miller, H. Postlethwaite.

Monitor M. & M. Co., Monitor; capital stock, $1,000,000; all subscribed; A. Kennedy, P. Curtz, H. F. Musser, G. C. Brandman.

Fortuna Mining Company, Fortuna, Humboldt county, Cal.: B. N. Willsie, D. R. Johnston, G. W. Snively, L. S Ash, A. H. Willsie, C. E. Bryant, M. F. Stephenson; capital stock, $1,000,000; subscribed, $1,475.

The Alaska Dg., C. D., D. Co., San Francisco; J. F. Moody, T. R. Jones, G. W. Cummings, E. F. Woodward; capital, $100,000; $500 subscribed.

Aromas M. Co., Watsonville, Cal.; capital stock, $500,000; subscribed, $150,000; J. T. Porter, A. S. Chalmers, G. H. Brewington, P. E. G. Anzar.

Recently Declared Mining Dividends.

Tamarack Copper Co., Mich., $3 per share; payable Dec. 31.

Osceola Copper Co., Mich., $1 per share; payable Dec. 31.

Utah, Utah, $1000; payable immediately.

Geyser-Marion, Utah, 3 cents per share, $9000; Dec. 1.

Morning Star mine, Cal., $6 per share; payable immediately.

Victor G. M. Co., Colo., $40,000; Dec. 1.

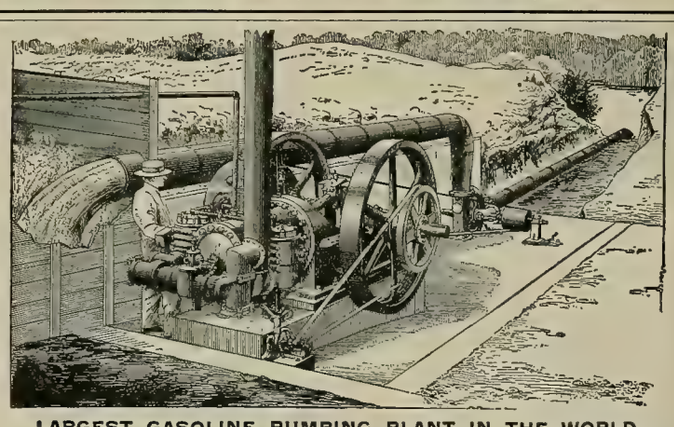
Geyser-Marion, Utah, 3 cents per share, $9000; Dec. 1.

Santa Rosalia, Mexico, M. Co., 10 cents per share; Dec. 1.

The Apollo Con. M. Co., Alaska, 50 cents per share, $100,000; Dec. 15.

Geyser-Marion, Utah, $9000; Dec. 1.

Swansea, Utah, $5000; Dec. 1.



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The illustration shows the gigantic pumping plant recently built by the Hercules Gas Engine Works on the Packer Ranch, Colusa Co. 80 h. p. Hercules Engine, pumping 7200 gallons a minute, 27 feet high. Burns Gasoline or Distillate oil. Cheapest power known. Gas, Gasoline and Oil Engines, 2 to 200 h. p. Send for Catalogue. HERCULES GAS ENGINE WORKS, 217 Bay St., San Francisco.

MINING MACHINERY, Second-hand.

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30 in. x 72 in. Direct Acting Hoisting Engine

BUILT FOR THE

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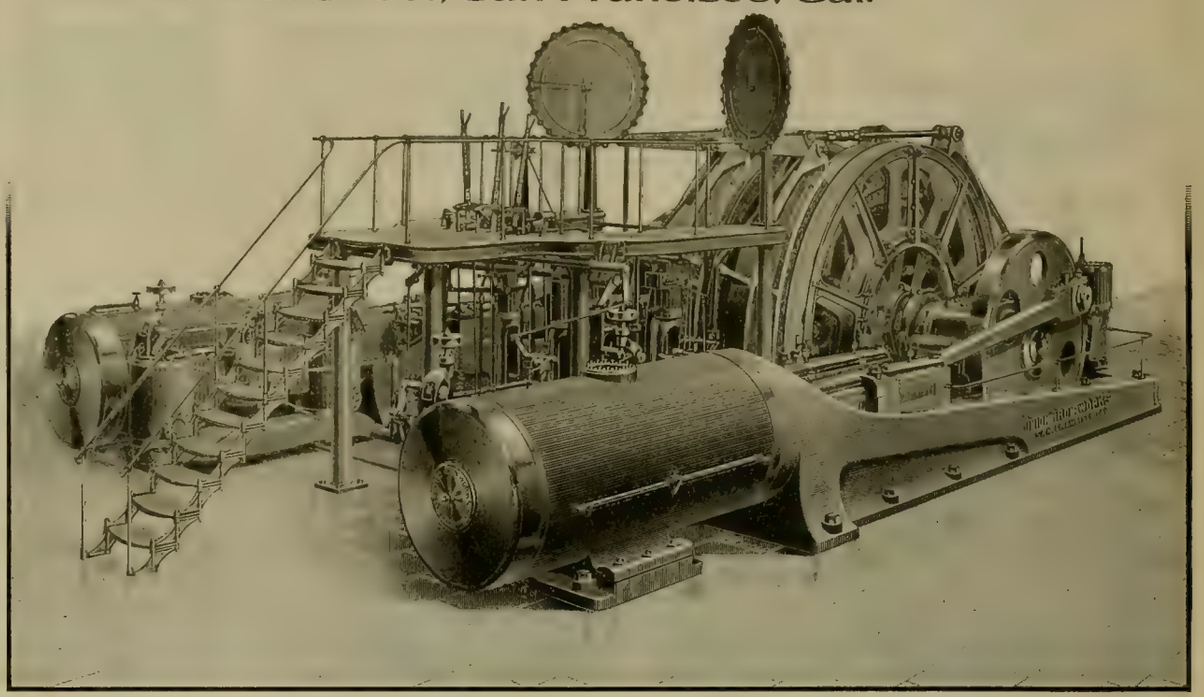
OF MONTANA.

Embodying all that experience and practical working have demonstrated as valuable in this class of machinery.



The brakes, clutches and reversing gear are arranged to be operated by compressed air or steam, by means of auxiliary cylinders which are under full control of the engineer, stationed upon the elevated platform shown, insuring the most rapid work with absolute safety. Shaft hollow forged steel of ample strength and stiffness to withstand any strains; reciprocating parts of steel and are as light as consistent with the duty required; cylinders of the "overhung" type, weight being taken by a guide saddle, which admits of free longitudinal movement, due to expansion, causing no strain on bed plate or foundations; cylinders steam-jacketed, fitted with valves provided with Corliss releasing gear and hand cut-off, enabling the engines to be run economically with reference to the work to be performed; bed plates modification of the Porter Allen type, heavy and substantial, with large foundation base and anchor bolts. A duplicate of this engine has also been furnished the Homestake Mining Company of Dakota.

BAKER & HAMILTON,

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Engines, Boilers,

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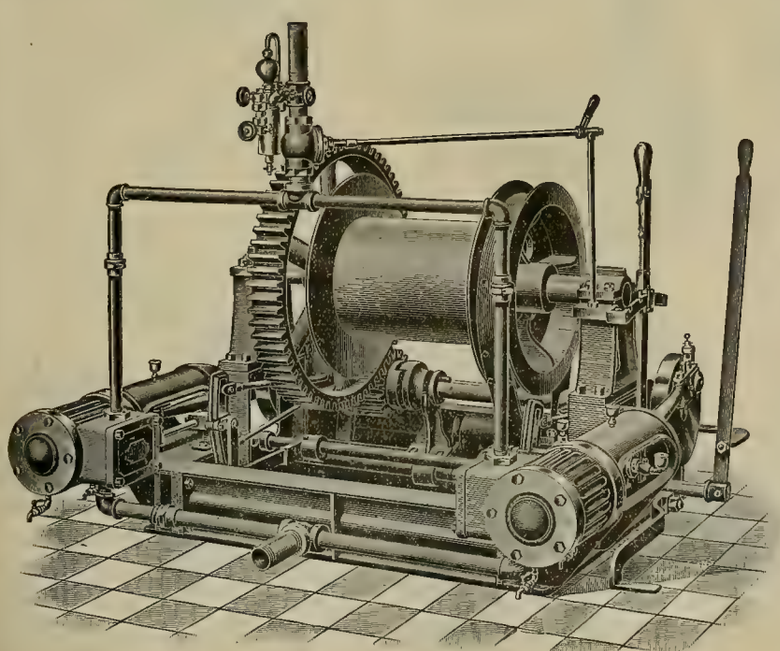

THIS CUT represents one of our improved **DOUBLE STEAM HOISTING ENGINES.** We have them in sizes from 12 H. P. up (with or without boilers). They are constructed with the greatest care by engineers familiar with the best previous practice. They come with sectional iron frames, reversible link motions, etc.; consequently can be shipped knocked down, in pieces suitable for transportation over difficult roads and trails.

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These outfits are built in the most substantial manner possible, and on the most approved principles. We recommend them in every particular.

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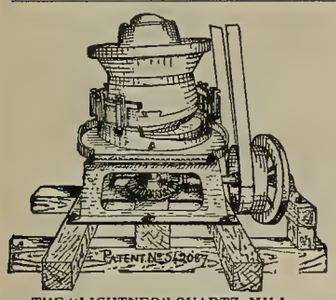

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No. 2 MILL—3 TONS CAPACITY, 1 1-2 H. P., = = $225.
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LARGER MILLS BUILT. - - - - SEND FOR CIRCULAR.
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The "SPADONE" Curved Edge Concentrator Belt is attracting much attention among mining men, its merits appealing to the millman o practical experience.

Illustration (Fig. 1.) shows a cross-section, and (Fig. 2.) shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. *We avoid this Mechanical Defect by our Spadone Curved Edge.* Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

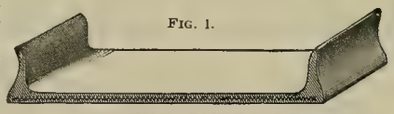
FIG. 1.

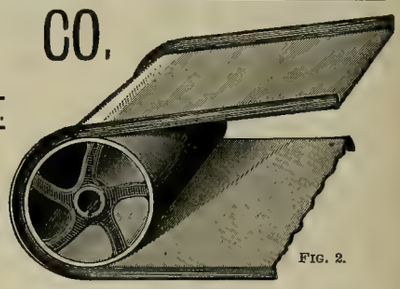
FIG. 2.

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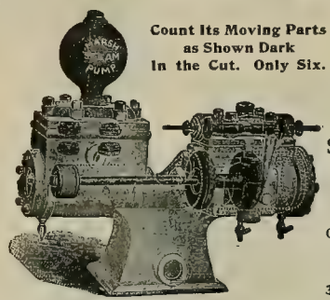

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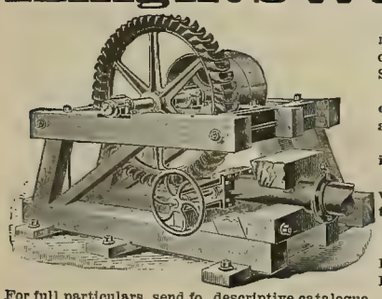

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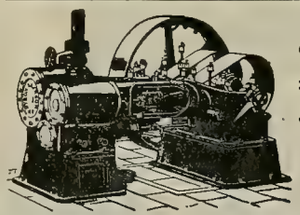
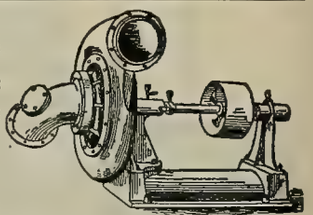


WRITE FOR CATALOGUE NO. 15.

Jackson's GAS —AND— OIL ENGINES.



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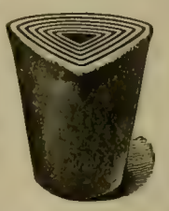
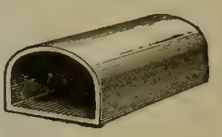


CHEMICALS, Etc.



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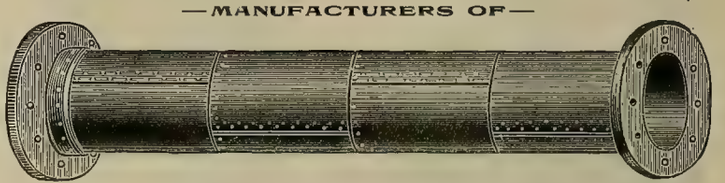

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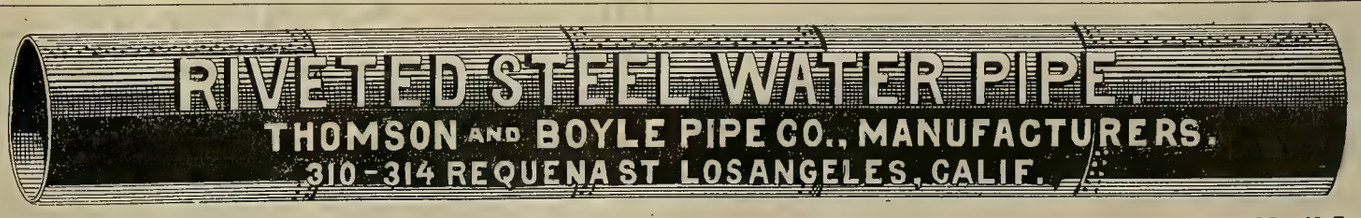

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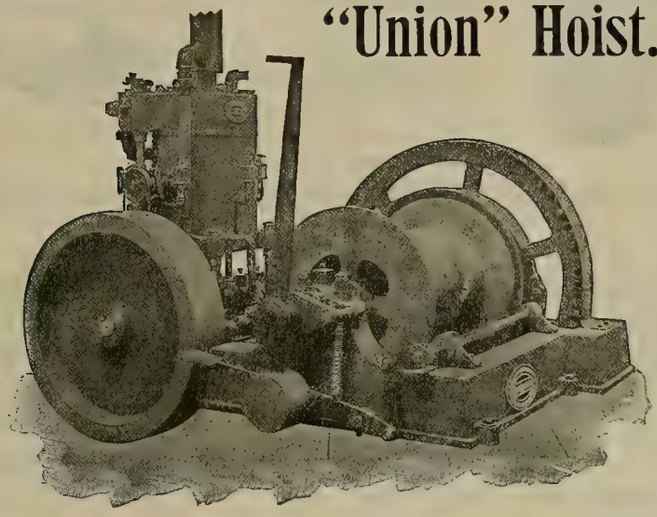

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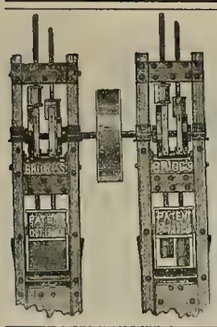

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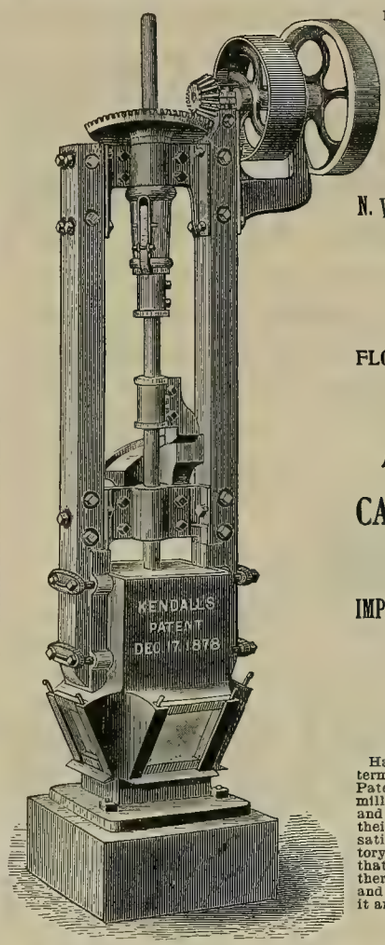

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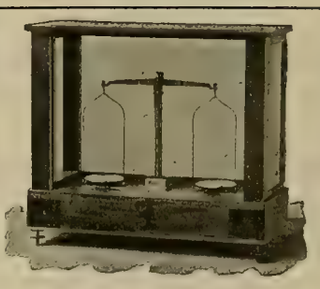

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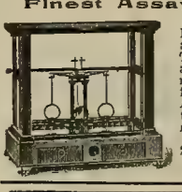

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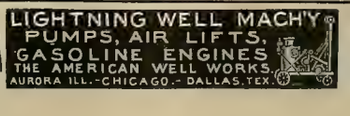

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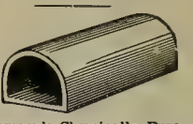

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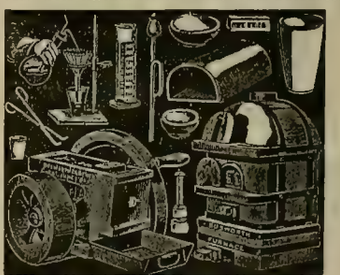

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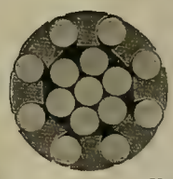

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We have a Sensitive, Simple Governor that will positively regulate speed of wheel. Specially adapted for electric railway and lighting plants.

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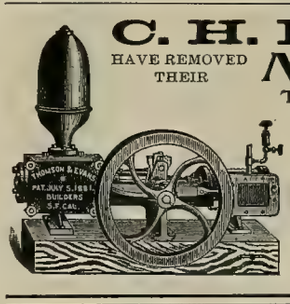

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Promptly, and at Reasonable Prices, and will continue the manufacture of

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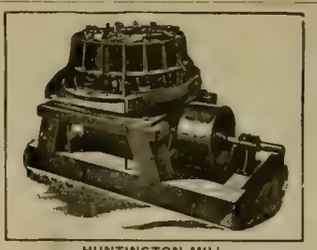

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THE PELTON WATER WHEEL,

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In simplicity of construction, absence of wearing parts, high efficiency and facility of adaptation to varying conditions of service, the **PELTON** meets more fully all requirements than any other wheel on the market. Propositions given for the development of water powers based upon direct application, or

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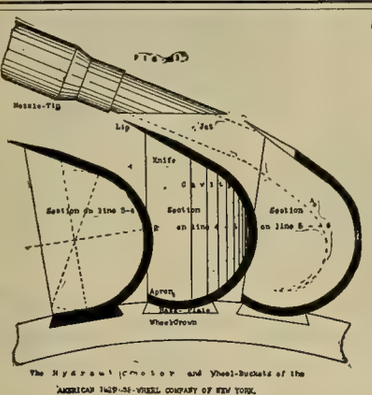

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Will furnish more power per cubic foot of water used than any other water wheel in the market.

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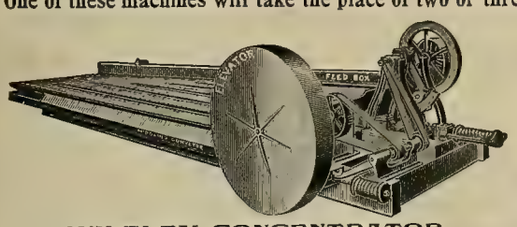
One of these machines will take the place of two or three belt concentrators of any style and do very much better work.



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Some Practical Reasons Why the Wilfley Concentrator Should Be Used in Gold Mills:

1. It will successfully handle three or four times more material than any belt Concentrator made, barring none.
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3. It will make cleaner and much more valuable concentrates, thus saving useless expense for transporting valueless material, as also extra cost for treatment.
4. It requires little or no attention when once adjusted and no expert is required to either adjust or run the machine.
5. It will save much expense in power and room, and the first cost of a mill requiring concentrators.
6. It has no expensive belts to crack and wear out, nor complicated machinery to keep in repair.
7. It is the only sensible plan of concentration, as any kind of material can be worked, which is not true of any style of belt machine.

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Quick Armature Winding.

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Assessment Notices.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 2d day of November, 1897, an assessment (No. 82) of 20 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of December, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 29th day of December, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

BEST & BELCHER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 2d day of November, 1897, an assessment (No. 63) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of December, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 28th day of December, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Director

M. JAFFE, Secretary

Office—Room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

CONSOLIDATED CALIFORNIA & VIRGINIA Mining Company.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3d day of November, 1897, an assessment (No. 10) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of December, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 29th day of December, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office—Room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

MARGUERITE GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 4th day of November, 1897, an assessment (No. 8) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 237 Twelfth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 13th day of December, 1897, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on SATURDAY, the 15th day of January, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

F. METTMANN, Secretary.

Office—237 Twelfth street, San Francisco, Cal. The secretary will also receive payments from 12 to 5 P. M. at his business office, 325 Sansome street.

RED CAP MINING COMP NY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 29th day of November, 1897, an assessment (No. 2) of Five Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, No. 125 Beale street, city and county of San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of January, 1898, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 29th day of January, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

H. H. MARTIN, Secretary.

Office—125 Beale street, city and county of San Francisco, California.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of September, 1897, an assessment (No. 8) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of November, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 29th day of November, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Thorpe Mining Company the day of delinquence in the above assessment notice has been postponed to November 20th, 1897, and the day of sale to MONDAY, December 13th, 1897.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Thorpe Mining Company the day of delinquence in the above assessment notice has been postponed to November 27th, 1897, and the day of sale to MONDAY, December 20th, 1897.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT

By order of the Board of Directors of the Thorpe Mining Company the day of delinquence in the above assessment notice has been postponed to December 4th, 1897, and the day of sale to MONDAY, December 27th, 1897.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

DELINQUENT SALE NOTICE.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 5) levied on the 3rd day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
John A. Heuinger	16	250	10 00
Nils Johnson	120	100	4 00
Nils Johnson	121	100	4 00
Hattie E. Gray	124	100	4 00
Wm. Westhoff	144	250	10 00
A. O. Lindstrom	148	250	10 00
Wm. Westhoff	177	500	20 00
Richard Phelan	188	5	20
Wm. Westhoff	200	100	4 00
Wm. H. Lillie	202	10,500	420 00
Mark Strouse	208	5	20
P. E. Robertson	215	250	10 00
Sarah Spalding	218	100	4 00
Abe MacCreadie	220	500	20 00
Alfred H. Hogg	221	300	12 00
Abe MacCreadie	222	240	10 00
J. W. Brown	231	4,099	163 96
C. D. MacNeill	236	200	8 00
Paul Mullier	239	50	2 00
Paul Mullier	240	100	4 00
Paul Muller	242	1,000	40 00
Chr. W. Heyer	243	755	30 20
Chr. W. Heyer	246	606	24 24
Abe MacCreadie	247	200	8 00
Wm. Westhoff	250	200	8 00
Mary Ann Robertson	251	250	10 00
Mary Ann Robertson	252	250	10 00
R. H. Daley	268	1,000	40 00
C. M. Howe	272	1,000	40 00
C. M. Howe	274	500	20 00
R. H. Daley	275	1,500	60 00
Francis Brady	277	700	28 00
R. H. Daley	278	100	4 00
Dr. H Sylvester	280	51,278	1,971 12
(2,000 shares of this cert. have been paid by H. Sylvester, being part of his stock.)			
L. V. Merle	286	10	40
J. T. M. Kelly	289	500	20 00
R. H. Daley	290	100	4 00
R. H. Daley	294	750	30 00
R. H. Daley	295	185	7 40
E. Swenson	296	1,750	70 00
Mark Strouse	297	5,000	200 00
Mark Well	299	750	30 00
C. W. Heyer	300	400	16 00
Mark Strouse	301	100	4 00
Geo. Day	302	1,000	40 00
Dr. H. Sylvester, Trustee	305	1,105	44 20
Dr. H. Sylvester, Trustee	306	5,000	200 00
R. H. Daley	307	250	10 00
R. H. Daley	308	240	9 60
F. Heard	309	125	5 00
Mark Well	310	125	5 00

And in accordance with law, and an order from the Board of Directors, made on the 3rd day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Rooms 12 and 13, No. 43 Sixth St., San Francisco, California, on SATURDAY, the 9th day of October, 1897, at the hour of 12 o'clock M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

The day of sale of the above delinquent stock has been postponed by order of the Board of Directors to THURSDAY, October 28th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, the 4th day of November, 1897, at the same hour and place.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, November 11th, 1897 at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to TUESDAY, November 16th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to TUESDAY, November 23rd, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, December 2nd, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, December 9th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from A. A. Pond, in the Red Hill Mine at Todd's Valley, Placer Co., to deposit tailings in Todd's Valley Canyon; from Ralph Farnham, in his mine near Indian Diggings, El Dorado Co., to deposit tailings in Farnham Creek; from John Spaulding, in the Red Dog Mine at Red Dog, Nevada Co., to deposit tailings in Greenhorn Creek; from George Standart, in the Grizzly Mine near Pike City, Sierra Co., to deposit tailings in Grizzly Canyon; and from Thos. Wayman, in the Sunshine Mine near Pike City, Sierra Co., to deposit tailings in a ravine below the mine, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on December 13, 1897, at 1:30 P. M.

THE
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The official organ of the mining industry, the Witwatersrand Chamber of Mines, Johannesburg Chemical and Metallurgical Society, and the Mine Managers' Association.

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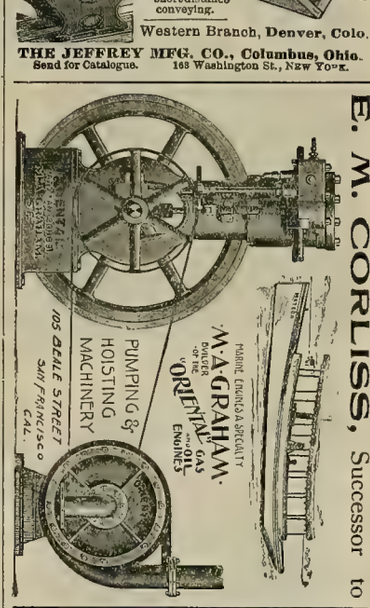
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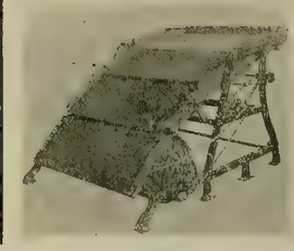

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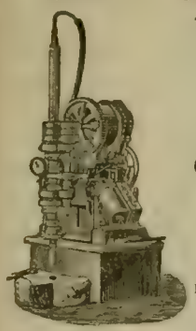

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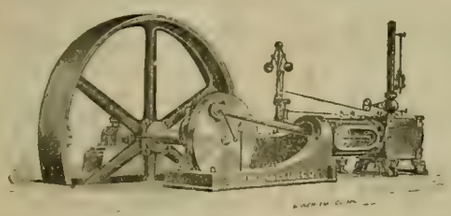

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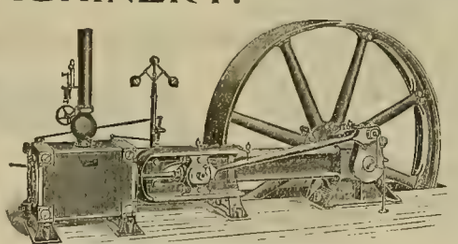

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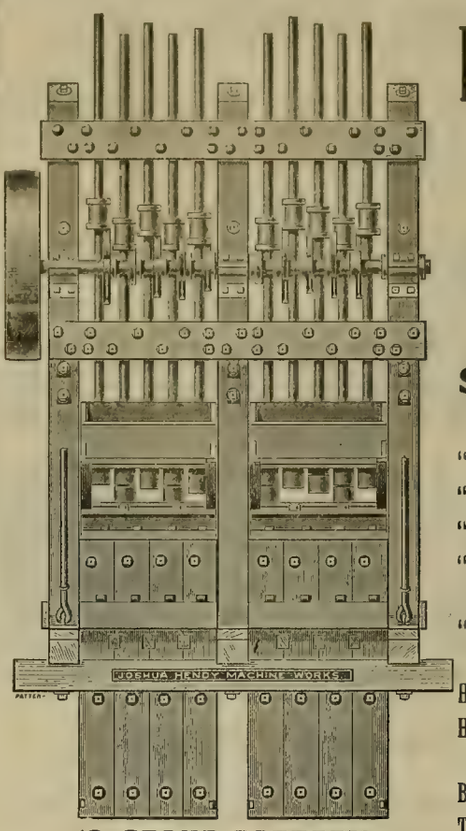

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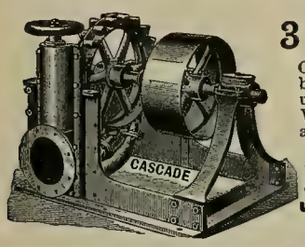

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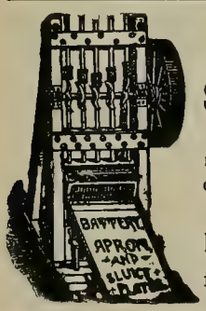

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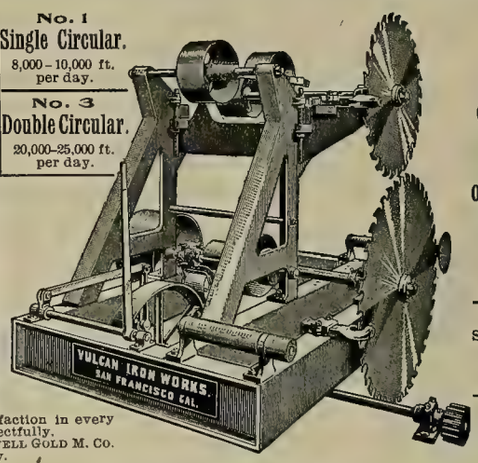

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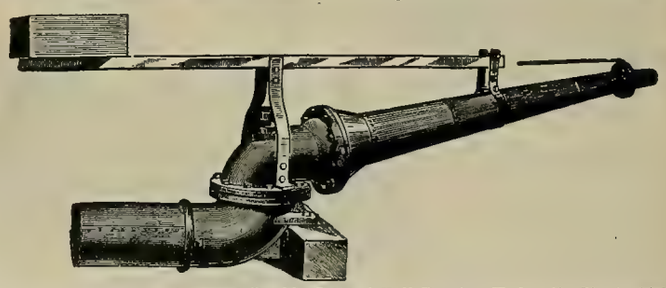

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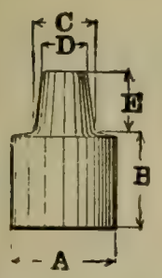

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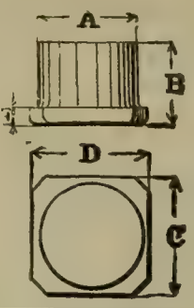

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Market Reports.

The Markets.

SAN FRANCISCO, Dec. 2, 1897.

Business continues to hold up well, but jobbers fill orders from stocks carried, so as to have little on hand at the close of the year for stock taking purposes. The consumptive demand has been exceptionally good so far this winter, with prospects of its continuing. Market values continue to ease on nearly all lines owing to somewhat of a selling pressure. Manufacturers, taken as a whole, are doing better than at the corresponding time last year. This applies to about every branch. Leading foundry and machine men are quite sanguine that next year will witness a decided increase in business. The certainty that several lines of steamers will run to Alaska and a Japanese line to Japan are creating a very hopeful feeling regarding next year's business in every branch of trade and manufacture. Eastern advices state that general trade has been and continues very good, with more wage-earners at work, and an increase in pay made by quite a number of employers.

In the local market there is nothing new to report. The call for accommodations is light, while funds in bank are steadily accumulating. There is said to be quite a falling off in the number of loans that are called in at this season of the year, chiefly for the purpose of paying dividends and interest. It is stated that disbursements next month in this city on interest and dividends will run up to over $5,000,000. These disbursements include those by incorporated companies and municipal, State and national authorities. With this large sum added to that already on hand new avenues for investment will be sought, particularly for loaning on good security. The rates of interest will be easy.

New York Silver Prices.

NEW YORK, Dec. 2. — Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	27¼	58⅞
Saturday	27⅛	58⅝
Monday	27⅞	59
Tuesday	27⅛	59⅛
Wednesday	27⅛	59⅛
Thursday	27⅛	59⅛

	Copper.	Lead.	Iron.	Tin.
Fri.	10 70 @10 85	3 75	10 00@12 25	13 75
Sat.	10 75 @10 85	3 77½	10 00@12 25	13 80
Mon.	10 75 @10 87½	3 77½	10 00@12 25	13 80
Tue.	10 75 @10 87½	3 75	10 00@12 25	13 77½
Wed.	10 75 @10 87½	3 75	10 00@12 25	13 77½
Thur.	10 75 @10 87½	3 75	10 00@12 25	13 77½

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	12½c Prem
New York Telegraphic Transfer	15c Prem
London Bankers' 60 days	$4.83⅛
London Merchants	$4.82½
London Sight Bankers	$4.86½
Refined Silver, per oz., 1000 fine	59½
Mexican Dollars nominal	47@47½

SILVER.—The market firmed up the past week in this city, New York and Europe, but at the close it is stationary. Light obtainable stock is quickly felt on any improved demand at home or abroad. It is also quite possible that the meeting at New York of representatives of the large smelters in the United States and Mexico may have something to do with the advance. The meeting was held for the purpose of devising ways and means to bring about higher prices for the white metal by limiting offerings or otherwise. The smelters represented are said to handle over 60,000,000 ounces of silver a year, which shows their importance. With a combined movement in this country, Mexico and Australia, the world's production can be easily handled in the interest of sellers, but can such a combine be effected?

Silver miners everywhere West are interested in the efforts of the smelters and refiners of the country to organize what, if successful, will practically amount to a trust or combine. The plan is to pool issues and store silver bullion at convenient points to be held until prices shall advance sufficiently to warrant sales at fair profits. The heaviest dealers in silver bullion are confined to about a dozen large smelters and refining plants. It is estimated that each of these has capital enough to enable it to carry 2,500,000 ounces of silver for a period of four months. Plainly put, if the efforts at pooling are successful, this will mean the withholding from the market of 32,500,000 ounces of silver for the period named. As the market on Nov. 20 carried only 27,277,565 ounces of silver, exclusive of that held in the United States main and sub-treasuries, which is tied up by silver certificates issued against it, it will be easily seen that the pool can cause an appreciable rise in the price of the white metal. One of the men at the head of the pooling movement writes as follows: "If by pooling issues, withholding from the market the metal until it can be sold at a profit, and not, as now, at a loss to producer, we can bring about the results inevitably attained by the dealer in wheat or other staple commodities, why should we not do so?"

MEXICAN DOLLARS.—There is a continued free export movement to China. The advance in Silver has stiffened Mexicans, with sales in a small way made by brokers over the counter at 47⅓ cents, but for round lots we doubt if over 47 cents could be realized today.

COPPER.—The market at the East and abroad is quiet, but this is usual to the holiday season. Our advices do not indicate that holders will force business, but are content to hold in expectation of an improvement soon after the holidays. If India harvests as large crops as reported, then she will buy copper more freely.

Our market is quoted as follows:

Ingot casting, jobbing	13 @—
Ingot " wholesale	12½@—
Sheet copper	— @16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½

TIN.—The market is quiet for spot. Some sales are reported for next season's delivery. It is the impression that fully as much will be used on this coast next year as was this year. There is some cutting by Americans to get a better hold here.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

SHOT.—The market is steady, with a continued good demdnd.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 40
Drop, B and larger sizes, " "	1 65
Buck, Balls and Chilled, do, " "	1 65

POWDER.—The market is firm with a good demand.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9 to 11c, according to strength and quantity.

ZINC.—The market is firm.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

ANTIMONY.—The market is steady.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 8c for Cookson's, 7¼c for Hallett's and 7c for Japanese.

QUICKSILVER.—The demand is light but the market is steady. There were only ten flasks forwarded to Mexican ports by the last outgoing steamer.

Our market is quoted at $39 for domestic consumption and $35@36 for export to the west coast of Mexico.

LEAD.—The market has held steady throughout the week. The consumption is light, but this always obtains at this season of the year.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	4 75	@	5 00
Sheet	6 30	@	6 80
Pipe	5 60	@	6 10

IRON.—In our market there is nothing new to report. The consumption for the season of the year is quite free. The East reports a free consumption, but the very heavy output is against sellers.

NAILS.—The market is steady, with only a fair demand ruling.

We quote the following basis: 20d to 60d, inclusive—wire $2 35, cut $2.25.

COAL. — Lower temperature causes a larger consumption for household purposes. For steam and gas the usual demand rules, although it is said that more Steam has gone into consumption than at the corresponding time in 1896. Receipts of coal for the week ending with Tuesday were as follows in tons: Comox 5550, Coos Bay 1960, Puget Sound 7500, Cook's Inlet 700, Coquille River 150, Nanaimo 2504, Departure Bay 2412; total, 17,776.

COKE.—Imports the past week aggregate 1661 tons from England. The market is steady.

The market is quoted as follows:

Gas Companies'	— —	@	— —
English, to load	— —	@	— —
" spot, in bulk	11 00	@	— —
" in sacks	12 00	@	— —
Cumberland	10 00	@	— —

IRON.—The market is essentially unchanged. The consuming iron shows a slight falling off in this city, but it is expected to set in towards March of 1898 in increasing proportions. The East does not report any material change.

AMERICAN.

	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

PLATINUM.—The market is firm.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

BORAX.—The market is fairly firm.

The market is quoted as follows:

Refined, in carload lots, in barrels	5½
Refined, in carload lots in sacks	5¼
Powdered, in car lots	5½
Concentrated, "	5

Chemicals.

The market is quiet, but there seems to be a better feeling along the line in sympathy with the East, where there is a slight strengthening reported in some, but, as yet, no advance has been established.

SULPHURIC ACID.—The demand is quiet.

We quote in a jobbing way at 1½c per lb for 66%.

ACETIC ACID.—The market is firm at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported steady from store at 6½@7c per pound in carboys.

BONEASH.—There is a slow demand at unchanged quotations.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

BLUE VITRIOL.—Our market is steady, with better inquiry.

We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is firm.

Our market is quoted in a jobbing way at $1.40 a pound.

SODA ASH, 58% (LeBlanc process).—The market is steady at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is weak at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—The market is quiet at 2½c a pound from stores.

NITRATE OF SODA.—After dropping to low figures for shipments there is a stronger tone, with a slight advance asked. This seems to indicate that the fight is drawing to a close.

Our market is quoted from store at 4c for 95%.

PHOSPHORUS.—The market is steady.

We quote in a jobbing way at 70 to 75 cents per pound.

Mining Share Market.

SAN FRANCISCO, Dec. 2, 1897.

The milking process of securing desirable shares at low prices is in evidence, and as has been the case heretofore is proving a great success. A short time ago, when prices ranged higher, it was all ore, and rainbow chasers bought eagerly, with the majority getting on a margin. Now that prices are low, with several as low as they ever get, cappers, camp followers and paid or interested writers' refrain is, if only ore can be found. The writer has stated time and again that one or more good-sized bodies of ore can be developed any time desired by the moneyed insiders, and it is only charitable to say that the smaller pools or cliques are ignorant of it. It is the knowledge of these ore bodies and the promising outlook for far better times next year that make moneyed insiders desirous of getting all the shares at low prices they possibly can. They recognize the fact that money was never so plentiful, and with returning confidence at the East and on this coast the general public will enter into any gamble that promises quick and big returns on the money risk. They also know that although the Comstock mines have been badly abused, as has the share market, yet outsiders with money, too, will venture in the game, particularly if the market is made active by lively and at times violent fluctuations. The success attending the marketing of the Kaffirs in England shows that there is plenty of money for investment, and it is safe to affirm that the Comstock shares can be made as lively and bring as much money as at any time in their history. The work in some of the mines on the Comstock continues to be of a kill-time character, and it is not at all likely this will be changed until some time next year, when times are favorable for a bull campaign. It is stated that West Con. Virginia will start work next month. There are many who have faith in this mine. The steady advance in silver is favorable to the mines on the lode.

The news from the Comstock mines, outside of official advices, is hard to get. In this respect it is no different from what has at all times been the case when the market is down and shares not money is wanted by insiders. So far the attempt to attract attention to Justice has not proven a success notwithstanding well informed mining men have confidence that a large body of ore will be uncovered, but more work and time will be required to bring it about. They think that what has been will be again. It looks now as if very important work will be started next year at one or more points on the Comstock which will galvanize it with life again. In Utah they are still going west with no change reported. In Andes the material encountered shows a slight improvement as they go north on the 175-foot level. Quite important work is being done in Sierra Nevada on the Layton Tunnel level. The new tunnel is being pushed ahead as is the north drift on the 900-foot level. In Union they are running a west crossdrift on the 900-foot level, but it will be stopped or else turned aside when it approaches the ore in the west, unless the shares are well in hand. They continue blocking out work on the 1000-foot level of Mexican. In the west crossdrift of Ophir on the 1000-foot level the change in formation is said to be quite favorable, although a longer distance will have to be run before they expect to strike ore. They are crossdrifting west on the old central tunnel level in Ophir. Active work is being done in Con. Virginia on the 1550-foot, 1650-foot and 1750-foot levels. The general belief is that good results will follow, but it may not before lower prices rule for the shares, as it is said there are some blocks out which insiders need in their business. They continue to extract and mill low-grade ore from the 400-foot Bonner shaft level in Gould & Curry. The work in Savage is about the same as heretofore published. No work in Hale & Norcross. In Chollar they are working on the 100-foot level so as to develop the same ore found in Potosi.

They are slowly but surely repairing the main incline above the 1100-foot level. In Potosi the south drift on the tunnel level is being pushed slowly. They are extracting a few tons of ore each day. On the 500-foot level of Alpha they are running a northwest drift. At last advices it was in low-grade ore. There is still a strong flow of water in the Confidence-Challenge-Con. Imperial west drift. It is out about 1630 feet. The surface tunnel in Con. Imperial is in over 415 feet. Reports are current that in Yellow Jacket they have struck ore towards the Kentuck line. They are doing some important work in Crown Point which indicates more active exploiting before long. In Belcher they are crossdrifting west on the 850-foot level and are also repairing and retimbering the north drift on the 1200-foot level. No ore is being extracted, which will not call for an assessment for milling charges. In Overman they are still at work on the 900-foot level. A few tons of ore are raised weekly. In Justice they are working on the 175-foot level. They raised last week ten tons of ore assaying about $36 to the ton.

From the Brunswick lode there is absolutely nothing new, although the active work which is being done may develop into something important any day. In Potosi they continue work on the south drift 500-foot level and also on the east crossdrift. In Chollar active work is continued on the 300-foot, 500-foot and 600-foot levels. On the two latter it is exploiting. They raised about eighty tons of ore last week of fair grade. In Occidental active work is being done on the 550-foot, 650-foot and 750-foot levels. On the latter level they expect to reach the downward continuation of the ore in about two weeks. In Savage they are exploiting the 600-foot level. Joint work by Con. Virginia, Best & Belcher and Gould & Curry is confined to the 300-foot and 600-foot levels. Nothing new is reported from it.

The following illustrates the changes of the week:

Mines.	Nov. 25.	Dec. 2.
Alpha	.....	$ 08
Alta Consolidated	$ 10	07
Andes	24	.....
Belcher	23	20
Best & Belcher	35	30
Bodie	.....	.....
Bullion	10	08
Challenge	26	25
Chollar	50	59
Confidence	85	78
Consolidated California and Virginia	1 20	1 10
Consolidated New York	.....	.....
Crown Point	17	14
Exchequer	.....	.....
Gould & Curry	24	21
Hale & Norcross	1 65	1 40
Justice	55	50
Mexican	38	32
Ophir	80	72
Overman	.....	07
Potosi	46	41
Savage	58	.....
Sierra Nevada	68	57
Union	30	25
Utah	07	06
Yellow Jacket	37	34

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Belcher S M Co, Nev	57	20c	Nov 20	Dec 24	Jan 14 C L Perkins, Mills Building
Best & Belcher M Co, Nev	63	25c	Nov 2	Dec 7	Dec 28 M Jaffe, 309 Montgomery
Con Cal & Va M Co, Nev	10	25c	Nov 3	Dec 8	Dec 29 A W Havens, 309 Montgomery
Crown Point G & S M Co, Nev	72	20c	Nov 10	Dec 15	Jan 5 Jas Newlands, Mills Building
E Best & Belcher S M Co, Nev	6	15c	Oct 30	Dec 3	Dec 18 E W Sichel, 337 Pine
Exchequer M Co, Nev	40	5c	Nov 1	Dec 6	Dec 30 G Elliott, 309 Montgomery
Gold Ridge Con M & M Co, Cal	5	4c	Aug 3	Sept 18	Dec 9 H Sylvester, 43 Sixth
Gould & Curry S M Co, Nev	82	20c	Nov 2	Dec 7	Dec 29 A K Durbrow, 309 Montgomery
Hale & Norcross S M Co, Nev	11	10c	Mar 20	Dec 28	Jan 18 R R Grayson, 331 Pine
Kentuck Con M Co, Nev	14	5c	Oct 27	Dec 1	Dec 22 A Waterman, 309 Montgomery
Marguerite G M & M Co, Cal	8	10c	Nov 4	Dec 13	Jan 15 F Mettmann, 237 Twelfth
N Gould & Curry G & S Co, Nev	19	10c	Nov 13	Dec 17	Jan 3 E W Sichel, 337 Pine
Overman S M Co, Nev	78	5c	Nov 17	Dec 22	Jan 12 G D Edwards, 414 California
Red Cap M Co, Cal	2	$5	Nov 29	Jan 6	Jan 29 H H Martin, 125 Beale
Thorpe M Co, Cal	8	2½c	Sept 28	Dec 4	Dec 27 A F Frey, Phelan Building

San Francisco Stock Board Sales.

SAN FRANCISCO, Dec. 2, 1897.

9:30 A. M. SESSION.

100 Best & Belcher	30	100 Justice	50
200 Bullion	08	300 Mexican	32
500 Challenge	25	450 Ophir	72
200 Con Cal & Va	1 10	100 Overman	07
100 Crown Point	14	50 Sierra Nevada	56
100 Gould & Curry	20	400 Union	25
300 H. & N	1 40	200 Yellow Jacket	33

SECOND SESSION—2:30 P. M.

50 Ophir	70	300 Sierra Nevada	57
1000 Mexican	31	50 Yellow Jacket	34
500 Best & Belcher	30	200 Seg Belcher	06
50 Con Cal & Va	1 10	400 Overman	07
100 Chollar	39	100 Union	24
200 Potosi	41	400 Alta	07
200 H. & N	1 40	200 Caledonia	22
500 Alpha	08	300 Occidental	1 20
100 Belcher	20	50 Gould & Curry	21
100 Confidence	78	200 Utah	06

WILL NEGOTIATE with owners or their duly authorized agents only.

WILL INVESTIGATE only thoroughly bona-fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

E. N. BREITUNG,
Marquette, Mich., U. S. A.
Operator and Dealer in
Mines, Mining Properties and Mineral Lands,
Mining Stocks, Bonds, Options, Leases, Contracts and Securities.
MONEY LOANED ON BONA-FIDE MINES

WILL EXAMINE on reasonable terms all kinds of Mines, Mining Properties and Mineral Lands as to their value, method of working and the condition of their titles.

WILL GIVE Options, Leases, Bonds and Contracts on all kinds of Mines, Mining Properties and Mineral Lands.

Assay and Chemical Work Done on Reasonable Terms.

Have best of bank and other references. Use McNeill's or A B C Telegraphic Codes.

DO ALL OUR OWN EXPERT AND CHEMICAL WORK.

Working Capital for Mines.

PACIFIC EXPLORATION COMPANY

Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

Commercial Paragraphs.

UNDER date of Nov. 23rd the Colorado Iron Works Co., Denver, Colo., report the following shipments: Two carloads smelting machinery to Descubridora Mining & Smelting Co., Mapimi, Mexico; one carload mining machinery to Kilton Gold Reduction Co., Florence, Colo.; one carload mining machinery to Moon Anchor Mining Co., Cripple Creek, Colo.; one carload water backs for smelter for El Paso Smelting Works, El Paso, Texas.

THE M. C. Bullock Mfg. Co., Chicago, have shipped one of their Champion drills with complete 1000-foot outfit, including boiler, pump, stand-pipe, casing, etc., to the German syndicate operating in British Guiana. This order was secured only after a practical demonstration of the merits of the machine. Two machines with complete outfits were shipped last month to Johannesburg, and they have orders for others which they are now bringing through their works. They are receiving numerous calls for their hand-power diamond drills as well as the larger sizes; and, judging from present indications, the coming season is to be a busy one in this particular line.

WILLIS SHAW, Contractors' Machinery, Chicago, Ill., reports the following recent sales: 75 H. P. double drum mining hoist to J. D. Hardin, Deadwood, South Dakota; quarry machinery to the Mitchell Lime Company of Mitchell, Ind.; 80 H. P. air compressor to the "Soo" Line, Minneapolis, Minn.; hoisting machinery to the "Big Four" Railroad at Ludlow Falls, Ohio; steam tug to James Stewart & Co., St. Louis, Mo.; two locomotives and an equipment of "Shaw" dump cars to Vandegrift & Jacobs for use on the Duluth & Iron Range Railroad; 75 H. P. mining hoist for the Great Eastern Gold Mining Co. of Deadwood, So. Dakota; 50-ton steam shovel to the Marion Brick Works at Marion, Ind.; and a carload of hoisting engines to Major Harrod of the New Orleans Drainage Commission.

WM. H. BIRCH & CO., of the California Machine Works, San Francisco, have a contract to build three sternwheel steamers for the Alaska Exploration Co., each of the following dimensions: Hull, length over all, 175 feet; beam, 35 feet; depth, hold, 7 feet; draught, light, 18 inches; built to carry 250 passengers and 400 tons freight each. T. P. H. Whitelaw is building the hulls. The machinery is to consist of tandem compound engines with high pressure cylinders 16 inches diameter, low pressure cylinders 28 inches diameter and 84-inch stroke; main shaft, 10 inches diameter by 26 feet 4 inches long; wheel, 21 ft. 6 in. diameter, 20 feet wide; boilers of the fire-box type, 72 inches diameter by 24 feet long, with a working pressure of 165 pounds of steam. Wm. H. Birch & Co. have contracted for all machinery and boilers.

Rainfall and Temperature.

The following data for the week ending 5 A. M., December 1, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

CALIFORNIA STATIONS.	Total Rainfall for the Week.....	Total Seasonal Rainfall to Date.....	Total Seasonal Rainfall Last Year to Same Date.....	Average Seasonal Rainfall to Date.....	Minimum Temperature for the Week.	Maximum Temperature for the Week.
Eureka	.90	9.27	3.48	8.49	34	60
Red Bluff	.08	4.19	5.38	5.23	32	62
Sacramento	.10	2.74	4.62	3.42	31	56
San Francisco	.20	2.85	6.76	4.38	44	59
Fresno	00	1.42	3.01	1.60	28	64
San Luis Obispo	00	.92	4.70	*	28	74
Los Angeles	.01	2.48	2.99	2.32	38	76
San Diego	00	1.09	2.08	1.27	44	68
Yuma	00	.81	1.20	1.23	38	76

Colorado's Gold Fields, Illustrated.

Just out, with correct map and nearly 100 mining views natural as life. This valuable book will be sent free, prepaid, with our big 56-col. family paper 3 months on trial for 25c; club of 5 and 5 books $1. Latest mining news. Mention THE PRESS and address *Illustrated Weekly Sentinel*, Denver, Colo. Cripple Creek is fully described.

British Columbia.

E. S. TOPPING, TRAIL, B. C.,

Has prospects for sale in Trail Creek and the whole of the Columbia basin. Will buy legitimate stock and mines for investors. Will examine mines. Has lots for sale in Trail and Deer Park.

DEWEY, STRONG & CO. PATENTS 330 MARKET ST. S.F. SCIENTIFIC PRESS PATENT AGENCY

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING NOVEMBER 23, 1897.

594,317.—PETROLEUM BURNER—F. C. Bates, San Jose, Cal.
594,234.—BICYCLE BRAKE—A. W. Duck, Oakland, Cal.
594,293.—DOOR WINDOW—J. Elwood, Sanger, Cal.
594,350.—CAR-BEARING ADJUSTER—C. V. Greenmayer, Los Angeles, Cal.
594,038.—PACKING MACHINE—E. Hanuk, Sacramento, Cal.
594,139.—METAL ROOFING—J. J. Knowlton, Oakland, Cal.
594,091.—GANG PLOW SEEDER—W. C. Matteson, Stockton, Cal.
594,092.—GANG PLOW—W. C. Matteson, Stockton, Cal.
594,351.—MINERS' CANDLESTICK—C. S. McCready, Bodie, Cal.
594,093.—ENVELOPE—W. McNaul, Bradley, Cal.
594,104.—FLAX THRESHER—J. Switzer, S. F.
594,043.—ROD COUPLING—Thompson & Abbott, Salinas, Cal.
27,882.—DESIGN FOR SPOON—R. Schaezlein, S. F.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CRUDE PETROLEUM BURNER.—F. C. Bates, San Jose, Cal., one-half assigned to J. W. Holland of same place. No. 594,317. Dated Nov. 23, 1897. This invention relates to an apparatus which is especially designed for the purpose of burning crude petroleum and particularly for burning it in stoves which are employed for cooking, heating, etc. It consists essentially of an enclosing box or case adapted to fit the firebox of the stove or other structure within which it is to be used; a horizontally disposed tray having shallow peripheral side flanges and means for introducing a regulated supply of petroleum to the bottom of the tray, a perforated pipe with means for controlling the supply of water thereto, so that the water is converted into steam which is discharged to mingle with the vapors of the hydro-carbon, an opening in the side of the case for the delivery of the burning gases, so that they may be carried up over the outside of the box and a preliminary igniting tray situated below the main tray, whereby the latter may be heated preliminary to the supplying of oil to it.

BICYCLE BRAKE.—Abram W. Duck, Oakland, Cal. No. 594,234. Dated Nov. 23, 1897. This invention relates to improvements in bicycle brakes, and it consists essentially in the employment of a pair of frictional rollers journaled at an angle with the line of travel of the wheel tire, so that when pressed downward upon the tire they produce by this difference in their planes of rotation a frictional pressure which is exceedingly effective in checking the movement of the wheel to which the brake is applied. This brake may be operated by any of the usual hand or foot levers upon either front or rear wheel, but a very convenient way of operating it has been found by connecting the rod which carries the rollers with a bell crank lever centrally fulcrumed curving backwardly over the handle bar, thence diverging a short distance parallel with the top of the bar, thus allowing the rider to actuate the brake by pressure with the thumbs of either or both hands.

WANTED

POSITION AS SUPERINTENDENT OF GOLD Mining property, quartz or gravel, or would travel as expert for good company. Address, "EXPERT," MINING AND SCIENTIFIC PRESS, San Francisco.

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LOW PLACER GROUND
IN CALIFORNIA, FOR DREDGING PURPOSES.
Must Exceed 50 Cents per Cubic Yard.
Send full description with price and terms to
W. H. BARRY, Occidental Hotel, S. F., Cal.

FOR SALE, AT A BARGAIN.

A complete Champion Prospecting Diamond Drill Outfit. Good as new. Used very little. Does successful work. For price apply to GOLD HILL MINING CO., Angels Camp, Cal.

FOR SALE CHEAP.

First-Class Air Compressor (Steam driven) and Drill, New.

Also, 3-Ton Capacity Pulverizer.

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GOLD! Promoter and capital desired to put in operation a new phenomenal gold extraction method which also manufactures gold. Address Box 576, Lincoln, Nebraska.

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Special attention given to preparing plans for the Chlorination and Bromine Processes of Treating Gold Ores.

PATENTEE { Brown's Complete Automatic Mill Process. Brown's System of Mechanically Stirred Roasting, Cooling and Conveying Furnaces, Etc.

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DEWEY, STRONG & CO., Patent Solicitors, 330 Market St., San Francisco, Cal.

Lunkenheimer's "Clip" Gate Valve.

Single Disc DOUBLE SEATED. Made with Screw Ends from ¼ in. to 3 in. sizes.

BEST IN QUALITY.
LOWEST IN PRICE.
THE ENGINEERS' FAVORITE.

These Valves are made of cast iron and all wearing parts of gun metal. They are superior to the common, cheap, brass valves with which the market is flooded.

WHY?

BECAUSE they possess all the advantages of a cast iron pipe fitting (Elbow, Tee, Coupling, Union, etc.) namely are heavy and rigid not injured by expansion and contraction or rough handling in pipe fitting. TAKE PRESSURE FROM EITHER END. Body and hub are held together by a steel clip, consequently always easily taken apart. Joint between body and hub made permanent by an imbedded seamless oval copper wire washer. If you desire the BEST, STRONGEST and MOST DURABLE valve for general purposes on all ordinary pressures, use this valve. IT IS A STANDARD FITTING, OF NEAT APPEARANCE and FULLY WARRANTED TO SATISFY. Made also in All Iron for Cyanide Plants. Try them and be convinced. Specify them and order through your dealer. Our Catalogue of superior Steam Specialties, FREE for the asking.

THE LUNKENHEIMER CO., Cincinnati, Ohio, U. S. A.,
SOLE MANUFACTURERS.
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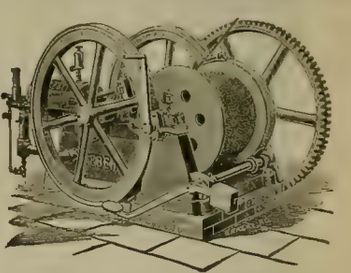
Weber GASOLINE HOISTING ENGINE.

MONEY SAVERS.

Costs to run One Cent per Horse Power per Hour. No Coal or Wood and very little water required.



This cut represents our 10, 15, 20, 30, 40, 50 H. P. Geared Hoist.

Hoisting for 32 Cents Per Day.

SAN PEDRO, N. M., April 23, 1897.

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KANSAS CITY, MO.

GENTLEMEN—Yours of the 14th at hand. The 10 H. P. "Weber" Gasoline Engine Hoist we got is "out of sight," and the longer we run it, the better we like it. We are now down with our shaft in the neighborhood of 175 feet. We only work one shift. All it costs us for gasoline is 32 cents per day. It takes us from three to four hours a day to do our hoisting. Yours truly, J. T. MCLAUGHLIN.

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CHLORINATION

And Other Aquarious Chemical Solutions. OUR FILTER PRESS Removes all Slimes and Hastens the Deposition of the Metals.

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RISDON IRON & LOCOMOTIVE WORKS, San Francisco, Cal., } Sales Agents.
C. B. BOOTHE & CO., Los Angeles, Cal., }

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DESIGNING AND CONSULTING

Mechanical and Hydraulic ENGINEERS.

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W. & P. Prepared Roofing.

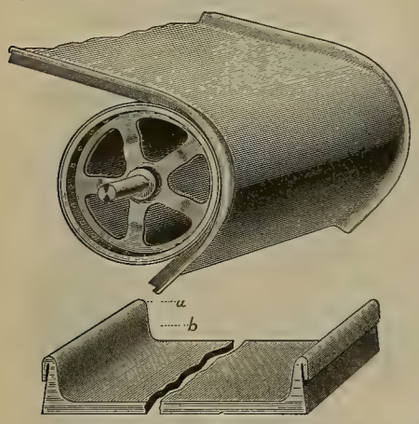
One ply. Cheap. Good for two or three years.
Three ply. A first-class roof.

BUILDING PAPERS, TARRED FELTS, ROOF PAINTS, COAL TAR.

Pacific Refining and Roofing Co.,

Sold by Dealers. 113 NEW MONTGOMERY ST., S. F. Send for Samples.

THE BROWNELL "PATENT LIP" FLANGE FRUE VANNER BELTS.



It has taken years of ceaseless testing and experimenting to produce the superior belt which we now offer, with elastic flanges and pliable body reinforced with specially woven duck. Every belt is manufactured by experienced workmen, and carefully tested on machines especially built for that purpose; consequently we are to-day manufacturing the best belts that mechanical ingenuity, combined with honesty of construction, can possibly produce.

SUPT. OFFICE WILDMAN GOLD MINING COMPANY, }
SUTTER CREEK, AMADOR CO., CAL., Feb 22, 1897. }

MR. JAS. S. BROWNELL, 132 Market St., San Francisco, Cal.—DEAR SIR: Replying to your favor of the 18th inst., will say that in the two mills operated by this company we have nineteen of your Patent Lip flange concentrator belts in use; some of them have been in constant use for the past two years and have given entire satisfaction. I know of no better flange for a side shake machine.

Yours truly, JOHN ROSS JR., Superintdenent.

MEXICAN MILL, EMPIRE, NEV., March 28, 1897.

MR. J. S. BROWNELL, San Francisco, Cal.—DEAR SIR: For some years we have used three different styles of belts on our Frue vanner at the Mexican mill, and for smooth working and endurance the Brownell Patent Lip flange belt has proved its superiority over all others, and I unhesitatingly recommend it to all who are using Frue machines.

Yours truly, EUGENE MAY, Foreman.

For any information regarding Frue Vanner or Belts, call on or address

JAS. S. BROWNELL, Western Agent FRUE VANNING MACHINE CO.

(Successor to Adams & Carter.) 132 MARKET STREET, ROOM 15, SAN FRANCISCO.

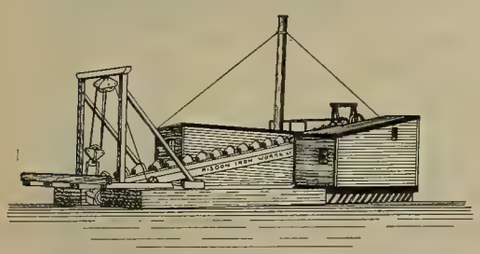
RISDON IRON WORKS,

MANUFACTURERS OF

Gold Dredging Machinery

FOR

★ YUKON ★ and ★ KLONDIKE. ★

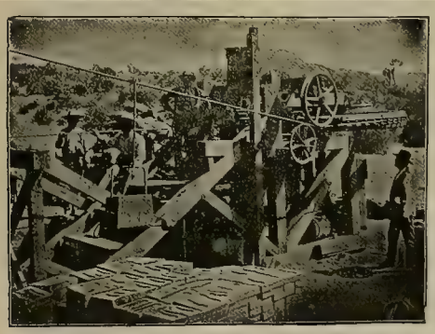


Our MINING RIVER DREDGE is just the thing for placer mining in Alaska.
Shipped knocked down and, if desired, erected in running order.

WE ALSO MANUFACTURE ALL KINDS OF

MINING AND MILLING MACHINERY,
ENGINES AND BOILERS, STERN WHEEL BOATS,
EVANS PAT. HYDRAULIC ELEVATORS AND HYDRAULIC GIANTS.
WATER WHEELS AND SHEET IRON RIVETED PIPE.

Office and Works: Howard and Beale Streets, S. F., Cal.



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Stands pre-eminent for the transportation of Ore, Fuel and other materials over mountainous and rugged country.

Parties desiring to remove large quantities of Sand, Gravel, Earth, Ore, Rock, to construct Dams, Levees or Embankments, etc., can do most efficient work at less cost by the

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Than by any other known system.

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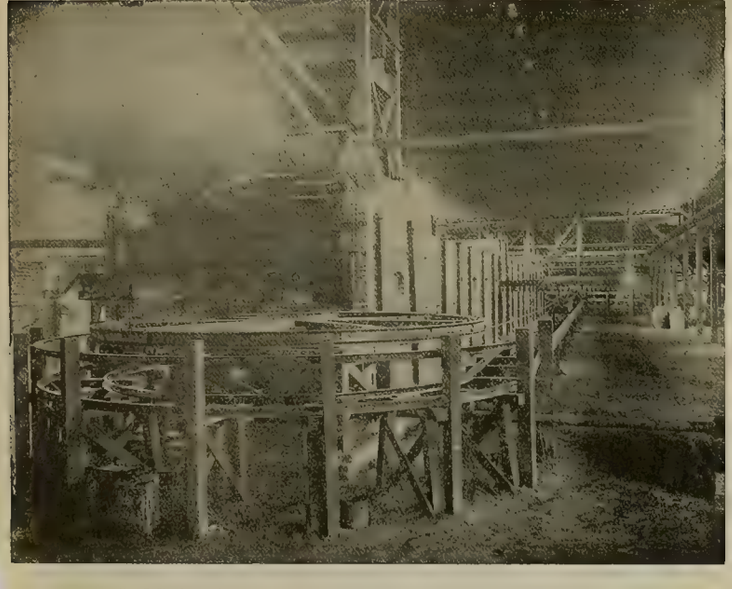

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PARKE & LACY CO.

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Mining Machinery & Supplies.

Sole Licensee for the Manufacture and Sale of the

ROPP STRAIGHT LINE FURNACE

FOR ROASTING, CHLORINATING AND DESULPHURIZING ORES.

Extracts from Letters Received from Mr. Philip Argall, Manager the Metallic Extraction Co., Cyanide, Colorado:

January 2, 1897.

"The roasting is invariably good. We can do 80 tons per day to 0.13% sulphur, when everything runs s[illegible]th. Our month record which, of course, includes all delays, is 1700 tons, from 1.94% sulphur to 0.3[illegible]

February 19, 1897.

"Our [illegible] running very nicely indeed, averaging 90 tons per day to 0.10% sulphur, and doing excellen[illegible]t, it has improved right along and we are highly pleased with it.

"For 24 hours [illegible] to-day 102 tons were roasted."

The ROPP F[illegible]NACE is now in successful operation at the following reduction works: The Hanauer Smelting Works, Salt Lake City, Utah (one furnace); The Metallic Extraction Co., Cyanide, Colo. (one furnace); The Colorado-Philadelphia Reduction Co., Colorado City, Colo. (three furnaces); The Selby Smelting & Lead Co., Selby, Cal; (one furnace); The Mount Morgan Gold Mining Co., Rockhampton, Queensland (one furnace); and Broken Hill Proprietary Co., Broken Hill, New South Wales (two furnaces).

Catalogue on Application.

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MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

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Vein Structure in Nevada Co., Cal.

In the issue of Nov. 6th appeared some illustrated mention of vein structure in Nevada Co., Cal., which has elicited much remark. Therein was noticed the character of the Idaho-Maryland, the Mountaineer and Omaha veins, where the vein consisted of a filling of white quartz from 2 to 3 feet wide between two parallel surfaces, with local pinches; in places the vein losing its regular character by reason of brecciating of the hanging wall. Another class of vein to which the Empire and North Star and others belong, presents more complicated structures. In them the simple clean break is replaced by a compound one, in which two or more distinct fractures have been formed at a distance of a few feet; between these lies more or less crushed and brecciated rock. Quartz-filled fractures lie along the hanging wall, the footwall, or along any minor break in the rock between the walls. The latter may more or less distinctly assume the character of a breccia cemented by quartz. It is usual, however, to find the main quartz vein close to the hanging wall. The rock between the walls is always most altered by metasomatic processes. The little veins and seams, sometimes (as in Fig. 1), forming a network in it, are predominately composed of calcite.

FIG. 2.— NORTH STAR VEIN, NEAR 1800-FOOT LEVEL, SHOWING QUARTZ VEIN IN BRECCIATED AND ALTERED DIABASE.

This structure is also illustrated by Fig. 2, both illustrations being from the North Star—the one near the 1700-foot level, the other near the 1800-foot level. The hanging wall is generally more distinct than the footwall. In these examples the evidence of extensive movement along the vein is less pronounced, the brecciated structures indicating a sudden short break rather than a long-continued grinding of the walls against each other. Schistose structure, due to the latter condition, occurs in places—for instance, along both walls of the Idaho-Maryland and the North Star, but only in the Ural and Merrifield veins does it become prominent. In these the quartz, where the vein is simple, is adjoined by several feet of schistose rocks, produced by the pressure and movement along the fissure; where the vein is compound, smaller streaks and seams of quartz are distributed through this schist, which may attain a width of 20 feet or more. The width of the quartz vein may in some cases attain several feet. On the Merrifield vein a width of 6 and 10 feet of solid quartz has been observed, and in the Ural vein, in the Nevada City mine, one smaller ore body reached 12 feet. Ordinarily 2 to 3 feet is the width of the Ural and Merrifield veins. Some veins in the Nevada City district do not average 2 feet in width. In the U. S. Geological Report, 1895–6, Waldemar Lindgren, from whose article on vein structure is quoted, says: "The Grass Valley veins are narrow, excepting the Idaho-Maryland, Gold Point, and a few more, and scarcely average 18 inches in width. Many veins, such as Houston Hill and Norambagua, have paid wel with an average width of 6 inches, or even less. Seams with only an inch or two of quartz will sometimes contain an extraordinary amount of gold."

FIG. 1.— NORTH STAR VEIN, NEVADA CO., CAL., NEAR 1700-FOOT LEVEL, SHOWING 2-FOOT QUARTZ VEIN AT HANGING WALL AND ALTERED DIABASE WITH CALCITE SEAMS BELOW.

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J. F. HALLORAN.....General Manager

San Francisco, December 11, 1897.

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In 1890 Colorado produced $4,156,229 in gold. For '97 that State expects to show a gold output aggregating $18,000,000. The great increase is due to the slump in silver, the universal search for gold, the improved scientific and mechanical devices for successfully handling low grade ore, and judicious advertising.

Recent articles in British mining journals about American mining investments, meaning, largely, California mining investments of British capital, would lead to the inference that "Yankee tricks," whatever they may be, were matters of usual local practice. In this regard it is interesting to note on page 554 of this issue the remarks of the chairman at a recent meeting in London of the Drake Properties, Ltd., where he says that the experience of his company with "the American vendors" was in every way satisfactory.

Senator Stewart's views on the proposed change in the Federal mining laws are given on page 550. Of course he opposes the general idea. He filed a caveat in this matter a generation ago and wants no interference with what he considers his vested rights. Sometime he will not be in the U. S. Senate. When that day arrives it will be easier to secure necessary changes in the mining laws of this country. Senatorial courtesy, respect for age, adherence to tradition and official inertia make slow the advance of reform.

Inquiry is still received at this office from possible and probable Klondike adventurers, asking for information as to prospects in connection with that new El Dorado. Nothing good can be said that is new, and nothing new can be said that is good. Disappointment awaits nine hundred and ninety-nine out of every thousand who start. There is no use to go to Dawson City unless one has several thousand dollars to buy a claim. He stands no show to otherwise secure ground in that vicinity, and the average Eastern man who would start on an adventure of that kind has no need to go, if he has as much money as would be required to make the trip and get anything. That men can get to Dawson next summer is an easy problem. Many of them will turn back almost immediately after arrival, a few will scatter out, but the vast majority will be terribly disappointed. Our advice is that no one should think of starting for that country without the possession of a stout constitution, at least one thousand dollars in money, and with the full knowledge that he is risking his life; and that even should he win wealth, it will be at the expense of his health.

Of Immediate Importance.

A Golden Jubilee Mining Fair is proposed to be held at Mechanics' Pavilion, San Francisco, beginning January 24th, 1898, and ending February 6th, 1898, all exhibition space to be free. This is the business part of the coming Golden Jubilee, celebrating the fiftieth anniversary of the discovery of gold in California, and it is worth the attention of every one directly or indirectly connected with the mining industry in California. It deserves and needs the active and hearty co-operation of all to make it the success that it can be and should be. Energetic men have taken hold, committees have been appointed, the preliminaries have been about arranged, but there still remains a great deal of actual work to do.

The Mining and Scientific Press has been asked to again call special attention to the propriety of the miners of the State making due exhibit. This enterprise is purely an advertisement, and as an advertisement it should be considered. It is the province, and should be the immediate purpose, of every mining county in the State to make due and creditable display of its mineral products at the Mechanics' Institute Exposition Building during this Jubilee Fair.

Superintendent Gilmour desires it publicly announced that after the 20th inst. he will be ready to receive and to properly place all exhibits forwarded to him. It is understood—but cannot now be definitely stated—that Wells-Fargo will transmit free such exhibits. This is a matter that should need no further urging on the part of this paper. Probably the better way would be for each county to arrange to what extent it shall take part in this exhibition, and who shall manage it. There will be room for all. Immediate organization in this regard is necessary. In all counties where there exist County Miners' Associations in connection with the California State Miners' Association, those in charge of that organization should immediately make arrangements for attractive and effective displays, contributing the best display of mineral wealth it can secure, together with all possible in the way of maps, models, etc. It is intended in general, during the exhibition, to give due prominence to every department of gold mining in this State. Where there is no county organization the most prominent and influential miners in such county can consider themselves appointed as a committee to take charge of this work, and to do all possible to secure proper representation in their county. On the principle that what is everybody's business is nobody's business, these things are sometimes neglected. But the time is short and enterprise and public spirit will suggest that necessary action in this regard be immediate.

This is the opportunity for the mining counties of California to have appropriate advertisement. This is the age of advertising; no matter what one has, if he wants it known, he must advertise it now. This rule applies to all cases whether it be an individual or a nation. The time has gone by when it is considered necessary to argue affirmatively the necessity of advertising; it is universally recognized. Widespread advertising is what has created the present Klondike attraction. Colorado understands this matter thoroughly. That enterprising State is now sending out two finely equipped palace cars full of samples of ore, finely colored portraitures of mining scenes, milling plants and descriptive literature, correct, truthful and up-to-date, which is to be distributed from the cars as they progress through the region east of the Rocky mountains. They are to traverse the leading railroads of the United States. Colorado is a splendid advertiser; her railroads annually spend tens of thousands of dollars, and the reward is reaped by the bringing in of money into that State. In this, Colorado is ahead of California. California has always maintained pre-eminence in the gold yield of any commonwealth in the United States; Colorado holds second place and proposes, if push and enterprise can do it, to rank first. It is for California to say whether it will or not. Such an exhibition as this to be held in this city in the early part of '98 will largely determine that.

The time is most propitious, when thousands of energetic men will shortly be headed this way en route to the Klondike. Whatever may be said of their judgment, it must be remembered that mining crazes are as periodical as financial panics. At present the craze is toward the Klondike, and it must run its course. It is largely for California to say how much of the enterprise and energy will be directed this way. There is no sentiment about this matter; it is purely a business proposition. Men are going to the Klondike by the thousands—many of them without the remotest idea of what gold mining is, or how it is done. This proposed California exhibition will be a practical object lesson to them, and particularly from the fact that it is proposed to make it worth their while to buy their outfit in this city. The scientific, practical and economical manner of gold mining, as shown at this exhibition, and the display of the State's mineral resources, would naturally affect them favorably toward this State.

We of California know that it is unnecessary for gold hunters to leave the boundaries of the State; or once here, to go elsewhere to find what they seek; but because we know it, does not argue that others have that information. There is a dense amount of ignorance existing as to the extent and present importance of the mining industry, and it is for the State that has thus far held the lead in the gold production of the world, to dispel that as much as possible.

This is not a matter solely for San Francisco; it is the business of the State, and should be an enterprise fostered and furthered by the entire commonwealth. The question for those who are subscribing to the fund in this city is not just how much they shall individually benefit by it; but what are the direct results that will accrue from their subscriptions in the way of increased trade, in which they must necessarily share. If one-tenth of those who come with money and energy to seek fortune in the drear Yukon region can be shown by practical actual proof that California is the better place to expend their energy and money, it will be of material benefit to the commonwealth; and it is with this end in view that the mining exhibition proposes to have its largest measure of success.

So far, the Mining and Scientific Press has refrained from proffering any advice regarding the details of working up this entire matter—which was first suggested in these columns; but it cannot refrain from directing the attention of those engaged in the furtherance of the scheme to the immediate necessity for extensive advertising in the East. Every dollar so expended will be returned a hundred times over. By "advertising" is not meant the distribution of little circulars and dodgers now being sent out. These don't amount to anything, anywhere, any time, for any purpose. The jubilee and the fair should be thoroughly exploited and noticed in the different business centers of the Union. It would pay the special committee having charge of this part of the work to get some experienced advertising man to take charge of that entire matter. If the reports in the dailies are to be credited, the advertising part of it is being very weakly conducted. Space should be at once secured in all the leading Eastern papers, and the matter fully advertised therein. The Associated Press would gladly aid in the matter, if it were properly placed before the local managers; and this kind of advertising would be most effective of all, for, as in other things, there are things that money cannot secure, and that kind of advertising is the best. Seattle and Portland have shown what is possible in that regard, and San Francisco should not be slow to profit by their example. These two enterprising cities have sent out, through their Associated Press agents, statements that necessarily fell under the eyes of millions of people. This could be done from here and should be done at once. Everyone who reads a newspaper in the Union could thus be made aware of the fact that in the State where gold was discovered fifty years ago, and which still leads in its annual production, the Golden Jubilee of such discovery will be appropriately celebrated; and that in the chief city of that State will be a mining exhibit of six weeks duration, which will show the latest and best methods of gold mining in all its branches, and which will be an epitome of the half-century of successful mining that has been the chief factor in creating the prosperity of the State and building up this west half of America.

Cheap Mining and Milling of Ore.

Some reference was recently made herein to the low rate of mining and milling gold ore in various localities—South Dakota, Colorado, Australia, Alaska, and California. Subsequently a statement appeared from one of our traveling correspondents that at the Monte Cristo mine, east of Jackson, near Volcano, Amador county, this State, where the vein carried an average value of $2 per ton, ore is mined and milled at an average cost of 60 cents per ton. This statement has elicited several inquiries as to its authenticity, the low cost of mining and milling having attracted considerable attention. The statement is believed to be substantially correct, though details are not to hand.

Such low rate is, however, not unprecedented in this State. At the Spanish mine, Washington, Nevada county, Cal., has been furnished a similar record. There the vein averaged 90 feet in width, the hanging wall being a soft shaly slate, the pay ore being found on that side. There was a 1200-foot tunnel, the vertical distance from the surface being 350 feet. The ore was hauled out by gravity, the empty cars being hauled back by mules. The ore was passed through a Blake rock breaker and ground in roller mills, of which there were three of 5 feet and one of 4 feet diameter. The mills made fifty-eight revolutions per minute and were fed by automatic ore feeders. The following is a record of one month's run of the mine:

MINE—COST OF PRODUCTION.

Run: Twenty-eight days' work produced 3143 tons of ore.

	Labor.	*Supplies.*	*Total.*
Extracting ore	$ 703 50	$113 41	$ 816 91
Delivering ore to mill	160 20	17 95	171 15
Dead work	105 20	10 93	116 13
General expense	78 35	1 95	80 30
Total	$1,047 25	$144 24	$1,191 49
Cost per ton	304	042	346

MILL—COST OF REDUCTION.

Run: Twenty-four and a half days reduced 3443 tons of ore.

	Labor.	*Supplies.*	*Total.*
Mill expenses	$ 227 32	$194 33	$ 421 65
Water for power	.....	161 70	161 70
Handling ore	154 50	5 35	159 85
General expense	78 40	1 95	80 35
Total	$ 460 22	$363 33	$ 823 55
Cost per ton	133	106	239
Bullion produced			$3,138 55
Total expenses			2,015 04
Profit			$1,123 51

It will be seen from this that the ore only yielded a trifle over 91 cents per ton, yet a profit of 32.6 cents per ton resulted, the total cost of mining and milling the ore being 58½ cents per ton. The percentage of profit was 35.8 of the total. In the previous month 2796 tons of ore were worked, which yielded $1.16 per ton. The profit was 56 cents per ton, or about 48 per cent of the total. The profit that month on a yield of $3,268.49 was $1,572.91. The cost of mining that month was 37½ cents and of milling 23 cents per ton, an average for the two months of 59½ cents per ton.

A Case in Point.

It will be remembered that the last California Legislature passed a law which, among other things, abolished mining district recorders in this State. Several sections of that law have been generally condemned by practical miners. Last July, in a case involving this point, before the Superior Court of Mono county, Cal., Judge Virden decided the law to be unconstitutional. So far as known, the case has not been carried to the Supreme Court of this State. Commenting on several communications received in this office from various parts of the State on this subject last September, the MINING AND SCIENTIFIC PRESS set forth very clearly that, however distasteful the law may be, the right of the State to make such law is absolute, and its mandates must be complied with. The best way to secure the repeal of a bad law is to strictly enforce it, and it is not improbable that the next State Legislature will repeal this statute. As to Judge Virden's decision (without discussing its justice), it is certain that, were it appealed to the Supreme Court of the State, it would be reversed.

A case directly applicable to this has recently been decided by the Supreme Court of the State of Utah (in which State a similar law was recently enacted), the decision being in the last number of the *Pacific Reporter* in re Monk, page 810, wherein J. T. Monk, who was recorder of the Big Cottonwood mining district in Salt Lake county, Utah, was ordered by due process to deliver to the recorder of the county the records of his district. He refused to obey, was adjudged guilty of contempt and committed to prison. Monk was afterward brought before the court on writ of habeas corpus, but was remanded to prison. From the order refusing to liberate him he appealed to the Supreme Court. Chief Justice Zane of the Supreme Court goes over the case at some length. The following paragraph is directly applicable to the controversy in this State regarding this same matter:

The petitioner also contends that the provisions of the State law above quoted, requiring county recorders to perform the duties performed before by the district mining recorders, and requiring the latter to deposit the books and records of their offices with the county recorders of their respective counties, conflict with a law of the United States regulating the disposition of its mineral lands. The claim is that section 2324, Rev. St. U. S., confers the authority upon the miners of the respective mining districts to make regulations governing the location, and recording of all papers necessary to hold possession of mining claims and required to be recorded. The provisions of the above section of the law of the United States, so far as material to the point, are: "The miners of each mining district may make regulations not in conflict with the laws of the United States or with the laws of the State or Territory in which the district is situated, governing the location, manner of recording, amount of work necessary to hold possession of a mining claim, subject to the following regulations: * * *" This law gives the miners the authority to make such regulations not in conflict with the laws of the United States or with the laws of the State or Territory. The Federal Government has made no provision for a recorder in mining districts. The authority to provide for recorders, and the recording of all papers to be recorded in locating and holding mining claims, is left to the States in which such locations are made. If the State does not exercise the power, the miners of the district may. By enacting the law in question, the State has used its power. The judgment of the court below appealed from is affirmed.

Of Present Importance.

A decision of considerable interest to holders of unpatented mining claims was made last week by Judge Rust of Amador county, in this State, in regard to the important matter of proper assessment work. Practicelli, plaintiff, located a quartz claim in the Clinton Mining District, Amador county, January 1, 1897, and recorded it the next day. The defendant, Gilbert, had located the same claim February 23, 1892, and assumed throughout to have valid possession. Plaintiff denied that during the year 1896 defendant had performed any labor or placed any improvements thereon, and claimed that defendant had forfeited all rights thereto. The decision (which covers three ordinary newspaper columns) showed that the Judge entered fully into the merits of the case, the pivotal point being whether or not the defendant, in 1896, expended any labor or placed any improvements to the amount required by the Federal Statutes, that being the year plaintiff claimed defendant had not done so, and that such neglect entitled him to enter and make his claim on January 1, 1887.

There was a great deal of evidence, all of which tended to show that considerable money had been spent by defendant on the property, shafts sunk, tunnels run, pipe laid, etc.; but that the last actual development work, within the meaning and intent of the statute, was done prior to March 20, 1894, and that in the year 1896 no real assessment work had been done. It was evidently a case wherein he believed he was doing all that was required, but, unfortunately, ignorance was no excuse. He seemed to have considered that by living near the claim and being frequently upon it, by pounding up rock, taking out samples, washing decayed quartz, etc., he was complying with the statute. But the law, which says that labor and improvements, actual and valuable, to the amount of $100 shall be performed each year, was not complied with; hence, though manifestly reluctant, Judge Rust was obliged, according to the strict construction of the law, to give judgment in favor of the plaintiff. The property is believed to be valuable, and the incident should be a warning to careless owners of unpatented mining claims—that unless the law is complied with, they are at the mercy of anyone who sees fit to take advantage of their remissness. Only twenty days remain to perform the work necessary to hold any unpatented mining claim on which such work has not been done for the calendar year ending December 31, 1897. This, however, does not apply to any mining claim originally located subsequent to January 2, 1897, on which the locator has till December 31, 1898, to do the required assessment work.

ANY CASE involving tunnel site locations always excites considerable attention. The latest reported is from Colorado. The contest is between W. S. Stratton, owner of the John A. Logan claim, and the Gold Sovereign Mining and Tunnel Company. This case does not involve the ownership of a lode or other discovery. The tunnel company claim the right to pass through patented ground in the prosecution of its work. Mr. Stratton enjoined the company, claiming that he owned the patented location; that his rights of possession dated back to his first location, which was made prior to the location of the tunnel company, and that the defendant had lost whatever rights it ever possessed by failure to prosecute the work, required by the Colorado statute. He also claimed that the statute of Colorado of 1897, giving tunnels the right of way to cross patented claims, violates the State and Federal constitutions and is void. Defendants claim that the case could at best be one of trespass, for which an injunction could be issued or refused; that the tunnel could not cut plaintiff's vein by reason of position, and that the broad construction given by the Supreme Court of the United States in the Rico-Aspen case justifies their position. This case does not involve the ownership of ore bodies encountered in driving a tunnel, its sole importance being as to the question of right under the law for a tunnel to pass through private ground. If the State law is sustained, a tunnel company can run its line through both end lines of a patented claim, traversing the lode for 1500 feet, to the detriment of the claim owner's plans for working and an attendant increase of cost for development of the property. The decision will be looked for with considerable interest.

THE Los. Angeles (Cal.) Mining Exchange is now dealing in non-assessable stocks, somewhat after the Colorado method, and some criticism is vouchsafed in contrast to the San Francisco method of handling stocks which are subject to assessment. This matter has been so often discussed that little remains to be said that has not been better said already. To those who approach the subject with settled convictions either way argument is useless. Where the company has plenty of money at the start probably the non-assessable plan is a good one, though usually corporations on that basis come to grief in case of the refusal on the part of stockholders to agree on some plan for providing sufficient development funds. True, owners of assessable stock may be frozen out, as indeed any good thing may be abused; but so far as is known no successful substitute has been found for an assessment where money is needed to prosecute further work, with the alternative of either supplying the money or shutting down. So long as men are of different minds, some willing to put up money, others unwilling, so long the plan of assessing stock as usually practiced in this State will obtain.

THE Atlantic & Pacific Aerial Navigation Company of San Francisco seem to have the courage of their convictions, so far as furnishing money is concerned. They contemplate the building of an airship and have secured from the Pittsburg Reduction Company of Niagara Falls, sheets of aluminum of unusual size. They propose to use these sheets in the manufacture of a cylinder, which will be 38 feet 2 inches in diameter, and 9 feet in length, with a forward cone of 50 feet and a rear cone of 45 feet. They propose to use this cylinder in the construction of an airship which will cost $15,000, weigh about 5000 pounds, and carry one ton of passengers and provisions. It is proposed to propel this machine by a gasoline engine of 100 H. P. This the company thinks will solve the problem of transportation to and from the Klondike.

FROM New Haven, Connecticut, the city of colleges, comes important information of the formation there of a company to extract gold from sea water. The process, (which, of course, is secret), has all been "thought out." The principal stockholder says he would not take $1,000,000 (one million dollars) for his stock. Additional information is vouchsafed that a grist mill will be used, probably to secure the flour gold.

Hydraulic Gravel Elevator.

Gold-bearing gravel worked by the hydraulic process is washed down by streams of water, under great pressure, thrown against it through nozzles. One problem is to get rid of the tailings or debris after the gold has been taken out in passage through sluices and undercurrents. It sometimes is easier to find the gravel in place than to find a place for it after it is washed down. It is this mass of waste material which brought up the debris question in California. To properly work one of these hydraulic mines, means must be provided for the washed-down gravel, dirt, rocks, etc., to be carried away. This cannot be done by hand, the volume being too great. Accordingly the miner, in working such claims, runs deep bedrock cuts to the face of the bank, so as to give suitable fall for the water to carry the waste off. The dump must be lower than the bottom of the gravel, which rests on the bedrock. Without sufficient down-grade from the mine to the dump the mine cannot be worked under ordinary conditions. Sometimes long bedrock tunnels have to be run (as at the North Bloomfield) in order to get this fall, but generally deep cuts in the bedrock serve the purpose, and in them the sluices to save the gold are placed.

The hydraulic gravel elevator permits of the debris or waste being lifted and run off through a flume. By this means low ground, without fall, may be worked; or the debris can be thrown back into old workings and kept out of the streams. The cut on this page shows the application of this system where the mining ground is lower than the dump, representing the elevator in place, with its outer discharge flume conducting the washed material of earth, sand, gravel, etc., to a final dumping point.

DEBRIS PASSING FROM HYDRAULIC ELEVATOR VIA FLUME.

The principle upon which the operation of the hydraulic gravel elevator is based is the fact, well known by hydraulic miners, that water and gravel can be driven uphill by hydraulic force, and that in a flume it is only necessary to give the impelling water more velocity to make it carry more earth or gravel before it. Miners, to accomplish this, give their flumes more grade. It is, therefore, only necessary to give water more velocity than it has through an ordinary flume to make it acquire sufficient force to carry gravel up an inclined plane. This fact long since suggested the construction of a form of machine which should be so direct and confine the inherent force of a hydraulic stream as to impel before its power masses of earth or gravel or other heavy material.

An inclined pipe is connected with the flume and one end led to a sump or depression in the ground. The open end of the ground section of the pipe is concave in shape, or a lower half-section of pipe flaring outward, into which the earth, sand, gravel, etc., are sluiced by hydraulic giants; the elevator entrance and throat sections are set in a chamber excavated below the bedrock surfuce. The material sluiced into this entrance is taken up by the stream issuing from a fixed hydraulic nozzle, which, by its impinging force, impels it forward and upward through the pipe to its point of discharge into the open flume above, whence it is carried away through a line of sluice boxes to a final dump. Confined as this material is within this tight iron pipe, it is necessarily impelled forward with the velocity of the stream itself, and as each particle of gravel or other material is directly acted upon by the full force of the stream discharged through the hydraulic nozzle it is necessarily disintegrated by this action, as well as by the friction along the pipe in its ascent, and the pulverization is complete.

Of course, it costs more to work a mine on this plan than on rough hydraulicking. More water must be used, for there must be a nozzle for the elevator to force the water up, as well as a separate one to wash the material down from the bank, and each of these nozzles must have a supply of water under pressure. But by using this system areas which have been piped out in the past can be utilized as reservoirs for impounding the debris from the remaining banks. This system has been successfully used for some time in this State, Colorado, Montana and British Columbia, mainly for working ground too low to provide suitable fall; but it can also be used, where circumstances favor, for working mines where the debris can be thrown back into reservoirs and kept out of the streams. The waste water is also forced up with the gravel and debris, though sometimes an injector, also operated by water, is used to lift this waste water to the flume that it may flow off.

Some Notes on Glacial Action.

Written for the MINING AND SCIENTIFIC PRESS by WALTER C. CHAMBERLAIN, Geologist.

Following close upon the cessation of volcanic activity in the mountain ranges of the Pacific slope, a glacial period, which is supposed to record from about 250,000 years ago, took place.

It appears—quite a remarkable coincidence—that immediately following the close of this tremendous outburst of fire and latent force through volcanic rents of the Sierras, and other ranges of the coast, a condition of glaciation should have enshrouded this portion of the globe, yet a strong body of evidence goes to prove that it really occurred, transforming the Sierras from their aspect of a seething cauldron of ruddy glow to one of a cold and lifeless mass, in the brief transition between the Pliocene and glacial ages.

The mighty forces exerted by glaciers, and their capacity for transportation, appears to be more marked further East than in some of the Middle States, where immense rocks, weighing many thousands of tons, transported hundreds of miles, stand as monuments of evidence to the powerful energy of these ancient herculean rivers of ice; although this has been disputed, many inferring that glaciers were not the agency by which these deposits of ponderous rocks were made. However, scientists are open to any explanation, and any rational reason for their presence through any other source would be willingly listened to. I fail to see how any power outside of the enormous force of glacial action, which exerts an energy equal to forty pounds to the square inch for 100 feet thickness of glacial ice, could have accomplished such a feat; certainly water has not the power for such transportation.

There have been various arguments advanced by scientists in reference to the altitude of the earth's surface during the glacial age, some claiming that a glacial period is an impossibility without abrupt elevation of some sort, others asserting that glacial periods are produced from physical phenomena, in conjunction with some slight geographical change of the earth's surface.

In the Pliocene age the mountain ranges of the Pacific coast had quite an elevation, which is shown by the Pliocene rivers. In the East this is not the case, the Middle States at present being devoid of elevation above an ordinary prairie level. They may have had an elevation sufficient to furnish gravity to the moving masses of ice, but it seems more plausible to believe that where this large distribution of rock took place was but a shallow sea, covering a submerged continent, glacial activity being, therefore, confined to the highest mountain ranges, which furnished rocks and other detritus that adhered to the glacial discharge in the form of icebergs. It hardly seems possible that a whole continent would rise and subside in order to furnish a glacial condition. In studying the subject it appears that the energy exerted by glaciers came from the north or northeast—from the direction of the pole, at least—and was not universal. If caused by extreme elevation, it was confined chiefly to the influence of the above direction. If from physical cause, the solving of the phenomena will be open for future study.

Returning to the Pacific side of the discourse, glaciers during their periods of operation in the Sierras, aided by atmospheric agents, made great inroads on all classes of friable lithological matter and outcropping ledges in their path. From two to three thousand years of glacial energy by these colossal engines of nature would outclass the work of all the stamp mills in the world for years to come. If this theory holds good, the placers of California would have been far richer had the glacial period occurred previous to the Pliocene age, the surface being then in a virgin state. Dissolution of rock through such a source would have been comparatively an easy task.

The Pliocene age, which preceded the glacial period, was a very peculiar one in geological history, because it marked such a complete revolution of conditions, and especially in the mountains of the Pacific slope. Previous to the short geological age which forms the transition between the two ages in question, the Sierra Nevada mountains were the scene of powerful volcanic eruption, the seat of the activity extending high up into the range. This long siege of volcanic action caused emissions of lavas which were remarkable for their intricate variety and high percentage of silica. Trachytes, liparite and rhyolite followed one upon the other in close succession, finishing chiefly with a capping of basalt, a material which is slowly acted upon by erosive or other agencies, and noted mainly for the protection it gives to the underlying strata. Its indestructibility has proved a shield to all classes of matter covered by it, and in some places it reaches a thickness of a thousand feet or more, having smothered the Pliocene ledges and rivulets with their precious sediment of gold-bearing gravels, where they must await release at the hand of the indefinite future. These two mighty forces occurring so close to each other marks two geological ages of great import to the past history of auriferous deposits on this coast.

Glaciers, and the conditions which attended them, were nature's stamp mills of prehistoric time, and were it not for the canopy of basalt which guards the treasure of our golden Sierras, as though it played the part of a sarcophagus, under whose massive seal reposed a deceased and much-lamented monarch, the gold output of California would have been a subject for our imagination to wonder at. As it is, mining in California, from a standpoint of science, is an industry only in its beginning, with a long and glorious future for all who exploit it with prudence and honesty.

AN artificial stone now being made at Woking, England, by the Owen process, consists of 87½ per cent of quartzose sand and 12½ of lime, which, first being sifted and mixed, are subjected for thirty-five hours to a hydrostatic pressure of sixty pounds to the square inch. A distinctive feature of the process is the boiling of the water used before it is pumped into the pressure chamber, the driving out of all air in this way being claimed to obviate blow holes and similar defects in the stone. The product improves with exposure to the atmosphere, being capable in a month of standing a pressure of 4000 pounds to the square inch. It is cast to any desired form in steel moulds. Pieces of the material have been repeatedly subjected to sudden cooling from a high temperature and to freezing—while saturated with water—and sudden thawing, without any signs of disintegration.

A "Pocket" Horizon in Trinity County, Cal.

Written for the MINING AND SCIENTIFIC PRESS by OSCAR H. HERSHEY.

Between the foot of the eastern slope of the White Granite mountains, which occupy the northwestern portion of Trinity county, and the summit of the Trinity range, which constitute its eastern boundary, is a region of mountains and valleys which is pre-eminently a "pocket country." Topographically it is characterized by steep slopes between 500 and 2000 feet in vertical amplitude, with narrow crest ridges and almost equally as narrow valley bottoms. Beginning on the west, there is first a long slope to the axis of the valley of the East fork of Stuart's Fork of the Trinity river, thence a rapid rise to the crest of the Minerva range, on the east of which is the deep valley of the Trinity river. Beyond it the ridge crests rise to an altitude of between 4000 and 5000 feet above the sea and culminate in the summit of the Trinity range. Every portion of this mountainous area is easily accessible to prospectors and good wagon roads follow the main streams.

The main features of the geology of the region are simple. There is a basement rock series of igneous or ancient quasi-volcanic material. Its prevailing characters on outcrop in the area under discussion are those of a compact, fine grained, dull green massive rock closely resembling certain varieties of basalt. When exposed it has a ragged appearance because of extensive jointing, but it lacks the stratification lines of slate. Near the surface it is very frequently amygdaloidal, the original rounded cavities being now filled with white quartz. Several hundred feet below the top of the formation it becomes coarser grained and finally passes into a coarsely crystalline rock of gray color and a composition like diorite.

Resting upon the igneous formation is a series of alternating thin-bedded black slates and thick-bedded blue quartzite which collectively constitute the black slate formation of probable Carboniferous age. In general, the slate formation remains practically in its original horizontal position except that it is gently arched with an axis along the summit of the Trinity range; but considered in detail it is much disturbed by faults and imperfect folds of small dimensions so that locally it presents dips of high degree, in not a few cases vertical and even overturned. The igneous formation has participated in these disturbances to a certain extent so that the contact between the two varies as much as 600 or 1000 feet in altitude between the two sides of a narrow ridge. In the valley of the Trinity river, the contact line averages several hundred feet above the stream level between Trinity Center and Eastman gulch, but in places rises to 700 or 1000 feet and in others the black slates come down to the river level. But disregarding the local variations it may be said that the green igneous rock forms the foundation of the entire region, outcropping in the valleys, passing through under the mountains to reappear in a distant valley or gulch. The black slates form the bulk of the mountains, capping every ridge and always seen in place above the green rock. The valleys are merely gigantic ditches cut by nature through the black slates and into the green rock below. These facts are of great importance to future mining operations in the region in question.

The contact between the massive green igneous formation and the black slates has so far proven to be the "pocket" horizon of the territory. Some gold in quartz ledges of low grade has been found in the green rock formation and perhaps a little may be scattered through the black slates above, but all the "rich strikes" have been made at or in the immediate vicinity of the contact. By reason of a long period of weathering in some ancient time, the green rock near the contact with the black slates has been softened and semi-decomposed and changed to a dull brown in color. It is popularly known as porphyry, but is as far from being a true porphyry as it can well be. Immediately above the contact the black slate frequently has a shining luster, a coal-black color and a schistose structure quite unlike its usual characters. Sometimes there is a thin vein of quartz between the so-called porphyry and the black, slaty material, but generally they are separated merely by a thin seam of ferruginous dirt or by nothing at all. The dirt seam often carries a little free gold, but the "pockets" are found where seams of quartz penetrate the "porphyry" downward from the contact. The gold lies in a thin, flat sheet upon the igneous rock and under the slate, and in some cases extends a short distance into the former formation, rarely into the latter.

Without discussing the causes of the presence of the gold at the contact, I wish to call attention to the fact that there is abundant evidence that only a very small portion of the gold so distributed has yet been recovered. The region has been prospected in a desultory way for years, but the contact line has been but little more than scratched; yet this scratching has in some cases been well repaid. The Van Ness mine, between the summit and the Trinity river, on the road from Redding to Trinity Center, has in the past few years yielded several pockets aggregating over $20,000 in value, and some gold continues to be taken out and recovered by such a primitive method as a simple sluice-box. These pockets all came from at and near the contact between the igneous rock and the black slates and were found close to the surface. It is preposterous to suppose that these few "pockets" were the only ones formed at this contact in this particular district. It is true that no others have yet been found, but it is equally true that the contact has not until quite recently been opened up except at the Van Ness mine.

On the west side of the valley of the East Fork of Stuart's Fork of the Trinity river, all the little gulches from Minersville north several miles, including Farley, Ragged, Italian and Haywards and on the opposite side of the ridge the Chicken, Little Chicken and French gulches draining into Digger creek, have proven rich in quartz gold distributed through the alluvial gravels up to a certain point above which there is little or none of this particular variety of gold. This point in every case is the contact line between the igneous rock (the so-called "porphyry") and the black slates. It is a popular idea that certain so-called "black seams," which are a mixture of quartz, slaty material and dirt and occur a short distance above the contact, have yielded the gold; but I do not think this idea is correct. I believe the gold to have been derived through the erosion or cutting away of the contact line, and that search for the remaining portions of the deposits should be made not in the "black seams" or other quartz ledges, but by uncovering the surface of the igneous formation on both sides of these small gulches. In confirmation of this conclusion, I may refer to the case of the Bonanza mine in the valley of Digger creek, about one and one-half miles above Minersville. This is situated at the contact of the two predominant formations of the region. Recently a $4000 pocket was taken out at the contact, having the "porphyry" for a footwall and the schistose black slate on top. Several other "pockets" have swelled the total output of this mine to between $8000 and $9000. These sums are small, but the returns are large in proportion to the amount of work done and capital invested.

It is safe to assert that the tract of land in the angle between Digger creek and the East Fork river contains sufficient gold in "pockets" at the contact of the igneous and black slate formations to make it at some future time one of the richest mining districts of small extent in this part of the State, but it will require capital to develop it. Some other portions of the "pocket country" will prove equally rich (judging from the placers in the gulches), but clear evidences of the presence of "pockets" are less numerous in the greater portion of the area than in the Minersville district. However, many a little gulch has a line of quartz gold extending up to the contact at the base of the black slates that has never been prospected by pocket hunters, but which indicate the presence of more or less free gold at the contact throughout the region.

It will readily be seen that the conditions governing the distribution of the gold "pockets" in the black slate area of Trinity county are such that it is not a good country for the average tenderfoot prospector. An occasional "pocket" which is near the surface may be found by the ordinary methods in use by the professional "pocket" hunters; but to get at any large percentage of the gold, which a scientific study of the region indicates to exist at the horizon of the igneous rock and black slate contact, the expenditure of large sums of money to run tunnels is required. The gold at this horizon is much in the form of a blanket vein and should be mined like the coal veins of the Mississippi basin. Because of the uncertainty of returns owing to a want of knowledge of the particular rules which govern the situation of the "pockets" on the plane of the contact, capitalists are loth to venture any of their money into a "pocket" mining scheme; but I believe that a large company with plenty of capital could, by selecting some small district like that in the angle between Digger creek and the East Fork river, and opening up the contact on a large scale and by scientific methods of mining, safely count on the certainty of rich returns. This is one of the great chances of Trinity county.

English Capital in American Mines.

TO THE EDITOR:—I write to earnestly endorse the article contributed by Mr. A. B. Paul under the caption of "English Capital in American Mines," and printed in a recent issue. Volumes of interesting reading on the same lines could be furnished by mine owners of California.

The author of the communication published in the London *Mining Journal*, referred to by Mr. Paul, might become more enlightened and change his opinion of California as a mining State if he would forego the time and expense to make the proper investigation for himself, instead of sitting quietly in his office formulating opinions based upon absurd theories, such as he refers to in the case of Capt. Johns. It is true that Mr. Johns is an experienced miner, that he has traversed the mountains of California many times during the past twenty years in search of a bonanza for his English company. It is also true that he has either passed or turned down many good mines, and a few bonanzas are now known to be among them. All or any one of them he had a chance to secure at a low price.

The failure of this English company to secure all the handsome dividend-paying mines desired is not for the reason that California could not supply them, nor that they did not have a chance to purchase. To illustrate, I will cite a most positive proposition that this company rejected. The Black Oak mine, in Tuolumne county, was examined by Mr. Johns less than two years ago. That mine then showed an ore reserve of $387,000, and, in addition to this, the bottom of the lower level showed a larger vein and still higher grade for a length of more than 200 feet. The owners at that time were being pressed for money to pay mortgaged debts then overdue, with foreclosure proceedings staring them in the face, and for that reason alone the property was offered to Mr. Johns for $225,000. Mr. Johns submitted the proposition, together with his report, and recommended the purchase, but his company, fortunately for the owners, declined.

The shaft has been sunk 200 feet and two levels run since, which now shows a ledge, considering its width, length and value per ton, that is perhaps unexcelled in this or any other State.

GEO. W. CAMPBELL.

Amending Federal Mining Laws.

TO THE EDITOR:—The resolutions offered by Col. W. S. Keyes in his speech before the Miners' Convention last held in San Francisco, as published in the PRESS, are radically wrong, with the exception of his fifth proposition. Objections to his second resolution have been given to the public through the columns of the PRESS, and have had their effect on Mr. Keyes to the extent that he is willing to allow a sufficient width of ground on lode claims to allow the lode miner to sink to a depth of from 1800 to 2000 feet—that is, he is willing the lode miner shall have a lateral width on one side of his lode the following: For 1800 feet deep at angle of 45° for the lode, 1272.798 feet width of surface ground; for 2000 feet deep, same angle of dip, 1414.22, or nearly as much lateral width of claim as the length of a lode claim now allowed under the law. By such a law he would shut out from the prospector that amount of land less 300 feet that is, under the law, open to him. But what would he do with lode claims whose dip of lode is at other angles than 45°? A law to be efficient and simple should be general in its application, at least to the same class of mineral claims. No locator could apply this proposed amendment until he had sunk his shaft to a considerable depth and had time to determine the angle of his lode, as the angles cannot generally be determined from the surface or by any short depth of shaft.

Mr. Keyes' third and fourth propositions are unnecessary. Miners' rules and regulations are generally giving way to the Revised Statutes, and the present code of mining laws are complete and intelligible to any one except perhaps a hungry lawyer without a brief. The most that ought to be asked is an amendment more clearly defining what are mineral lands and what Mr. Keyes asks in his fifth resolution, which is a good one, and should have received more attention than he has apparently given it.

His sixth is faulty in several particulars. It should not prohibit prospecting by means of a tunnel for blind lodes. Lodes that float rock therefrom show that they probably exist, but of which no croppings are visible, and are applied to so-called "dead rivers" or deep gravel channels. He does not allow ground enough to pay for the outlay of capital necessary to explore a deep gravel channel. He says nothing of the width to be allowed, and by the language used does not allow location until the channel has been encountered.

His seventh proposition is faulty—very much so—in that he would locate lodes of any kind of mineral rocks that are properly veins or lodes or are classed as such under placer mining laws.

Mr. Keyes' eighth resolution is simply confiscation of the property of the prospector or miner who is without capital. A failure to apply for patent before Jan. 1, 1900, shall constitute a forfeiture of his possessory rights to mining property that he has himself discovered or bought. This is just what it means. If the miner cannot for want of money apply for patent, he must be deprived of his holding without recompense therefor, and provision should be made that the neighboring claim owner shall assist in this piece of injustice; and if the miner without means has a neighbor on either side of his holding, a bone of contention is at once presented for the two to quarrel over. Means are here provided that the wealthy mining companies may in time acquire the property of all the companies with but little capital by a process called "freezing out."

Every resolution offered by Col. Keyes but the fifth is calculated to tie up the prospector's pick. No. 8 in particular would do this and in addition stop the operations of all mining companies which have not capital enough to compel their neighbors to respect their rights. The suggestion is made that

the people of the United States adopt the mining code of Canada or Mexico. Why should we do so? Our own laws are the most free on earth. In Mexico a concession must be obtained before anything can be done, and taxes on everything pertaining to mining are heavier than within our own borders. In Canada a license must be obtained before prospecting can begin and other taxes that must be paid yearly, besides taxes on value of property. Here there is one restriction—the prospector must be or have declared his intention to become a citizen. Our own code of mining laws are not perfect, but they are better than that of any other country, for they do not bar the citizen from trying, nor rob him of his "find" if he is successful in his quest, whether be be poor or rich.

E. H. MOORE.

Nevada City, Cal., Nov. 26th, '97.

Practical Working of Drift Mines.

Written for the MINING AND SCIENTIFIC PRESS by FELIX CHAPPELLET, Supt. Eureka Consolidated Drift Mining Co.

Regarding the working of gravel from drift mines, it is difficult to give exact statements covering particular cases, as much depends on the location of the claim. A good outlet, a deep and steep canyon to dump in, so as to give a good grade to the sluices, also the proper amount of water which can be disposed, the cost of that water, etc., are among the first considerations. Assuming that everything is satisfactory as to the outlet, canyon, water, etc., I prefer sluices with a good grade, with as many drops as conveniently possible to build; also one or two undercurrents on the way. I prefer this to patent washing apparatus, which must be watched, need repair and power to run. Still, there are circumstances in which a mine may be forced to use some of those machines. With a good dump at the head of the flumes, a small monitor to prepare the dirt before it goes in the sluices, is a great help. The flumes and riffles must be kept in good order. Blocks or riffles raise often enough to prevent the sand or clay becoming hard between them. I have been working cemented gravel for many years, and have only the ideas which experience gives any miner.

To work cemented gravel, stamps are best—heavy stamps, so as to crush any hard pebble in one blow. If the mill could be built on the side of a deep canyon, and had water power, I would put in a rock breaker so as to help the stamps and crush fourteen to eighteen tons per stamp. In front of the battery should be tables of the same width as the mortar, so as to give the pulp the chance to travel very thin on the tables. On these tables should be grooves 1½ inches wide by ¾ of an inch deep, cut from one side of the table to the other, the grooves to be about 16 or 18 inches apart. Tables should be 10 to 12 feet long. In these grooves put quicksilver, the grooves well filled, and when the pulp passes on top of these grooves it takes the gold. The important thing in milling is to always have the quicksilver in a clean state; in fact, everything must be clean in a mill. A drop of grease or oil or dirt on the quicksilver prevents amalgamation. Below these tables I would advise to have rubbers, one for each table. These rubbers were used in early days in quartz mills to save quicksilver and sulphurets. Concentrators have taken their place in quartz mills, but I think they are good in gravel mills where concentrators are not in use. These rubbers save the quicksilver which may escape from the grooves; besides, it helps to force the amalgamation of the gold, black or coated. These rubbers are small expense, take about ¼ H. P. each, and they will pay for themselves in a short time. Below these rubbers are sluices to catch floating black quicksilver. My experience is that with such equipments hardly any quicksilver is lost, consequently no gold.

Senator Stewart on Mining Laws.

Senator W. M. Stewart of Nevada was recently interviewed by the Denver *Republican* regarding the proposed change in the Federal mining law, and said:

"I think several changes in the present law are necessary, but I do not believe the substitution of vertical side lines for the present apex law will cover the points involved, or that mining men of the country would permit such a provision to pass without determined opposition. The passage of such a law would necessitate so large a surface area to give the locator all his rights on the vein that it would practically shut out the prospector, who would not have a chance of owning his claim, and if we throw the prospector out of a job we put a definite stop to all mining, for it is these fellows, who roam around the hills to find a vein, who keep the mining industry alive.

"I am inclined to believe that the provisions of the law regarding assessment work are too often evaded, and something should be done to insure the proper observance of the law in that respect. The assessment work is merely an evidence of good faith on the part of the locator. It should not be so trifling either in the terms of the law or in practice that men should be enabled to hold large tracts of land without doing sufficient work to prove their earnestness. Perhaps it would have the effect desired if claimants were allowed to commute the work required by law for $50 per annum in cash, but in this event there must be some provision of law which would compel those who prefer to do the assessment work to actually perform the stipulated amount of work. They might be required to produce the certificate of the surveyor general that $50 worth of work had really been done, which would probably cost them more than the $50, and would result in the commutation for cash of the work required in all cases, or it might be secured, as I understand is recommended by the proposed law, by a provision requiring a certain number of cubic feet of rock work or a certain number of cubic feet of loose dirt. In the latter case the annual certificate would be unnecessary, and the matter might be left to the courts in the event of litigation whether the legal amount of work had been done. It is probable, however, that an annual certificate of labor performed would be necessary in order to defeat attempts to evade the law.

Vertical Side Lines.—"Another objection to the vertical side line proposition occurs to me. It would not do to cut a vein in two with a side line within any reasonable distance from the apex. The entire principle of mining law rests upon the fact that the discoverer of a vein is entitled to the whole of that vein as far as he is able to follow it into the bowels of the earth. To limit a claim to 1320 feet square—forty acres—would not give locator enough of his vein. Take the Comstock, for instance, which has followed its dip on the vein for more than a mile. It will be readily seen that to give a locator surface ground which would enable him to follow his vein to that distance within vertical side lines would require a very large surface area, very much larger than the forty acres contemplated by the proposed law, and this would be against the interests of the prospector, who would not be able to secure a title to his land after he had found his lode.

"Regarding the proposition to do away with the requirement for the discovery of a lode, as a condition of possessory rights and ultimate title, I do not think it would be wise under any circumstances. It must be borne in mind that it is a matter of no particular importance whether the Government obtains $50 a claim as a consideration for possessory rights or not, but it is of the utmost importance to the nation and the Government that mineral shall be discovered and the resources of the country developed. In the event a person should be permitted to locate one or more claims without previous discovery of mineral, and claim possession by the payment of an annual fee, it is very easy to see what would happen under certain circumstances. The requirement of the annual payment or the actual amount of labor represented thereby would probably operate against wholesale appropriations of land under ordinary circumstances, but the moment a rich discovery is made the surrounding territory would be filed upon and held by men able to pay a $50 fee, and thus the purpose of the law, which is always to induce development, will be defeated. This would not only operate against the prospector, whose protection should always be one of the main considerations of our mining laws, but against the public interests, as the land would be very largely held for speculative purposes, and the development of its mineral wealth retarded for years.

A Possible Compromise.—"It is possible that upon a careful examination of the proposed law some compromise might suggest itself upon which both sides in this controversy might stand. Keeping in view the idea that the locator should be protected in his right to his vein as far as he is able to work it, it may be possible to permit the vertical boundary proposition to stand, by giving the locator a preference right to one or more claims on the side of the dip of the vein. Do not understand me that I favor such a compromise. I have not given the matter sufficient thought and at present I am not favorably impressed with the vertical side line idea. I admit the necessity for some changes in the law, but I am opposed to any very radical changes. I will make a careful study of the matter and will certainly do whatever I can to simplify the law and render it more effective for the ample protection of the honest prospector and the active development of the mineral resources of the country. During all of my service in Congress I have been compelled to fight for the possessory rights of the prospector. When I first entered the Senate there were but three men in that body who knew anything about mining, Conness of California, my colleague and myself. That was during the war, when there were various schemes devised for the purpose of raising money for the expenses of the Government. One of these schemes was proposed by Julian, then a member of Congress from Indiana, who presented a bill for the sale of all the mines of this country located upon public lands at auction. He was elected to Congress on this issue three or four times and finally succeeded in getting his bill through the House in 1866. I prepared my bill, which was necessarily very crude, and it was passed through the Senate, but it went to the bottom of the calendar in the House, and there did not appear to be any chance for its passage at that session. Higby of California had a bill in the House affecting water rights, and I got him to tack my bill to his. Then I had it passed through the Senate again, and then came one of the hardest fights I ever had in Congress. I followed the bill to the House and interviewed every member on it.

"Bills were pending for the establishment of two navy yards in New England—one in Connecticut and one in Maine—and I found that we three senators held the control of the situation on them. I traded with the senators and members interested, and took advantage of a number of other jobs that were pending which required my three votes in the Senate to carry them through. The majority of the members of Congress did not know anything about mining and were inclined to favor Julian's bill, as they had not the vaguest idea of the value of our mining territory, and the measure promised them some money in hand at a time when money was sadly needed. In working for the measure I was nearly all the time on the floor of the House, and Julian objected to my presence as an invasion of the privileges of the House. The Speaker finally ruled that, as a Senator, I had a right on the floor of the House. The fact that the law was coupled with a bill regarding water rights accounts for the awkwardness of the title of the laws of 1866. The bill passed by a small majority and became the law. When I got through with the work, I was so exhausted with my two months that I threw myself on my bed at 5 o'clock in the afternoon with all my clothes on and did not wake up until 7 o'clock the next morning.

The Present Law.—"The law, as I have said, was crude, and it was soon found that it did not fill the demands. In 1872 I prepared the present law and had it passed, and, while there are some things in which it doubtless needs amendment, it has given fair satisfaction for twenty-five years, and I think is a reasonably good law.

"The rulings of the Land Office are the main difficulties with which the miner must contend. I have been obliged to oppose the Land Office almost constantly. The Interior Department wanted to have sole control of all mining matters without the intervention of the courts and I had to oppose that, for that meant that every miner in the country would be at the mercy of the construction placed upon the law by some $1200 clerk. And even now some of the rulings of the Land Office are rank. The recent ruling permitting patent for a group of claims to pass upon the performance of only $500 worth of work is an outrage.

"The proposition to create a Department of Mines and Mining will come before the Senate, and, of course, I cannot say what action I may take; but it is my impression that there is a better chance to secure a Bureau in the Interior Department, as the first step toward getting a department created. When members of Congress see the amount of labor involved in connection with mines, they may be more willing to create the department. The creation of a Bureau will be a long step in that direction."

The Principle of Business.

No calling requires a greater use of brain power than business, and few require a higher order of general ability. The great secret of success in business—the secret, in fact, of success on a large scale—is to conceive of it as a matter of principles, not merely as a series of transactions. There are great merchants as there are great statesmen, and there are small merchants as there are small politicians, and the difference between the great and small men is much the same in both. The small politician works by the day, and sees only one opportunity before him; the small merchant does the same thing—he is looking for the next dollar. The statesman, on the other hand, is master of the situation, because he understands the general principles which control events. This knowledge enables him to deal with large questions and to shape the future. The great merchant does the same thing. His business is not a mere money-getting affair, not a mere matter of barter, but a science and an art. He studies the general laws of trade, watches the general condition of the country, investigates present needs, foresees future wants and adapts his business to the broad conditions of his time and place. He puts as much brains into his work as does the statesman, and he ends by being not a money-getter, but a large-minded and capable man. An eminently successful man of the statesman-like quality says that the more he understood life the more clearly he saw that it was all done on business principles, by which he meant not only that the universe is governed by unvarying laws, but that the promptness, exactness, thoroughness and honesty are wrought in every fiber. On these business principles all life is conducted—if not by man, at least by that power which is behind man. It ought to be the ambition of every young man to treat his business from the point of view of the statesman, and not from that of the politician.

Why Should We Not Make Our Own Iron?

TO THE EDITOR:—No industry promotes the commercial prosperity of a country so much as the establisbment of iron works.

California and the whole Pacific slope, including British Columbia, have hitherto been under the disadvantage of being compelled to get their raw iron from the Eastern States, with the exception of a few thousand tons imported from Great Britain. The result is that business naturally belonging to this coast goes to Eastern firms. For instance: two ocean steamers for the Alaska trade have just been ordered from Cramps, whose shipyard is on the Atlantic seaboard, and an undue proportion of the stamp mills, hoisting works and other machinery for the new mines now being opened in the Northwest is lost to San Francisco. In my own limited experience, I know of a Chicago firm now erecting a mill in southern Oregon and another in Washington.

Why should this condition of things exist?

Pig iron costs $10 per ton at Eastern points and $20 per ton here. It is therefore evident that if iron can be made on this coast as cheaply as elsewhere, a very large and profitable industry can be established.

Three attempts have been made to manufacture iron—one in each of the three States of California, Oregon and Washington—and those familiar with the subject predicted, what ultimately happened, that the ventures would fail.

The prime condition necessary to success is that the works be established where suitable fuel is abundant, and if the iron ore and flux be also in close proximity to the fuel, an ideal situation is realized. It is this which has enabled Alabama to export last year 60,000 tons of iron to Europe, and it is the abundance of good fuel in Pennsylvania which, now that the local carbonate ores are nearly exhausted, enables it to import annually 700,000 tons of ore, mostly from Spain, and to use the low grade New Jersey rock containing only 14 per cent of metallic iron concentrated by the Edison process, as described in one of your recent issues, (not a word about the cost of this process is given, and it must be expensive, quarrying, concentrating and making into briquettes).

When it is considered that five tons of ore, coal, lime and other supplies are required to make a ton of iron, the other four tons making only smoke and slag, the advantage gained in saving of freight by having all the raw materials in close proximity is apparent.

About eight years ago a scheme was largely advertised which proposed to erect iron works near Seattle, distant fifty to eighty miles from the nearest ore and fuel. A townsite was laid out and many town lots were sold, but it is almost needless to say that no iron works were erected.

I have been led to make this communication because, in order to get support for the establishment of iron works on an ideal site, with coking coal, iron ore and lime in close proximity, where iron can be made for $8 per ton, and having railway and water communication, I am met with the tale of all former attempts having failed, and further, it is plainly stated, what I can hardly credit, that the transcontinental railway companies are strongly opposed to the making of iron on this coast, as the greater part of their overland freight consists of the products of iron manufacture. My idea is that the railways would reap the main advantage, they being the largest consumers of iron, besides reaping the benefit of the increased traffic always accruing to the establishment of an iron industry.

R. B. SYMINGTON, M. E.

San Francisco, Nov. 30th, '97.

SOME interesting facts in regard to military signaling by telegraph, telephone, balloons, etc., are contained in the annual report of Gen. A. W. Greely, chief signal officer, to the Secretary of War, just made public. The permanent military telegraph lines operated by the Signal Corps aggregate 802 miles in length, exclusive of the short cable in New York harbor. The most important additions during the past year have been in connection with the operations against hostile Indians in Arizona. Gen. Greely says: "The most notable advance is in the development of the combined telegraph and telephone apparatus devised by Capt. James Allen, Signal Corps, which is distinctly superior to any previously constructed, and admirably answers all requirements. An operator can easily carry a combination telegraph and telephone office; and while one soldier telegraphs a message, another may, over the same wire, talk telephonically with another station, the distant receiving operators hearing only their own message. The outfit weighs but sixteen pounds, including battery, has been rigidly tested up to a distance of more than 600 miles, and is a pronounced success in its various capacities as a 'buzz' Morse, telephonic and phonoplex instrument. The importance of this means of communication is not confined to the field work of the Signal Corps, but in its many applications may well become world-wide."

Does Technical Education Pay?

The fact that the different colleges and technical schools are now opening their doors for a new year brings to notice two great changes that have taken place in college education, which have been very noticeable during the past fifteen years, says *Machinery*. These are the increased attendance of students of small or moderate means, and the introduction of engineering and scientific courses which are supposed to be of a more useful nature than those of former years.

While the primary object of any course of study is and ought to be to give a general training on broad lines, the above-noted changes indicate that the majority of those who now go to college hope to receive a certain amount of special training which shall directly aid them in their future work, similar to that given by a medical college, which fits its graduates to a certain extent for medical practice. In short, whatever thought concerning general training the student may have, he wants to know if his studies will pay him in dollars and cents.

As far as mechanical work is concerned, there appears to be a difference of opinion regarding this point; many holding that everything that has been done with or about machinery can be done better, or at least as well, by the man whose mechanical knowledge has been obtained from his own practical shop experience.

It can be stated as a general principle that what brings money is a knowledge of how to do things and the ability to do them. So far as the results are concerned, it can make no difference where this knowledge or ability was acquired. Plenty of men who have come up through the shop have secured it and have been successful, and so have plenty of men who have had a technical education.

The question then seems to be: Where can the knowledge and ability be obtained to the best advantage? We have no hesitation in saying that under the right conditions the knowledge can be best obtained in the technical school and the ability in the shop. In many cases, of course, the obstacles in the way of the former are the expense and lack of preparation, but several schools are already doing much to make it easier for those who really desire to attend them. We should be slow to advise anyone to undertake a course of study when it would be likely to result in a sacrifice of health in the endeavor to pay his way. He had better try to get his knowledge in some other way. Aside from this restriction, we believe a course in mechanical engineering will pay anyone who already has or is willing to get the needed practical experience in addition.

Scientific Progress.

Gold in Mine Timbers, Etc.

Some time ago the MINING AND SCIENTIFIC PRESS was in simultaneous receipt from three widely separated points of inquiry as to the possible existence of gold in mine waters and old mine timbers. The answer was a decided negative. In this regard the following is of interest. It is from a paper of several hundred printed pages in length, entitled "Genesis of Auriferous Lodes," by J. R. Don, at the Chicago meeting of the Am. Inst. Min. Eng'rs. Mr. Don says:

The evidence for the existence of gold in mine waters rests, so far as I am aware, on the discovery of gold (1) in boiler scale from boilers fed with mine water, and (2) in wood taken from old mine workings where it had been covered for some time with mine water—the latter being assumed to have carried dissolved gold into the timber, to be precipitated by the organic matter of the wood. But the finding of gold under such circumstances does not prove that it was in solution in mine waters at deep levels. In the first case, the gold may have been carried into the boiler in suspension, along with the silt which all mine waters contain. In the second case, even though gold may have been dissolved in the water surrounding the old timbers, it may have been brought into such solution by the action of the air in the mine workings, oxidizing sulphides of the rock to sulphates and setting free sulphuric acid, which in turn, acting on the chlorides always present in mine waters, would liberate hydrochloric acid. This acid, acting on oxides of manganese, would free chlorine, which would dissolve gold. This statement applies particularly to all mines the waters of which contain considerable iron. Every sample of chalybeate mine water analyzed by me acted as a precipitant of gold when taken fresh from the workings, but as a solvent of gold at ordinary temperatures, in the presence of the oxides of manganese, when it had been exposed to the air for a week or two.

Mr. Newbery, however, distinctly said, in his testimony already cited, that he found angular quartz which had been soaked up into the timber examined, and that the gold might have been mechanically introduced the same way.

With regard to the suspension of gold in mine waters, the following evidence, obtained by me last year, may be of interest:

In the Long Tunnel G. M. Co.'s mine at Walhalla, Gippsland, Victoria, one of the most productive mines in Australia, the water pumped from various depths, down to about 2300 feet below the surface, is run into two large settling tanks, before using. At the time of my visit one of these tanks contained a large quantity of fine silt, which had been suspended in the mine water. I analyzed three samples of about two pounds each, first panning off the lighter part, and then assaying the residue. The first sample gave 0.0063 grain of gold; the second, no trace; and the third, 0.0175 grain.

These results show that assays of boiler scale do not necessarily prove that gold was dissolved in the water depositing it; and, also, that in all analyses even of samples from the vadose circulation, to test the presence of dissolved gold, care must be taken to free the water beforehand from every trace of suspended matter.

I have tested many old mine timbers for gold. In every case the outside wood was chipped off to the depth of about ¼ inch; and, when cracks appeared in the timber, about ¼ inch on each side of the crack was also chipped off. These parts were burned, and analyzed separately from the inner portions.

The following table shows the results of several such analyses:

Sample.	Description and Locality.	Part Analyzed.	Gold Found.
I.	Prop from the Tipperary Gold Mining Co., Macetown, Otago, much decomposed. The part analyzed had been under water for many years.	Outside of the prop.	None.
II.	Do.	Inside of do.	None.
III.	Prop from an old tunnel in an alluvial terrace, near Skipper's Point, Otago. The part analyzed had been under water for probably twenty years.	Outside of prop.	None.
IV.	Do.	Inside of do.	None.
V.	A prop from the Premier mine, Macetown, Otago. Water had been running over it for two years at least.	Outside of prop	0.0038 grain.
VI.	Rotten wood from the lower part of a rejected prop from the Long Tunnel Gold Mining Co., Walhalla. From a part of the mine where a richly auriferous reef had been worked.	Outside of do.	0.0097 grain.
VII.	Do.	Inside of do.	None.
VIII.	Decayed portion of lath brought up from the deep workings of the Northern Star Gold Mining Co., Ballarat. Had evidently been saturated with water for many years.	No portion was sound; all was burned and analyzed.	None.
IX.	Portion of sleeper used in a tramway, Northern Star Gold Mining Co., much decayed. A large quantity of water had been running over it for at least a year.	No portion was sound; all was burned and analyzed.	0.0129 grain.

The Scientific Advance.

It is astonishing, says *Popular Science*, to look back and see the strides that have been made in eighty or ninety years. In the beginning of the century there were stationary steam engines, and a few crude attempts were being made in the direction of steam navigation; but as yet the locomotive was a thing unthought of. To-day marine navigation has taken the form we see in the giant vessels that ply between this country and Europe and the first-class battle ships of the world's great navies, with their triple-expansion engines, their wonderfully perfected boilers, their twin screws, and their infinitely multiplied appliances for safety and efficiency.

At the beginning of the century electricity was a curious study, giving only slight promise of any useful practical applications. It had not advanced beyond the frictional machine, the Leyden jar, and the voltaic pile. The telegraph was as yet undreamed of, and the telephone and the dynamo utterly imaginable developments. Had anyone dared to conceive that signals could be made to pass in a second of time between Europe and America he would have been considered a fit candidate for Bedlam; and certainly not less insane would have been considered the notion that a human voice could by any device make itself distinctly audible at a distance of 500 or even 1000 miles. To-day these things are commonplaces, and men are beginning to grudge the trouble of putting up wires for the conveyance of the electric current, great authorities in the scientific world having told them that, theoretically, it ought to be possible to do without such crude appliances. What was a curious toy in the beginning of the century is the jack-of-all-work at its close, or, in other words, the most widely available form of force in the modern world. What steam cannot do, owing to the difficulty, on the one hand, of generating it locally, and, on the other, of conveying it to any great distance, electricity, which is capable of infinite subdivision and of distribution from a relatively distant center, stands ready to undertake.

We have only to look around us to

see the innumerable wonders that science in its practical applications has wrought, and to be impressed by the beneficence of its operations. The electric light in our streets and the familiar trolley car constitute additions to human well-being and enjoyment the value of which it would be difficult to estimate, while the telephone has almost revolutionized the industrial and commercial life of cities and towns. Electro-chemistry, again, and photography are two arts the influence of which is at once widespread and penetrating. The former dissociates the elements, isolating those we wish to isolate and leading others to form new and desirable combinations. It has produced what is virtually a new article of commerce in the metal aluminum, previously a rare and expensive product, and in a thousand ways has transformed or modified industrial processes. What photography is to the present age it would take a considerable treatise to set forth. The bookmaker, the traveler, the astronomer, the physician, the analyst, the architect, the biologist, the police agent, the engineer, the microscopist, the military man, the artist, and the representatives of a hundred other crafts and professions would all have to contribute to the tale. By photography we can record successive movements in the impact of a cannon ball and analyze the life history of a lightning flash; we pierce the abysmal depths of space and catch the faintly trembling rays of bodies that no telescope has the power to reveal.

THE Smithsonian Institution has just come into possession of the Haslett Phillips collection of Indian implements and antiquities from the Potomac valley. It is reputed the largest single collection of its class in the world, and its value is greatly enhanced by the careful arrangement and record of individual specimens. The collection consists of over 20,000 pieces, principally spear and arrow heads, stone knives, hammers and scrapers, and fragments of pottery and soapstone utensils. Mr. Phillips has made a life-long study of prehistoric man in the Atlantic tide-water region. In his opinion, which is accepted as authority by the Smithsonian scientists, Washington was not the first capital on the banks of the Potomac. The site, owing to the great advantage in connection with stone quarries and the river fisheries, was the headquarters of the great Algonquin Confederacy, the most powerful of the Indian nations on the Atlantic coast. It was with these Indians that Captain John Smith first came in contact on his initial voyage up the Potomac, and his memoirs contain an account of a fight with the Indians in their principal village on the site of what is now Anacostia, a suburb of Washington.

A. FRENZEL, in Tschermak's *Mineralogical Journal*, makes scientific description of the tellurides of Kalgoorlie, Australia. Sylvanite from Hannan's gave on analysis 58.63 per cent of tellurium, 36.60 per cent of gold and 3.82 per cent of silver, differing in some degree from the tellurides of California and Colorado. The Kalgoorlie specimens are silvery white with a metallic luster and have perfect cleavage in one direction; hardness on the mineralogical scale, 2½; specific gravity, 8.14. An iron black telluride of gold and silver with conchoidal fracture and no cleavage is also found at Kalgoorlie.

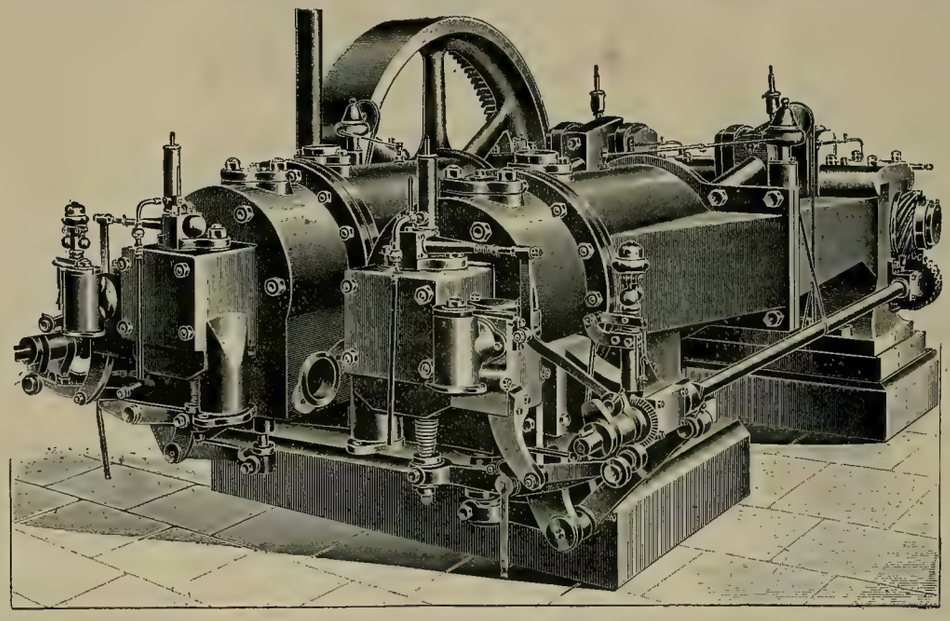
PROF. PETRLIK of Prague describes the application of the Pœtsch freezing process in the sinking of a shaft at Brux, in Bohemia, where thirty yards of quicksand had to be sunk through. The bore holes for the freezing tubes were put down January 15, 1895; freezing began June 1, sinking through the ice on December 2, and the shaft was completed May 15, 1896. The lining, when the shaft had been filled with hot water and pumped out, proved to be perfectly water-tight. Such appliances are of little interest to the Klondike, where the problem is to overcome natural existing conditions similar to those artificially produced at Brux.

Mechanical Progress.

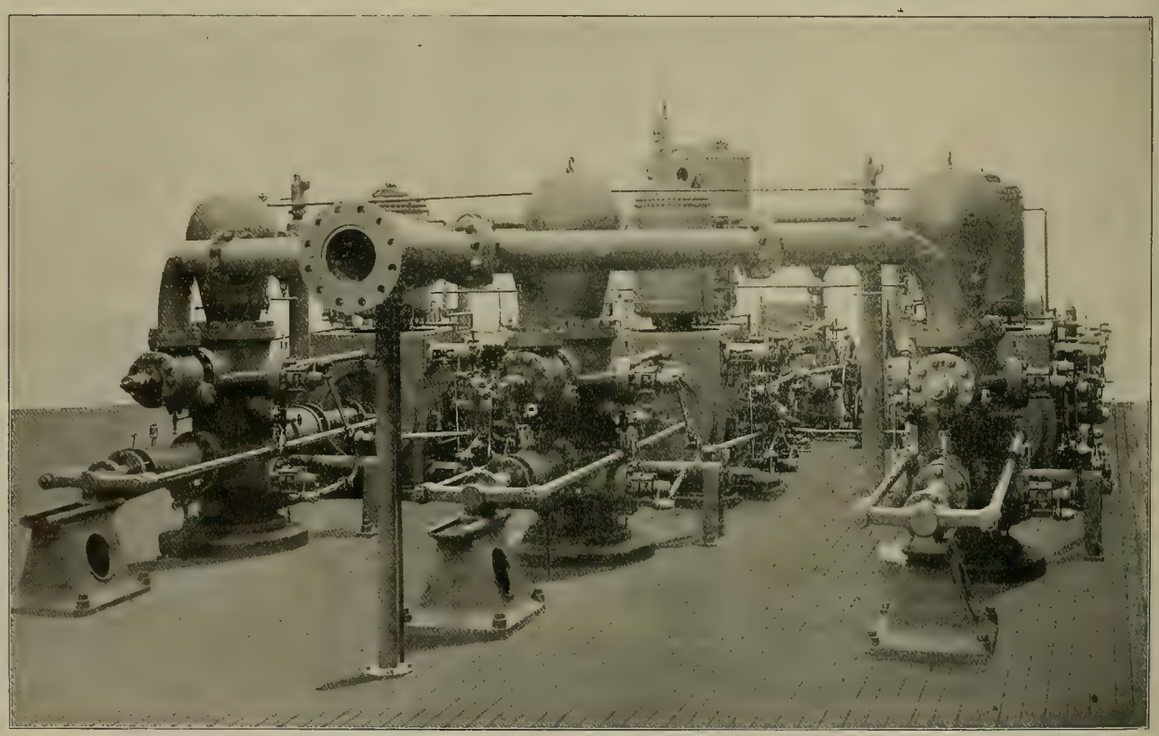
Mining Pump.

The Riedler pump, built by Fraser & Chalmers, Chicago, for the Chapin Mining Co., Iron Mountain, Michigan, is a triplex differential, plungers 6⅞ inches and 9⅝ inches diameter by 30-inch stroke, driven by a horizontal triplex tandem compound condensing Corliss engine, steam cylinders 22 and 36-inch diameter by 36-inch stroke; capacity, 2200 U. S. gallons per minute against a total head of 1700 feet when running about 74 revolutions per minute. It is designed to run economically with steam pressure at engine of 110 pounds per square inch, or by compressed air with a pressure of 60 pounds per square inch at engine. This pumping engine, illustrated herewith, is believed to be the largest underground pumping engine in the world.

At the present time the pump is working on the 1310-foot level and raising 1200 gallons of water per minute, but, later, will be lowered to the 1700-foot level.



A 300 H. P. MODERN GAS POWER PLANT.



RIEDLER PUMP FOR THE CHAPIN MINE, IRON MOUNTAIN, MICH.

A Modern Gas Power Plant.

The London *Engineer* gives an illustrated report of a 300 H. P. gas engine plant, working on the Thwaite patent continuous cycle, part of which is reproduced on this page. The apparatus consists of two large cylinders side by side. The air is supplied by a fan driven from the main engine, and the gas is fed into the hopper at the top. The gas, as it leaves the bottom of the second generator, has a high temperature, and is made to heat the incoming air by means of a recuperator apparatus, thus restoring a considerable amount of heat to the generators. From the recuperators the gas passes through a physical purifier to the pressure governor-holder, which automatically governs the supply of gas to balance the demand, and from which the gas engine receives its supply.

The gas engine is of the duplex type, having two cylinders 16 inches diameter, side by side, the length of the stroke being 2 feet. There is one firing stroke every revolution when fully loaded. The speed is 140 revolutions per minute.

The charge of gas and air is compressed to ninety pounds per square inch above the atmosphere. The engraving shows the teeth of the flywheel into which the piston of the small starting engine gears; this engine is of the vertical type, having a cylinder 6 inches diameter. Both tube and electric ignition gear are applied to the engine. The engine house is covered with a water tank, which feeds the circulating mains of the engine.

Sectionalized Machinery.

Builders of mining machinery are ever confronted with the problem of transportation difficulties in mountainous countries. In North and South America, particularly, Nature's obstacles to the carriage of unwieldly parts of mining outfits have taxed the resources of designers, with the effect of developing a species of "sectionalized" machinery in which every part, in point of weight and shape, has been proportioned with an eye to the carrying capacity of a mule. Engines, pumps and stamp batteries and the miscellaneous lot of other apparatus which make up the modern mining plant are all made

in pieces, which, under ordinary conditions, would not be thought of and would entail useless detail in construction and subsequent erection. To the mine superintendent in almost inaccessible latitudes, however, they have a significance of the keenest interest and importance, and their proper consideration by the builder may make to the mine owner all the difference between smooth sailing and fretful delay and lost money. *Cassier's Magazine* cites an incident in Peru where a company operating there determined to erect a crushing mill, and the chief member of it, a German, insisted on placing the order in Germany. When the machinery, which had been specifically ordered for mule transportation, was unloaded, it was found to embrace timbers 16 by 24 inches, by 24 feet, weighing 800 pounds. This was destined to go by a trail which led over the *cordillera*, at an elevation of 16,000 feet to a *quebranda*, on the other side 7000 feet lower, over which no mule could carry more than 300 pounds, nor any piece longer than 6 feet.

A similar case was reported from Mexico, where a stamp battery, timber and all, had been sent out from England. It was to be erected for an English company, and the order had been placed with a home manufacturer by the London office without consultation by the officers at the mine. The mine was ten freighting days from the railway terminus, without a vestige of a wagon road, and at last accounts the local officials were still puzzling their brains as to how the main battery frames were to be transported to their destination.

Blasting Coal by Hydraulic Process.

On account of the many dangers attending ordinary methods of blasting in coal mines, a safer process of loosening the coal has long been a desideratum. Such a device—a new hydraulic apparatus—has lately been exhibited before the Manchester (England) Geological Society by James Younge, the inventor, and its merits explained. The apparatus consists of a hydraulic cartridge, 18 inches in length, 3 inches in diameter, and weighing thirty pounds; also a small but powerful hand pump, fitted with a pressure gauge of about twenty pounds weight. In using it the coal is holed underneath to the usual depth, and a hole drilled near the roof to about the same depth as the holing, in the same way as for blasting, after which the cartridge is placed in the hole and pushed to the back; no "stemming" is required. The pump is coupled to the cartridge, the suction pipe is placed in a small bottle of water, and work commences. Very soon the gauge begins to show the rising pressure—half a ton, a ton, a ton and a half, two tons, to the square inch.

During this time a cracking sound is heard, indicating the shearing off of the coal at the back. The gradual way in which the work is done, without shock or jar of any kind, prevents even the least damage to coal or roof, in striking contrast to the action of explosives. The time occupied is rated at twelve minutes—this including the placing of the cartridge in the hole, connecting the pump, getting down the coal, withdrawing the cartridge from the hole, and getting to the next place.

WINANS' cigar steamers, famous a generation ago, which have lain idle in Southampton water for the last twenty-five years, are now to be broken up and sold for old iron. They represent quite a large and entirely inert investment, and no further experiments in marine construction on the principles which they embody is to be looked for. They will always rank among the curiosities of shipbuilding, and stand as a sign that the experimental millionaire and his money are sometimes speedily parted; but they possessed no fitness for the function designed, and had not enough "go" in them even to find their way to Davy Jones' locker, so they will go to the scrap heap instead.

Electrical Progress.

The Niagara Falls Transmission Line.

The power transmission line from the Niagara Falls power house to Buffalo is now undergoing a considerable increase, the demand for power from Buffalo having within the past few months grown beyond the capacity of the line first put up. The three wires strung on the poles will shortly have three companions, and the white insulators on each pole will be increased to six.

A new order for cable as well as for transformers has been placed with the General Electric Company. The cable is of special manufacture, is insulated to stand the ultimate pressure of the line, which will be 22,000 volts, and is tested under a considerably higher pressure before leaving the works. There will be used at first 24,000 feet of this cable for that part of the transmission line within the city of Buffalo. The order for increasing transformers covers seven of similar size and design to the three already installed in the transformer house of the Niagara Falls Power Company. These ten transformers are the largest ever built. Each has a capacity of 1250 H. P., making a total step-up transformer capacity of 10,000 H. P. They are of the air-blast type, and will stand in rows of four upon the air-tight chamber, whence the air is forced through the ventilating spaces in the transformers. It will be remembered that the two-phase current at 2200 volts passes from the 5000 H. P. generators in the power house to the transformers. In these it is not only increased in pressure, but changed in phase, the current issuing from the transformers' three-phase current at 11,000 volts. This pressure will be adopted until it becomes necessary to increase it, when it will be doubled and be delivered to the transmission lines at 22,000 volts. On its arrival in Buffalo it will be delivered to the step-down transformers of the Cataract Power & Conduit Co., which controls its distribution there. The electricity will be transformed down to different pressures for distribution over a city network to different points for a variety of purposes, being used directly in induction motors, a number of which will probably be installed in grain elevators, etc.

Several step-down transformers will also be placed in the station of the Buffalo General Electric Company, and from these the three-phase current, converted into direct current in rotary converters, will be utilized for lighting purposes and for small power units.

The Buffalo Railway Co. is also increasing its step-down transformer and rotary converter capacity in its Niagara street power house. In addition to the two 500 H. P. converters already in operation, the General Electric Co. has built two others of similar capacity and construction. These will bring the total converter capacity in the station up to 2000 H. P. To supply these necessitates the installation of three additional step-down transformers in the transformer house between the station and the canal. These will be of about the same capacity as the three already there—each of 275 K. W.—reducing three-phase current from about 10,500 volts to 375 volts for delivery to the alternating current side of the rotary converters in order that it may issue direct current at 550 volts, at which pressure it is delivered to the bus bars of the station switchboard.

REPRODUCTIONS in hard steel of objects in low relief, such as medals and electrotypes, are obtained by a German electrician, Herr Josef Rieder, by a simple electrical process, forming a short column, which is detached and fitted with an ebonite sleeve, leaving the top and bottom alone exposed. The cast is placed face upward in a vessel containing an electrolyte. The piece of steel to be etched is laid on the face of the cast—which projects above the surface of the liquid—and made the anode of the cell, the cathode being a wire spiral placed in the liquid. A moderate current of considerable voltage suffices. The current passed through the high parts of the cast dissolving the steel and allowing it to settle until a complete copy of the original surface is obtained. Difficulties are the softness of the plaster and accumulation of carbon from the dissolved steel.

New Use for Magnets.

In the plate mill of the Illinois Steel Company a new use is found for magnets. All know from experience that a magnet will attract cold steel, but few have ever thought of magnets lifting red-hot metal, yet this is done hourly at the plate mill of this company. Their magnets will lift five tons of red-hot steel, not only that, each magnet will pick up half a dozen large steel plates and drop them one at a time with the regularity of clockwork. So cleverly and quickly do they conduct themselves that they seem endowed with almost human intelligence. It is truly marvelous the way these pieces of magnetized steel pick up the steel plates that would require a derrick to hoist under any other circumstances and place them in the desired spot as easily as one would pick up a dime and place it in his pocket. A keen-witted electrician solved the problem of operating these magnets so the plates could be dropped one at a time. Of course, it was not desirable to pick up a half dozen plates and throw them down in a heap somewhere. The system required that one plate at a time should be taken care of. The electrician in the case made a study of the matter, and soon became expert in operating the switch. It came to him one day just what ought to be done to bring the magnet up to the one-plate standard. So, after the magnet had taken up several plates, he pulled the switch out, thereby breaking the current for an instant. He found that by this operation one or two plates could be dropped off at each breaking of the current, the plates next to the magnet retaining sufficient magnetism to hold them to the steel of the magnet itself until the current was again switched on. This operation was repeated until only one plate remained attached to the magnet. A great many concerns have been afraid to put magnets into use on account of the apparent danger of dropping the material, and thus endangering the men who might be at work. But the company supplying them say that in years of experience they do not know of a single case where anyone has been injured by the material dropping, and they firmly believe that it is the safest way possible of handling certain classes of iron and steel. The magnets are so designed that it is impossible for the men who are placing them to receive a shock. Inventive genius is making it more and more possible to work with this powerful factor and not receive the slightest injury. Electricians who have studied this matter say that this is the beginning of a new era in the appliance of electricity to mechanical purposes, and when the fact is demonstrated that this force can be used in perfect safety, electricity will find fields of usefulness in directions apparently barred to it at the present time.

Large Electrical Transformer.

What is described as the largest electrical transformer in the world for commercial use has just been completed at the Westinghouse Electric & Manufacturing Company's plant at East Pittsburg for the Niagara Falls electric power plant. The transformer will have a capacity of 100,000 volts, and its successful construction is remarkable from the fact that electricity at such a pressure is a near approach to lightning. The transformer will be used for testing the effectiveness of insulation on the great cables to be used to convey power from Niagara Falls to Buffalo for the operation of the traction system there. The pressure to be used in carrying 10,000 horse power to Buffalo will be 20,000 volts, the volume being decreased and the pressure being increased from 2000 volts in a transformer at the dynamo. This is done so that the great H. P. can be carried a long distance on a small copper wire, rendering economical operation possible. To carry 10,000 H. P. at a voltage of 2000 would require a cable six or more inches in diameter, while that to be used will only be two-thirds of an inch in diameter. The great difficulty, however, was in securing insulators that would prevent the electricity from jumping from one wire to another, the sparks at such a pressure reaching ten and twelve inches. This was the main problem in the construction of the big transformer. Two months were spent designing and making the instrument, and in tests now being made it acts satisfactorily. Generally speaking, the two coils in the transformer are separated by fifty or more sheets of specially prepared paper soaked with insulation varnish. The wires are carefully wrapped and the whole is immersed in oil. The wire used is only of the diameter of a darning needle, and even with the high voltage the possible H. P. equals 40. At such an enormous voltage the wire is luminous, and destruction by the leaping sparks is an unusual feat to prevent. Already on the 20,000 voltage Buffalo line several poles have been burned down by sparks at broken or defective insulators. The voltage is decreased to 2000 again at the traction plant.

THE conversion of the capitalist is the most significant achievement of the modern electro-chemist. Not many years ago electrolytic processes were regarded by those who were at once enterprising, opulent and sane as sinks for surplus cash. Without giving unqualified consent, one may admit that this view was at least tenable. It is, of course, obvious from the purely technical standpoint that the chief use of the capitalist is to embark in new enterprises which are too risky and expensive to be practicable for men of modest means, and that his failure and ultimate commercial extinction are mere incidents in the march of progress. The present situation of electro-chemical industry may be summed up thus: The refining of copper is a thorough success, and its ultimate predominance is assured; the winning of zinc is about to come; the aluminum industry is on a firm and broad basis; sodium can be made cheaply, but wants buyers; soda and chlorine products are just rounding the corner, and their manufacture is being seriously undertaken; the co-operation of the capitalist in all reasonable enterprises has been secured. There has been much solid progress, and we may fairly look for further and substantial advances in the near future.

THAT electricity is a progressive science needs no proof, and the rapidity and the extent of its daily growth is astonishing. The vast number of people interested in the various branches of its commercial and scientific application is forcibly illustrated by the number of journals devoted exclusively to electrical topics, there being no less than fifty-eight of these, while there is an equal number of allied journals that treat of the new developments in special fields. Of the electrical journals, fifteen are published in France and eleven in the United States, while the balance are scattered all over the civilized world. With these facts in mind the difficulty of the electrical engineer in keeping thoroughly posted on the developments of his art may be appreciated.

DR. CARY T. HUTCHINSON at a meeting of the New York Railroad Club said that in his opinion the time was not ripe nor conditions suitable for the application of electricity to heavy railroad traffic. The chief conditions for economical electrical service is that the train service shall be frequent—that is to say, that the machinery, including the copper feeders, be always kept loaded, doing work to its full capacity nearly all the time, instead of two or three minutes out of the hour, as would be the case were an attempt made to run the present trunk line service with electricity.

Mining Summary.

CALIFORNIA.

Amador.

The Baliol mine is mining and milling at a cost of 85 cents per ton. By increased milling facilities, the owners expect to reduce the cost to 50 cents per ton.

Record: At the South Spring Hill Con. the shaft is down 1200 feet and a crosscut is being driven to the vein.

At the Wildman the shaft is down 1300 feet, with a vein 3 to 75 feet wide. The Wildman and Mahoney are in charge of a thorough miner.

On the Central Eureka the shaft is down 950 feet.

The South Eureka is 1250 feet deep on a vein of from 5 inches to 15 feet, 20 stamps. The company is about to change to electric power for the mill, blower and crusher.

Ledger: The Live Oak, operated years ago by Parker & Thomas, has been reopened by Young & Sullivan. They sunk a new shaft to water-level ore. They are running a drift on the ledge.

Butte.

A circular letter which has been addressed to the shareholders by the secretary of the Consolidated Gold Mines of California states that "the ore already in sight is estimated at upwards of 250,000 tons, which is sufficient to keep the new 40-stamp mill running for five years or more. The general average of the ore, after discarding all rich assays, is taken at $4.33 per ton, and the manager says that the working expenses, including mining and milling, will not exceed $2.25 per ton."

C. W. Reed has bonded the Parsons mine, near Robinson Mills, and will sink a shaft 100 feet. If the ledge holds out, he will pay $2000 for the property; if not, it will revert to its present owners.

Gridley *Herald*: W. H. Rinehart reports that he has discovered a quartz vein on the North Butte, near Pennington. The ledge is about 3 feet wide.

Calaveras.

The following is a condensed report of the meeting of the Drake Properties, L't'd., at 64 New Broad St., London, on Nov. 19. Chairman C. Bingham said: "You are aware that we have acquired a huge property in California, 821 acres, practically right on the heart of the mother lode—a lode which is stated by our engineer and by other eminent experts to be in all probability the richest and most extensive auriferous formation that the world has ever seen, not even excepting the well-known Witwatersrand formation. The three chief lodes, or, rather, the three chief reefs, or ledges, as we call them in California—the Utica, the Blind or East Ledge and the Dead Horse ledge—practically traverse the south portion of our property. One of them, in fact—the Dead Horse—has an outcrop length in our property of no less than 4000 feet. The Utica reef, which from the map would appear only to touch one corner of our property actually passes into it, and has a great length in our property at a comparatively small depth. One of the considerations which led us to acquire these properties was their proximity to the famous Utica mine. We know very little about the Utica mine—that is we know very little accurately—because the owners of it are private individuals, not a company, and it seems to be extremely difficult to get them to impart any information whatever. Some experts put the profit made by the Utica people in the last four years at £240,000 a year. That is the lowest estimate. Other experts, including our own engineer, say that the profit last year exceeded £400,000. That last estimate is in all probability nearer the truth than the one I named first, because it has been testified to in open court, in California, by one of the proprietors. At any rate, gentlemen, we know as an absolute fact, that the Utica people possess one of the largest milling plants in the world. Taking the great weight of the stamps into consideration, it probably has the largest output in the world. That shows, of course, in the clearest possible manner—especially as I understand that those stamps are running day and night—that the Utica Co. must have an enormous reserve of payable ore. But that is not the most favorable point as regards our property. Lately the Utica people have been sinking a new shaft, and that new shaft is placed practically as near the boundary of our property as the Utica people can well get. They have apparently had the best results from that new shaft, for Mr. Meyer writes in his last letter but one that they are actually putting up another huge mill, making the third mill on that small property—that is small as compared with ours. I would like to read you an extract from a letter dated Oct. 11, which Mr. Meyer wrote me personally respecting this Utica shaft. This is what he says: 'The result of my new examination (he has been making a fresh examination of our property generally) is as favorable as the former one, and my plans will show you that we have reason to place absolute confidence in the future. I am also endeavoring to obtain exact information respecting the underground workings of the Utica; they should not be far from the Ghost shaft, for the reports of their shots are felt in the Ghost shaft with extraordinary force. The bottom of the shaft seems to shake, and the ventilating pipe, which goes down to the bottom of the shaft, throws up a puff of air to the surface every time a shot is fired. The sound always seems to come from the east, never from the west. All this agrees with my observations respecting the strike and underlie of the veins we have to cut. The Utica is making preparations for putting up a new stamp mill at the mouth of the new shaft. It is in this part, close to our property, that they find the richest shoots of gold. There is no doubt whatever of the increasing richness of the Utica lode as it goes towards the southeast.' Mr. Bingham proceeded: "We were thrown back a considerable time—in fact, about two months—by the protracted negotiations which took place between the American vendors and ourselves. I will refer to that later. That has put our engineer a little out in his calculations, but I am very glad to say that he has shown such enormous energy since he started work that he has already nearly caught up to the two months, and if he goes on at the rate he mentions in his last cable he will undoubtedly overtake his estimate long before he is due to cut the reef at a depth of about 600 feet. This is what he cabled the day before yesterday: 'South shaft: We are now drilling 4 feet per day; the rock is slate quartz with sulphurets; in the Ghost shaft we are now making preparations to commence hoisting water; the conditions are very favorable for cheap working.' At the present moment he is sinking no less than 4 feet per day. In his original plan of campaign, he said that he hoped to be down in the south shaft 450 feet on June 1st—that is, practically, six months from to-day—whereas, if you calculate what 4 feet per day means for say, 115 working days, you will come to the conclusion that, on June 1st, he will not be down 450 feet, but something like 700 feet. That, practically, explains the situation, as far as we have progressed, up to the present time. In the Ghost shaft Mr. Meyer is now at 400 feet. The new equipment is being put up and is nearly ready, as you will see from the cable; so that in a few days sinking will be going on vigorously in both shafts, and as Mr. Meyer himself writes, 'the really interesting part of the work will commence.' I should just like to mention that in this mine we are not going for high-grade ore; of course, we shall be pleased to have some high-grade ore if we get it, but we are not anticipating it. We are anticipating a large body of medium-grade ore, and as the costs of working in California are probably very much lower than in any other part of the world, medium-grade ore, if we get it in anything like the body that they have in the Utica—and I think, gentlemen, there is every reason to anticipate that we shall—will pay extremely well. I referred just now to the delay in the negotiations about the acquisition of the property. The Americans did not trust us. They had seen in an adjoining property how people came over from London, promised to find capital, acquired for that promise (and for that promise only) a third share in the property, and then simply let the matter slide, so that they practically got a third interest in the property for nothing. That, I understand, has been done repeatedly in California; so that, while we on one side will not trust the Americans they seem to have some justification for not trusting us. That made our negotiations rather difficult, and at one time we were on the point of breaking them off. Fortunately, however, as they began to realize that they were dealing with respectable and substantial people, we got one concession after another made, and in the long run we succeeded in getting practically everything we wanted. We have now made a contract for the acquisition of those properties which is eminently satisfactory to your board, and I am pleased to say is quite satisfactory to our shrewd and very careful lawyer, Mr. Francis. I think, however it is due to the American vendors to say that with that slight exception we have found them all along the most satisfactory vendors we could possibly have to deal with. I have some little experience of mines, though perhaps not so much as my co-directors, but they say the same thing as I do—we have never yet had to deal with any vendors from our own colonies or elsewhere who have met us as these vendors have done. They have practically sold to us a very large mining estate, which we think is very valuable, on which they have spent over £4000 themselves. They have sold us that estate for paper only; we have not paid them one cent in cash. That shows in a great measure the confidence they have in their own properties. But, in addition to that, they have actually subscribed no less than £5000 of the working capital of the company. I think it would be utterly impossible to show your belief in your own property in a more satisfactory manner than that. I would like to read you one or two words that the chief vendor, Mr. Drake, wrote me on this subject. He says: 'I believe the property we have turned over to the company is even more valuable than Mr. Meyer has reported to you. If you and your associates will not be in too great a hurry to realize on your investment, it will make you more money than you dream. Do not think from this opinion that I am an enthusiast. If the stock is held in a few hands, and if the Tryon tract is properly developed, it alone can be sold for double the par value of the capital, thus leaving the Garnett tract, which is even richer than the Tryon tract. The Harwood and Reidell tracts present a little different features, but I believe are equally valuable. Knowing these facts I may have been a little too particular on what terms I relinquished control of the property.' Well, gentlemen, I can only say that I hope Mr. Drake will turn out to be a true prophet. Mr. Meyer has been so successful hitherto in the management of this company that for the first time I believe on record we actually have a report showing that the expenditure up to date for the machinery, for the work—for everything, in fact—actually something like 20 per cent below the estimate that Mr. Meyer made. My experience has always been that the reverse is the case. If a man estimates so much it is usually 50 or 100 per cent more. In this case Mr. Meyer is so much below his estimate that he has saved a considerable part of his salary already, and that gives us the hope that his estimate, amounting to £15,500 for proving and equipping this mine, exclusive of his salary and the salaries in London, will turn out to be a correct forecast."

At Sheep Ranch the Round Butte gravel mine has twenty men employed. Preparations for hydraulic work, as soon as water comes, is being pushed. It is locally reported that H. F. Butternut & Co. last week found a nugget on the San Antone ridge which weighed 54 pounds 9½ ounces.

Prospect: The Mountain King, owned by Womble Bros., Big Seven owned by W. J. Lewis, and Homestead owned by McCarty and Womble, near Copperopolis, Madam Felix mining district, were bonded last Saturday to a Chicago company; terms of the agreement are that work shall commence within sixty days, a 20-stamp mill erected within six months. These properties have been considerably developed and the ore showing is very good. On the M. K. there is a shaft 270 feet; one of the conditions of the bond requires that this shall be sunk 230 feet deeper, making 500 feet. On the Big Seven the shaft is 110 feet, The Homestead has three tunnels—275 feet, 65 feet and 40 feet.

The shaft of the Pine Log near Copperopolis has reached 700 feet and sinking continues, while ore is being stoped from all the levels to keep the 20-stamp mill in motion. The sulphurets, of which there is a good percentage, is shipped to the Selby Smelting Works in San Francisco. D. Juttin is Supt.

El Dorado.

(Special Correspondence).—The Selby M. Co. (Incorp.) are progressing rapidly in their development work on the old Larkin Ranch, three and one-half miles south of Placerville. The shaft is 225 feet, and crosscutting has reached 40 feet on this level, both east and west. Drifting has been prosecuted north and south on five ledges. The ore body is 60 feet wide, of a medium grade. There are three claims in the group. The property (owned by San Francisco people) is "squarely" on the mother lode. W. Larkin is superintendent and V. Neale president of the company.

The Harville, adjoining the Selby on the south, has four claims, and is controlled by San Francisco and Eastern people. The company expects to sink 500 feet (by contract) before crosscutting.

Eastern men have taken hold of the Stillwagon and Rosebud mines near Fairplay and are developing them.

The tunnel on the Mulkey & Spreckels property is nearly finished, and the old workings will be reached in a few days.

Kern.

Application for a patent is made for the Good Hope mine owned by G. B. Kinyon, located in the town of Randsburg.

Ore running nearly $1000 to the ton is reported in one of the shafts of the Rademacher mine. This is the first mine located in that part of the desert.

In the Stringer district, near Randsburg, there are fifty dry washers at work; in the Pumpkin Roller district and Goler as many more are taking out pay dirt. In the Stringer country dry washers are averaging about 12 cents per run of fifty shovels each. Twenty to forty runs are made in a day.

The *Miner* hears that the officers of the Kramer-Randsburg Railroad are figuring on putting up a 40-stamp mill, with concentrators, at Barstow, and that it is proposed to give a cheap rate for ores, so that it will be possible to haul and mill the ores at a price not to exceed $4 per ton.

Mariposa.

(Special Correspondence).—On the Flyaway group E. C. Loftus is putting down a two-compartment shaft; he will go down 300 or 400 feet and thoroughly prospect the property. The storage dam at the Virginia will be completed in about a week and some progress has been made on the new mill. The Daisy tunnel at the Red Banks is nearing the 900-foot mark and it is thought the ledge may be cut at any time. About three weeks ago it was stated in these columns that the Merced Co. had struck a body of high grade ore in the Mary Harrison. The directors of the company authorized a denial of the report which was published in two Boston papers. The accuracy of the statement is proven by the fact that recently at Coulterville the company caused the arrest of two miners charged with stealing ore from the Mary Harrison mine. Several hundred pounds of ore, alleged to be worth about the same number of dollars, were seized at the time of the arrest, and are claimed by the officers of the company to have been taken from the workings of the Mary.

Mariposa Dec. 6th, '97.

The following is clipped from the News Bureau of the 3rd inst.: "Plans are under way by which friends of the Merced Gold Mining Co. will advance the company about $60,000 at 6 per cent interest for development of the property. It is proposed to resume sinking of the Mary Harrison vertical shaft and to connect by levels with the old incline shaft. While the condition of the mine is sufficiently encouraging to induce friends of the company to advance this money, it is not thought best as yet to levy a $3 assessment. In the 600-foot level of the Mary Harrison shaft some good ore has been found. Of three assays made the results were $14, $225 and $9 to the ton. The latest mill returns showed a little over $5 to the ton. The company has some 60,000 tons of ore blocked out which should pay a profit of $1 per ton. If results of new workings are satisfactory an assessment of $3 per share may be levied and an electric power plant established. People close to the management believe that the mine is capable later of earning $300,000 per annum."

Nevada.

Underground work at the Bellefontaine mine, in Willow valley, has been suspended pending construction of a new 5-stamp mill.

The Chinese companies which have been hydraulicking for several years at Omega are adopting the elevator process, which they have in course of construction.

The monthly production for the past year of the Delaware gravel mine, Nevada City, has been $15,000 per month, says the *Transcript*.

It is said that tributers who have been working at the W. Y. O. D., Grass Valley, for a long time have realized $4 per day.

The Black Oak, above Moore's Flat, is being developed by the California Mutual M. & D. Co. A new tunnel is being run for the ledge, which showed well in the shaft from the croppings.

The incline on the Milliken Ranch gravel mine is 600 feet and the drift north is 260 feet. Poorman & Hastings expect to tap the Harmony channel within 100 feet. A. Durbin is superintendent.

The Phœnix Company's reservoir is completed; it is 100 feet long by 50 feet wide and 10 feet deep. There is a fall of 500 feet from the reservoir to the mine. As soon as the workings are dry exploration will be commenced.

The lessees of the Eagle Bird mine, Maybert, started their mill last week. The ore is of a promising nature.

Good rock is being taken from the Orleans at Grass Valley. A favorable strike has been made in the 800 level rich in sulphurets.

The copper mine at Spenceville is in active operation, shipping 200 tons of ore daily to the Stager Chemical Works in Alameda.

The Nevada City Board of Trade has unanimously voted to co-operate with the county supervisors in making a display of the gold ores of Nevada county at the Golden Jubilee Fair to be held in San Francisco next month.

Herald: Suit has been begun in the United States Circuit Court by F. Williams, as trustee, against the Gold Hill M. Co. and others to foreclose a mortgage given in 1890 to secure an issue of $50,000 in bonds. The property mortgaged includes the Nevada City quartz mine and other property in Nevada county.

Telegraph: Work was started on the Sauvee, between the W. Y. O. D. and the Pennsylvania. The mine has been called the Golden Treasure. Capitalists from San Francisco and Los Angeles will handle the property. Work began cleaning out the tunnel. The shaft will be pumped and crosscutting commenced. The mine is owned mostly by F. Dulmaine.

Union: On the Widbur mine the new shaft is down 150 feet. A 30-inch ledge of paying rock has been struck, and another of 4 feet was also encountered. J. Deasy is superintendent.

A recent crushing of forty-three loads of ore from the Wisconsin at Grass Valley yielded the sum of $25 per load.

Placer.

The Pioneer has made a survey for a new tunnel on the 1500-foot level. The foundation for the twenty additional stamps has been ordered, and it is expected a chlorination plant will be erected.

The cleanup after a month's run at the Gold Blossom mine, at Ophir, aggregated over $10,000. The mine has forty men at work, is running ten stamps at present, and will have twenty more at work soon.

Plumas.

At the mouth of Mill Creek two Frenchmen are taking out considerable gold.

The Rappahannock has shut down for winter.

F. Eyraud is working on Stoney Bar, and is taking out a little gold.

The Cooley Bros. on Smith's Hill are sluicing and making good wages.

H. and J. Batty are mining on Willow Bar, meeting with success.

Riverside.

The G. C. M. Co. organized at Riverside. D. E. Mitchell, Pres.; E. B. Fish, Vice-Pres.; C. C. Doran, Sec.; First Nat. Bank, Riverside, Treas.

The company will operate the Gold Canyon mines, Riverside county. They consist of two claims, 3000 feet, a ledge averaging 7 feet in thickness. Two tunnels have been run on the vein, one 90 and the other over 300. The ore shows well, the poorest milling $10 per ton. The company will erect a 10-stamp mill. The ore is free milling.

San Bernardino.

Los Angeles *News*: The strike in the Rose mine in San Bernardino county, fifty miles from Victor, at the 800 level, is said to be 4 feet wide and assays well.

San Diego.

(Special Correspondence).—In the Julian district work is to be resumed on the Cincinnati Belle. Report says a cyanide plant is soon to be put in at the Stonewall mine for working the tailings, which have been fully prospected. It is anticipated $100,000 will be recovered. About twenty men will be employed. The Mountain View Mining Company is continuing work on its property on the backbone of the ridge running north from the Stonewall towards the Ranchita. It is taking out and sacking some fine ore. Work on the Laguna Mining and Milling Company's property in the Laguna mountains is temporarily suspended. Mining interest and prospecting in San Diego county is more active than ever before.

The Golden Cross mines at Hedges have passed into possession of the Free Gold M. Co., which among other capitalists includes I. Trumbo of Utah and California. Litigation has been settled. The purchase price and attorneys' fees amount to $250,000.

(Special Correspondence).—A rich strike is reported in the Helvetia mine, near Banner, which until recently has been lying dormant.

Men are at work on the Cincinnati Belle. Ore is being hauled to the company's 10-stamp mill at Banner.

W. R. Farnsworth is at San Diego from Banner with nuggets from the North Star mine, near Banner, believed to be on the same ledge as that of the Ranchita mine.

At Fallbrook the miners in the Defiance mining district have completed a road which joins the railroad at Murrietta. It is expected the smelter will be in operation Jan. 15th.

Shasta.

Some interest has been created at Iron Mountain by the reported discovery at the headwaters of Slick Rock and Spring creek of

a body of ore assaying $150 per ton in free gold. The width of the vein is reported as 2 feet. About twenty locations have been made on Government section 23. Mine Superintendent Wilson, Mine Foreman Thompson, Asst. Supt. Nourse, members of the company's staff, company railroad employes and other attaches have located claims.

The twenty stamps of the Texas Consolidated are again crushing ore. A test will shortly be made of an electric drill.

Forty men are employed in the Roberts mine, Harrison gulch, Ferdinand Hurst manager. There are 10 stamps and a cyanide plant. Captain Roberts will soon double the capacity of his mill by adding 10 more stamps.

At Hall City W. R. Hall has closed down his mill for the season after a successful run. He will continue taking out ore during the winter.

Twenty tons of ore shipped to the Keswick smelter from the Mt. Shasta mine netted from $40 to $90 per ton.

Sierra.

A mining company was organized last week at Downieville. A. Costa was elected president, J. Latrielle treasurer, C. Meany secretary, T. Costa general manager, O. Nessler superintendent. The mine was named "The All Nations."

Hardly any rain has fallen as yet, and it is thought shortage of water supply will considerably reduce the output of gold in this and adjoining counties.

Siskiyou.

The mines at work, Scott Bar, are Walker & Russell, Schuler & Co., Smith & Maxey, Monroe & Woolridge, Martin Andrews & Co., Hunt & Nesbitt and McCauley & Co.

Work has been temporarily suspended on the Mabel, the Columbia, the Gumboot and the Quartz Hill mines.

C. L. Payton & Co., Yreka, have leased the Commodore mine, and will develop it on an extensive scale.

R. S. Lenhart, superintendent for the new company owning the Gold Ball mine at Salmon river, intends to continue working this winter.

Journal: The Distlehorst & Barton Klamath dredger is working at Horse creek and is reported taking out pay gravel.

At the Blue Gravel, on Greenhorn, they have commenced to take out gravel. The rain of the past two days has furnished plenty water.

Most of the placer mines in Siskiyou are starting, as the late storms have furnished plenty water.

Trinity.

The Brown Bear at Deadwood shipped 58,000 lbs. of sulphurets to San Francisco last week.

It is estimated that the La Grange Hydraulic M. Co. people have spent, or will have spent when the work is completed, $1,000,000 in development work and improvements. The newer work, such as the flume, siphon line, tunnel, etc., has cost in the neighborhood of $500,000. The company's flume is eleven miles in length, requiring 3,000,000 feet of lumber for the construction. But three giants are operated at a time. Steel cables are swung across the diggings, and to these are attached travelers fitted with platforms which are lowered to the bed, loaded with boulders and then hoisted, moving to wherever desired. Water power is the motive force.

Tuolumne.

The Tuolumne County Water Company's flume, which has been shut down for ten weeks, was opened on the 8th inst. The dam of the storage reservoir, about twenty-five miles from Jamestown, washed out some time ago, and the stamp mills had to depend entirely on the streams for water. For over two months many of the mills have been shut down, but will resume work at once.

The new 20-stamp mill at the Gagnere is under way. Over a mile of pipe will be used to furnish water power for the mill and hoisting works. Supt. W. G. Long intends to have the mill in operation January 1st.

At the Norwegian a rich strike is reported.

At the Santa Ysabel a great deal of prospecting work has been done, principally at the 200-foot level, from the different shafts, but at No. 2 shaft on the Mascot vein, development is being carried out at the 300-foot level. At No. 3 shaft is developed the Knox and Boyle ore chute 700 feet on the incline of the vein; this ore chute was worked formerly to about 400 feet on the incline, yielding a high grade of ore. It faulted at this point and was in consequence abandoned by the former owners. The present owners sank 200 feet farther on the incline and found the ore chute again, through which they drifted 80 feet; sinking another 100 feet on the incline they again found the ore chute and have drifted 50 feet, still holding good ore in the face. Near No. 2 shaft they also discovered the Mascot ore chute, which carried good ore continuously for over 300 feet at the 200-foot level; the stopes above this level have not been as regular as expected, the ore being pockety, but on sinking to the 300-foot level they have again found the ore of better appearance than at the 200-foot level, and are now drifting on it to learn its extent. They have also between No. 2 and No. 3 shafts at the 200-foot level the Central ore chute, which showed very well, and are now cutting under it on the 300-foot level and find good ore in the drift. In doing this extensive prospecting to determine the location of the ore chutes and in erecting mill and power plants, they have contracted a debt of about $80,000 to date, which has been carried by the trustees who have voted to call a meeting of the stockholders to authorize an increase of the capital stock by 30,000 shares.

Independent: Rich ore has been found in the Confidence mine in the old workings. The property is owned by San Francisco people. O. S. Buckbee is the new superintendent.

Supt. Fisher of the Lady Washington is making arrangements for the erection of a 10-stamp mill.

The Tuolumne Co. M. & D. Co. of Fresno has acquired the Sell, Barenda, Columbus and Hughes mines.

A rich strike is reported in the Marble Point, operated by J. Joseph. This is a new property.

Yuba.

There is great activity in mining about Brown's Valley. The Pennsylvania is turning out good rock and the ledges are developing in size.

NEVADA.

The Molus mine near Bishop, on the line of the C. & C. R. R., is reported looking well.

The Gold Creek M. Co., which gave such promise, is reported to be in a bad way. Suit has been brought against the company by various employes whose wages have remained unpaid for four months.

In Eagle Valley mining district there are 150 men, forty working for wages.

A. G. Campbell at his Italian and Red Eagle mines has a vein 10 feet wide, with a value of $25.

Supt. Kislingbury is exerting the Inter Ocean and has taken the offer of $40,000 for a group under consideration.

In New York City last week a sale of $1500 of the Comstock Tunnel Company's bond was made at 4 per cent, 1 per cent less than the last previous sale in September.

The Boston – Nevada Copper Company's smelter in Mason valley has closed down for thirty days. About 100 tons of black copper and copper matte, the product of the recent run of the smelter, is being hauled to Wabuska for shipment to the refining works.

The owners of the Altoona received from the shipment of seventeen tons of ore 25 ounces of silver, $38 in gold and 5 per cent lead. The chute from which this and other shipments have been regularly made for the past three years has been followed to the depth of 80 feet, and is still looking well at the bottom of the winze. In the neighborhood of $350,000 have been extracted from the mines in the immediate vicinity of this property, all the ores of which run from $50 to $100, and as high as $300 in gold.

Manager Cohen says that during the month of November there was handled at the De Lamar mill nearly 9000 tons of ore. Some say the earnings will not fall short of $300,000 per month; the more conservative fix their guesses at $200,000.

Virginia *Enterprise*: The test of 1000 tons of Gould & Curry rock from old fills in the mine has proved a success. It is probable that 2000 tons of the rock will be reduced, which means work for miners and millmen.

Lyon County *Times*: Work is progressing on the Silver City mine, extending the tunnel. In the past week several promising stringers were cut. This is one of the richest mines in the camp.

Several carloads of black copper and matte were shipped to the reduction works from the Boston-Nevada Copper Company's smelter. The value of the product is said to be about $9000.

Pioche *Record*: Very few claims will be forfeited in this district this year for want of assessment work. Many claim owners, nonresidents, are writing from outside points and arranging for the protection of their interests.

A contract was let on the Reed group for running a tunnel on the north slope of Lookout mountain.

White Pine *News*: A nugget worth $251 was found last week on J. C. Marriott's claim near Osceola. It was oval in shape, measured 4 inches in length, 1¼ inches in width and ⅜ of an inch thick. On this same ground a $76 nugget was found by E. Marriott and another worth $20 by B. Tilford.

OREGON.

A. H. Carson of Grants Pass says that at the present time there is not a placer mine in southern Oregon that has water that is not paying.

At the Jewett mine, Grant's Pass, the 5-stamp mill is running steadily on $20 ore.

The Southern Oregon Miners' Association elected W. H. Hampton Pres., L. L. Jewell Treas. and E. C. Wade Secy.

In the spring of 1896 there were few giants operated in Josephine county, and at the present time there are twelve in readiness for the coming season. Quartz mines are also being developed.

Miner: J. Burkhardt of Pleasant Creek has been prospecting for coal in Jackson county. He has specimens of bituminous coal, the ledge of which he says is three feet wide and as good coal as is produced in the Eastern States, and that it bears every indication that it will prove to be a regular blanket ledge of enormous extent.

WASHINGTON.

Work is progressing on the Acme mine, near Kettle Falls, under the supervision of E. B. Burdick. Considerable ore is ready for shipping.

In the Blind Discovery, once known as the Bunchgrass, a rich body of ore has been struck.

BRITISH COLUMBIA.

(Special Correspondence).—The Tin Horn mill, it is thought, will be run a week beyond the thirty-day limit, as the bins were filled when crushing commenced with the poorest ore obtainable from the lowest of the four tunnels. This ore was run through for fifteen days, according to the advice of the superintendent. Then the better class of ore was taken, and the amalgam showed up beautifully on the plates. The Winchester, said to have the best showing in the camp for the amount of work done, is selling the rest of its treasury stock, with the idea of putting up a large mill to work its two big properties—the Stemwinder and Winchester. The Tin Horn mill (bought in San Francisco) has been pronounced the best in the Province, and it is altogether likely that the dozen projected mills for this camp will come from San Francisco.

Dabney, Parker, Kennedy Bros. & Purgold have purchased the Tamarack group, near Ymir; consideration, $60,000.

The British-American (Ltd.) has purchased seventeen claims in the Algonquin group, near Christina lake; price, $50,000.

R. J. McKenzie bonded the Enterprise, Anchor and Lake View properties in Long Lake from A. Cameron and D. R. Campbell for $50,000.

An English syndicate has bonded the Athleton claim in Wellington from Mack Bros. for $15,000, paying 10 per cent cash.

The Idaho Co., operating the Idaho, in the Slocan, has paid a dividend of $30,000, making a total of $240,000 to date.

A new enterprise is reported on Sheep creek, a mile below the O. K. mine, Trail District. A cyanide plant is being erected by an Englishman, the capacity of which will be fifty tons. It is claimed that ores can be treated at a cost of $3.50 per ton, and that ore worth as much as $6 per ton will pay to mine.

(Special Correspondence).—Reports to-day from Phillips Arm, Vancouver district, state that the London syndicate who are to purchase the copper-gold Blue Bell prospects under certain conditions have made their first payment. They are to spend $10,000 more in developing. If all is well at the end of that time, they will pay in purchase money to the present owners $12,000 more and a block of stock in the new company.

Vancouver, Dec. 4, '97. A. E. GOODMAN.

W. M. Ridpath, president Poorman Mining Company, has smelter returns from the first two cars of ore made by the new management. Thirty-six tons was sent to the Trail smelter and netted the company $707.66, or $19.58 per ton.

All Le Roi ore will be shipped to Northport after Feb. 1st, '98.

THE KLONDIKE.

A Juneau dispatch via Victoria, Dec. 8th, reports that 3000 men were to have left Dawson by the up-river and the overland routes about Nov. 1st, starting in squads of 100, being forced to leave by the scarcity of provisions on the Klondike; 3000 is considered a large estimate.

UTAH.

The management of the mill at De Lamar's Mercur mine has contracted for 2000 of the 2400 H. P. to be delivered at the plant, transmitted thirty-five miles.

Officers of the Anchor Mining Co. the ensuing year are F. Smith, Muskegon, Pres.; E. F. Holmes, Osceola, Mich., V.-Pres.; W. S. McCornick, Salt Lake City, V.-Pres.; H. Myers, Cleveland, Sec.; D. Keith, Gen. Mgr.

The Salt Lake *Tribune* reports the purchase by the Utah Con. M. Co. of a fractional interest in the Salvator lode.

Miner: Supt. Kirby of the Bullion-Beck, Tintic district, has added 60 men, making a total of 100.

Supt. Marx of the Black Dragon, Silver City, is sinking two new shafts.

The Eureka Hill is placing 20 additional concentrators, employing 200 men and shipping 100 bars bullion and 40 cars concentrates each month. Supt. Buckbee is in charge.

Tribune: The record at the Consolidated K. C. R. & S. Company's sampler in Salt Lake City shows that, during November, Maj. Jackson and his staff handled 3000 pounds of gold cyanides, the value of which varies from $9 to $40 per pound.

Mercury: Supt. Moody of the Tioga group, owned by an Ogden company, reports the incline 100 feet and good ore. When the incline was commenced, assays of $1.60 in gold and several ounces silver were obtained. Now the silver values have disappeared, while the gold contents have increased to over $7 in the face.

De Lamar's Mercur mines have contracted for 2000 H. P.; the energy will be transmitted thirty-five miles.

IDAHO.

The Flynn group in the Cœur d'Alenes, comprising sixteen claims, has been bonded to the representative of the Kansas City Smelting Co. for $235,000, 5 per cent of the amount down.

The shaft at the Surprise mine, near Idaho City, is down 150 feet and a station is being cut.

A. J. Mallory, representing New York parties, has bonded 1000 acres of placer land in Boise basin, at Idaho City. He has secured water rights, embracing all available water in that vicinity. The deal includes the property of K. P. Plowman, J. Branstetter and the Hanson property.

The Stemwinder and machinery and the Granite mine, mill and tramway were sold at sheriff's sale at Murray last week, F. Z. Holman bidding in the former at $107,499.73 and J. P. Keane the latter for only $3720.88.

J. Keane, the purchaser of the Granite, has commenced work. The Granite was a famous property in the Cœur d'Alenes in early days, there having been some $600,000 taken from it.

Wardner *News*: A. O. Newton, manager of the Butte and Yellowstone Coal and Coke Co., reports work for the erection of the company's fifteen coke ovens proceeding favorably.

The sale of the Lambert-Post mine, Mount Baker district, is consummated, passing to a Portland, Or., firm represented by H. Stanislawsky. The consideration is said to be $100,000.

Sixty pounds of gold was taken out of the Buffalo Hill placer mines at Elk City, Idaho county, this season.

MONTANA.

The Supreme Court has affirmed decision of District Court of Silver Bow county denying injunction to the Montana Ore Purchasing Co., restraining the Boston & Montana from working the Johnstown and Rarus lodes in Butte. Some time ago Mr. Heinze applied to Judge Lindsay for a temporary restraining order to keep the Boston & Montana from extracting ores from fractions of the Johnstown and Rarus. This was denied, and Heinze appealed to Supreme Court.

It is reported in Butte that J. Cudahy of Chicago has completed a deal for a controlling interest in the Big Seven mine near Niehart for $225,000. The Big Seven is capitalized for $3,000,000, and was originally a silver mine.

The Scotch directors of the Diamond Hill mines near Hassel, says the Helena *Independent*, have decided to make some further investigations as to the value of their property before abandoning work at the plant. A small force of men has been put to work, and a few of the stamps in the Mammoth mill have been started again, the object being to make a thorough test of the capacity of the enterprise and the true value of the ore. The cause of the disappointment of the company in the past is said to have been poor estimates of the value of the low-grade ore in the property. The assays made showed much more gold than was subsequently saved in the practical working of the mine. A. Urquhart, the secretary of the company, now has charge, and H. C. Hansen, formerly assayer for the company, has charge of the chemical and metallurgical departments.

Preliminary work on the Queen in Meagher county, which is to be reopened, has been pumped to the 300-level.

At the Kennett a double compartment shaft 350 feet has been sunk, and the drifting and crosscutting done at that depth has uncovered ore. In the Lucky Boy, by the same company, a shaft 100 feet in depth has tapped the ore body. A 60-stamp mill is in course of erection.

The Butte *Miner* reports that the Empire, in Lewis and Clarke county, has been sold to a Cincinnati syndicate for $65,000.

At the West Colusa and Leonard shafts, Boston and Montana Co., preparations are being made for an air compressor, whose capacity will be 4500 cubic feet per minute, sufficient to keep in operation 65 drilling machines. The motive power for working this will be furnished by seven boilers of locomotive type, having a capacity of 100 horse power each.

A Butte dispatch of the 10th says that in the Low Land mining district a strike has been made in the Ruby mine, from which the owners are taking out "over $2000 a day." The property was purchased last summer from A. Moudenhauer of San Francisco for $90,000, the principal owner being M. E. Graves of New York.

SOUTH DAKOTA.

Black Hills Review: The owners of the Victor mine have let a contract to sink 100 feet and crosscut. This property is fourteen miles from Rapid City. Work will also be resumed on the Storm Mountain property the first of January.

The Hercules M. Co. has engaged F. Rossiter as superintendent of the company's operations in the Black Hills.

The shaft on the Sunnyside is 200 feet; the vein, free-milling ore, is strong and well developed at the bottom. The property is in Pennington county.

The Guilt Edge group, located near Big Strawberry gulch and owned by M. L. Day, is making regular shipments, averaging five tons a day, that return $132 in gold and 3 ounces in silver per ton.

WYOMING.

Business men of Douglas will develop the copper discoveries at the Hazen mine. Sufficient funds have been subscribed for driving a 200-foot tunnel on the lead.

MICHIGAN.

The Tamarack Mining Co.'s dividend of $3 per share, payable December 31st, makes $6 per share, or $360,000 this year. Total dividends now aggregate $5,190,000. When its new No. 5 shaft reaches the lode results are expected which will fully compensate for all the expense and arduous labor connected with the undertaking. It is going down some 5000 feet to pierce the lode cut into by the Camulet & Hecla at their Red Jacket shaft.

The Quincy Mining Co. has determined to build a new up-to-date smelter on the Pewabic sands at Lake Superior, where the Quincy output will be treated. The work of constructing the plant is to begin in the spring, and the estimated cost will be $100,000.

COLORADO.

At Leadville to date there has been no official announcement made of what is being done relative to the drainage of down-town territory. The members of the Pumping Association claim to be entirely ignorant of any arrangements that would tend to show the early inauguration of this work. At the same time there is the general impression that there is a deal on foot whereby a number of interests in the down-town territory will be consolidated, and after this is effected that the combination will be prepared to commence pumping operations.

The air compressor plant owned and operated by the Yak Mining, Milling and Tunneling Company, which was destroyed by fire some weeks ago, is being rapidly rebuilt, and within ten days the new plant will be completed and the company will be in a position to resume shipments of forty to fifty tons per day.

The following is given as the schedule of smelting rates on Clear creek and Gilpin county ores, as agreed upon at the recent meeting of the smelters:

For dry and copper ores the following are the rates fixed:

Gold is paid for at the rate of $19.50 per ounce when the ore contains .05 of an ounce or more in gold.

For silver, 95% of the New York quotation is paid.

Copper, dry, is paid for at $1 per unit.

Treatment charges, Denver delivery, $7.50 per ton; no extra charge is made for silica when the ore contains no more than 40%, the excess above 40% being charged for at the rate of 10 cents for each per cent, and an al-

lowance of 5 cents for each per cent below 40% being made up to a maximum treatment charge of $9.50 per ton for ores not exceeding $25 per ton gross value and $11 for ores exceeding $25 gross value; ores containing zinc, not to exceed 5%, no extra charge, and 50 cents extra charge for each per cent of zinc above 5%.

Lead ores are paid for as follows: Gold, when ore contains .05 of an ounce or more, $19.50 per ounce; silver, 95% or the New York quotations; lead on the basis of $4 per 100 pounds; no charge for zinc up to 10%, and 50 cents for each per cent in excess of 10%. Lead contained in the ores is settled for as follows: For 5 to 10%, 40 cents per unit and $11 treatment charge; 10 to 15%, 40 cents per unit and $9.50 treatment charge; 15 to 20%, 40 cents per unit and $7.50 for treatment; 20 to 25%, 40 cents per unit and $5.50 for treatment; 25 to 30%, 45 cents per unit and $9 for treatment; 30 to 35%, 45 cents per unit and $3.50 for treatment; 35 to 40%, 45 cents per unit and $2 for treatment; 40 to 45%, 47 cents per unit and $1 for treatment; over 50%, 55 cents per unit and $1 for treatment. All treatment charges Denver delivery.

Tailings and concentrates: Gold, when ores contain .05 of an ounce or more, $19 per ounce; silver, 95% of the New York quotation; lead in concentrates and tailings upon a $4 basis, 40 cents per unit if ore contains 5% or more; 10% of silica allowed without extra charge, 10 cents charged for each per cent over 10; 5% of zinc allowed without extra charge, 30 cents charged for each per cent in excess of 5; treatment charge, $3.50 per ton in carload lots, Denver delivery.

Herrington shipments, Cripple Creek, for November aggregated 358 tons, netting $8007.07.

Moon Anchor earnings for November netted $35,000; dividend disbursements for the same month were $15,000.

W. Head will have charge of the Howbert at Cripple Creek.

The northern boundary of the Cripple Creek gold district has been extended three miles by the discovery on Copper mountain of a blanket vein of ore, which ore lies near the surface and is mined with a plow and wheelbarrow.

Beginning with Dec. 1st all transactions on Denver 'change are in the name of the Denver Mining Stock Exchange and Board of Brokers, who succeed the old Colorado Mining Stock Exchange, the latter having gone out of business.

Denver *Record*: The Vindicator, near Cripple Creek, is producing thirty tons a day, encountering no water. The shaft is 485 feet. The ore runs better than ten ounces gold.

The Cripple Creek and G. H. tunnel has let a contract of 400 feet. It will cut at 700 feet the Anchoria-Leland and drain the Moon-Anchor and Midget 800 feet deeper than existing workings in those properties.

The Rigl on Battle is down over 285 feet. Two ore chutes have been opened. The existing reserves will justify production for three months.

The Mabel, Gilpin county, operated by C. F. Barker, is showing well. At a depth of 110 feet below the adit, levels are being driven each way from the winze and in both levels ore is showing of an average value of $50 per ton.

At the Brack Hollow, on Maryland mountain, shipments of mill ore are made which give returns of over two ounces gold per ton.

Ore has at last been found in the Mollie Gibson thirteenth level, but has not been developed sufficiently to ascertain its extent. The strike is said to run about fifty ounces silver per ton and a small percentage of lead. The find is the first of importance made in the camp below 900 feet from the level of the city.

Ouray *Herald*: Work has begun on the tunnel of the Treasury Tunnel, M. & R. Co. in the Red Mountain district. The T. T. M. & R. Co., is a Pennsylvania corporation, organized under the laws of Colorado, capitalized for $500,000. W. J. Hammond, Jr., of Pittsburg is general manager, and R. Whinnerah superintendent. The tunnel will be 7920 feet long, 8 feet high and 8 feet wide, and, at an elevation of 10,500 feet, will run under Commodore peaks to the head of Silveride basin. The bore will cut through the crest of the range 2600 feet from the surface, and deep mining will be one of the principal objects. Two years and a half will be required to finish the work laid out.

NEW MEXICO.

The Othello and Desdemona are shipping two cars per day to the El Paso smelters. J. Mitchell is superintendent.

Discoveries of opals in the Cochiti district are attracting attention. The stones are found in a country extending from the north bank of Colla canyon across to Peralta canyon and south from Colla to Bear canyon, eight miles long and two miles wide. The matrix in which the stones are found is a hydrated quartz.

The H. M. Porter mill, Hillsboro, is running on ores from the Snake, Opportunity and Bobtail mines. At the Opportunity a body of honey-combed quartz, the spaces being filled with a fibrous blood-red substance, has been encountered, which runs sixteen ounces in gold to the ton.

Capitalists have made a deal with H. Whitehill and H. Woods for the purchase of the Helena gold mine. The negotiation provides for the erection of a cyanide reduction works.

The Texas mine, Grant county, is reported to have struck a rich chute of ore in the shaft at 333 feet.

ARIZONA.

Clark and Hoyt of Los Angeles have bonded a group of claims in the Pearce district, Cochise county; consideration, $30,000.

The Kasser G. M. Co., at Globe, in addition to the bullion product in November, shipped two cars of concentrates, running $50 to $60 in gold, to Deming, N. M. J. Kasser is superintendent.

A strike was made in the Rescue, in Gila county. The ore body shows a face of 20 inches.

The Golden Rule, near Tombstone, now operated by the Golden Queen Mining Co., F. Playter superintendent, is working twenty men and shipping ore.

The United Verde is shipping 3,000,000 pounds of copper bullion every month.

MEXICO.

At Santa Elena, Sonora, a 100-ton cyanide plant will start up Jan. 1st. Twenty-five of the sixty stamps in the mill are working on pan amalgamation, with satisfactory results.

The Sonora Railway has contracted with the Boleo Company of Santa Rosalia, Lower California, to move 18,000 tons of copper matte and bullion per annum. The first train load was to be delivered at Guaymas on December 3rd. The freight will go to New Orleans, passing through the United States in bond, thence by steamer to Europe.

NICARAGUA.

In a report to the State Department about gold in Nicaragua, Consul O'Hara at San Juan del Norte says: "Much of the newspaper talk about gold in this country is pure imagination, and while I have faith enough in the gold fields of eastern Nicaragua to believe that gold hunters who have both the time and money to prospect a year or so might find poorer gold mines elsewhere, yet I feel that it is my duty to warn Americans not to come here in the expectation of getting rich in a few years. Up to the present time, with but few exceptions, no one has succeeded in making a fortune in the mining districts of Nicaragua."

CANADA.

The shipments of asbestos and chromite by the Quebec Central Railway from Jan. 1st to Nov. 1st, '97, are as follows:

CHROMITE.	*Pounds.*
From Coleraine	42,560
From Black Lake	3,323,040
Total	3,365,600
ASBESTOS.	*Pounds.*
From Black Lake	998,550
From Thetford mines	13,341,000
Total	14,339,550

AUSTRALIA.

Under date of Nov. 20th, British Broken Hill Proprietary reports: Mill returns for fortnight ending Nov. 17th: 4069 tons of crude ore produced 824 tons of concentrates, which contain 491 tons of lead and 20,122 ozs. of silver.

SOUTH AFRICA.

At a meeting of the Con. Gold Fields, S. A., Co. in London on the 15th ult., John Hayes Hammond said: "I have been a consistent technical advocate of deep-level mining. * * * This section shows you the surface of the ground sloping to the south. The red line represents the reef—that is, the ore-bearing formation, dipping at an angle beginning where it outcrops on the surface at 50°, and gradually flattening to a depth of 30°, where we find it in our deep-level shafts. This map—it is only approximate, I may tell you, but it is sufficiently accurate for the purpose of illustration—will show certain important facts. One is that there is an undoubted tendency of the reefs to flatten in depth. It will show you, therefore, that we shall not have to go as far to reach the reef in our deep-level properties as might have been estimated from a study of the superficial developments of the reef. It will show you in connection with this particular property another most important fact—that is, there is not the slightest tendency for the diminution in size of the reefs or decrease in the value of their gold contents. Now, I have talked to you tentatively for the last few years about mining to a depth of 3000 feet. Having gradually educated you up to that point, I may tell you that we fully expect to be able to mine depths of over 5000 feet, to which depth, indeed, mining is carried on profitably in other countries. We have actually demonstrated by extensive developments the value of this ground to a depth of 2385 feet, and there is no question of the continuance of the reef and the ore bodies to a depth of over 3000 feet, because that has been demonstrated by the Bezuidenville bore hole, as I explained at last year's meeting. The technical difference between mining on a deep-level property and mining on an outcrop property consists in this, that in the mining of an outcrop property the reef is followed by an inclined shaft starting immediately upon the reef and, consequently, immediately upon the ore bodies from the outcrop. In the case of a deep-level property the reef lies considerably below the surface of the ground, and must be reached, therefore, by vertical shafts sunk through barren ground at various depths from 1500 to 2000 or 3000 feet. The only engineering difference is that you must sink a vertical shaft to reach the reef. When the reef is once struck the character of mining is precisely the same—the same incline shafts and precisely the same machinery are used, and the cost is not one penny per ton more.

* * * * * *

I now call your attention to the other map we have prepared of the central section of the Rand. This section of the Rand is the cream of the district. It is not only that, but it is a mining district unequaled in value in the history of gold mining operations throughout the world. It extends for about eleven miles from the Langlaagte estate to the Witwatersrand (Knight's). You will see this company's important holding colored on the map. The value of this district has been conclusively established by upwards of 100 miles of developments actually on the reef by numerous shafts intersecting the reef at different points in the area and by still deeper boreholes. It has been conclusively proved also by the fact that over 10,000,000 tons of ore have been mined within the area. Last year twenty-two companies were operating within the area, and actually distributed in dividends about £1,500,000 from working something like 2,500,000 tons of ore, and this year during thepast seven months twenty-five companies have been in operation—you will see the deep-level mines are gradually coming in—and they have extracted about 2,000,000 tons of ore, and have actually paid a profit of £2,000,000, or nearly £1 per ton. I think it is simply wasting your time to endeavor to strengthen your belief in this section, as this section is universally acknowledged as an extremely rich and reliable one. But it is also estimated that from within this section something like £4,000,000 sterling will be extracted down to a depth to which mining is acknowledged by everyone to be feasible. To realize this sum I will tell you it almost equals the output of the entire United States of America during the last fifty years, and it exceeds two-thirds of the entire output of the world for the same period."

Commercial Paragraphs.

THE Alaska Transportation Company of San Francisco and New York is building three steamers at the Fulton Iron Works, San Francisco.

THE six Leffel 1000 H. P. water wheels to be installed on the Big Hole river in Montana will transmit the power twenty-five miles and operate under a 60-foot head. Leffel & Co. are building a plant for Georgia of two wheels for 1600 H. P., 112-foot head, fourteen miles transmission.

THE E. P. Allis Company, Milwaukee, Wis., is building an addition to its machine shop at the main works—a one-story brick building, 106x150 feet, with a double roof, to be used for finishing their heavy engine work. A 30-ton Shaw electric traveling crane will run through the center the entire length of the building, with 30 feet clearance from the floor to the lower line of the crane.

THE Gutta Percha and Rubber M'f'g. Co. reports an increasing demand for the "Spadone" concentrator belt, over 100 having been placed during the past year. The thickening and strengthening of the outward rolling edge of the "Spadone" belt, adding from three to five years to its working life, is a noticeable improvement, and the results show that it is appreciated by practical mill men.

THE Kansas City Smelting & Refining Company has adopted a flag which will float over all works and agencies of the company in the United States and Mexico. The colors of the flag are a combination of the national colors of both countries—red, white and blue, and red, white and green. On the red is a crescent, on the blue a Maltese cross, on the green a circle, and on the white a letter. These signs are their chemist's symbols for the four metals—gold, lead, silver and copper. The products of the smelter bear the name of "Alchemist's Brand."

THE Colorado Iron Works Co. has just closed a contract with the Germania Lead Works, Salt Lake City, for five Bruckner roasters, complete. They have entered an order for a slag equipment complete, including four 44 cubic feet capacity self-dumping slag trucks and electric generator, electric locomotive, standards, etc., for handling trucks, and also report the shipment of four 44 cubic feet capacity, self-dumping slag trucks to the Copper Queen Mining Co., Bisbee, Arizona, and one self-dumping slag truck, of 60 cubic feet capacity, to W. A. Clark, Butte, Mont.

NEW gold dredges now building handle 2000 cubic yards of gravel per day, at a cost varying according to locality and price of fuel of from 3 to 7 cents per yard, the low cost of 3 cents per yard being attained by the dredge built by the Risdon Iron & Locomotive Works of San Francisco, now in operation upon the Yuba river, Cal. This dredge has given such satisfaction that Captain Couch, formerly of the Boston & Montana Co., and who now is interested in a gold dredging proposition in California, has recently placed an order with the Risdon Iron & Locomotive Works for four complete dredges.

THE Gates Iron Works are building an addition to their establishment at 650 Elston avenue, Chicago. The addition will be 80x365 feet, built of steel and brick. The steel work will be installed by the Pittsburg Bridge Company, who have the contract to complete their work in sixty days. The whole shop will be covered by an electric crane built by the Morgan Engineering Works, the crane having an 80-foot span, with 30-ton lifting capacity. This shop will be the main machine shop and power house of the plant. The present shops will be used more particularly for erecting and shipping. The new shop will open into the old one, making one large floor space.

A NOTABLE change is about to be made at Omaha, Neb., where the new Omaha Thomson Houston Electric Light Co. is undertaking the concentration of its station. It has recently placed an order with the General Electric Company for three monocyclic alternators, each one to be directly connected to a compound condensing McIntosh and Seymour engine. These alternators will be revolving armature, 48-pole machines, each of 300 kilowatts at 150 revolutions, and will be separately executed. They will take the place of a considerable number of smaller machines and will be used to furnish current to an extensive system of 3-wire secondary main fed from large transformers.

Recently Declared Mining Dividends.

Alice M. Co., Utah, $20,000; Dec. 20th.

Pennsylvania, Grass Valley, Cal., 5 cents per share; payable immediately.

Iowa G. M. & M. Co., Silverton, Colo., ½%, $5000.

Calumet and Hecla, Montana, dividend $10 per share; payable Jan. 1. With that dividend—the 105th declared by the company—the total dividend disbursements aggregate $51,850,000.

Morning Star M. Co., Placer county, Cal., $6 per share; payable immediately.

Geyser-Marion M. Co., Utah, $9,000: Dec. 10th.

Silver King M. Co., Utah, 25 cents per share, $37,500; Dec. 10th; total amount dividends to date, $1,312,500.

Recent California Mining Incorporations.

Nancy Hanks Con. Co., San Francisco; capital stock $500,000, subscribed $400,000.

Aromas M. C., Watsonville; capital stock $500,000, subscribed $150,000.

Chapman Smelting Works Co., San Francisco; capital stock $100,000, all subscribed; C. Solomon, G. H. Brooker, I. Muraski.

Granada Co., Los Angeles; capital stock $100,000, subscribed $500.

Try Again M. Co., S. F.; capital stock, $50,000; $25 subscribed; S. Elder, D. S. O'Brien, J. M. Hooper, W. H. Chapman, C. H. Miller.

American G. M. Co., S. F.; capital stock, $500,000; $125 subscribed; W. C. Mysell, Flora D. Mysell, W. F. Jones, J. C. Mysell, S. Dobzensky.

The Nancy Hanks C. M. Co., Nevada Co., Cal.; P. K. Dow, A. McMahon, J. H. Isham, F. Lapham, A. S. Groth.

Lady Alice G. M. Co.; T. L. Ford, F. P. Kelly, W. M. Abbott, H. Newberg, C. W. Cross.

Standard Placer M. Co., Eureka; capital stock, $60,000; subscribed, $40,500; N. H. Price, A. T. Crane, C. Potter.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING NOVEMBER 30, 1897.

594,514.—PRESSURE GAGE—C. W. Bemish, Tacoma, Wash.

594,776.—BAND CUTTER—D. R. Burnham, Pullman, Wash.

594,600.—SUBMARINE BUOY—E. A. Chamberlain, Woods, Or.

594,462.—THRUST BEARING—O. F. Cook, San Jose, Cal.

594,728.—LEMON SQUEEZER—Cox & Hughes, Red Bluff, Cal.

594,583.—BUNDLE CARRIER—A. W. Duck, Oakland, Cal.

594,615.—BIT—B. H. Fowle, Spokane, Wash.

594,637.—BICYCLE SUPPORT—W. F. Hewlett, Pomona, Cal.

594,695.—WATER FILTER—W. Hunter, S. F.

594,628.—ADVERTISING DEVICE—A. J. Kellogg, Portland, Or.

594,803.—MARINER'S COMPASS—O. Kustel, S. F.

594,629.—SYRUP PITCHER—E. G. Lantz, Albany, Or.

594,801.—MUSICAL LADDER—Ella L. B. Mack, Los Angeles, Cal.

594,422.—PULVERIZER—A. Paul, S. F.

594,757.—RAILWAY SPIKE—J. Richard, Bisbee, A. T.

594,654.—CLOCK—J. Schulte, Jr., Monterey, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CLOCKS.—Joseph Schulte, Jr., Monterey, Cal., assignor of one-half to Thomas J. Field, same place. No 594,654. Dated, Nov. 30, 1897. This invention relates to improvements in clocks and timepieces. The object of the invention is to regulate the clock by a compensating device which increases the rapidity of the pendulum or balance wheel beats in proportion as the strength of the spring giving the impulse decreases. It also enables the pendulum to automatically regulate and center itself with relation to the escapement wheel so that its beats will be of even duration, although the clock itself may incline a little to one side or the other. It consists essentially of a cam within the train of clock mechanism having a gradual increase in curvature from the initial point to the terminus of the cam surface, a fulcrumed lever having the free end continuously in engagement with the cam so that the impulse of the escapement is increased in proportion as the tension of the winding spring is reduced. A disk is centrally mounted with relation to the escapement wheel, a pallet and verge is carried by a downardly projecting extension of the disk, the verge connects with the pendulum rod so that the tilting of the clock allows the disk and extension to move and adapt itself automatically with relation to the position of the pendulum.

MARINER'S COMPASS.—Oscar Kustel, San Francisco, Cal. No. 594,803. Dated, Nov. 30, 1897. This invention relates to improvements in mariner's compass. It consists in the novel construction of the compass card, means for supporting the magnetic needles employed therewith so that the whole device is as light as possible consistent with permanency. It consists essentially of a compass card composed of a continuous circular sheet of woven material with a pivotal center and a peripheral supporting, the surface of the card having the points of the compass marked thereon and a support for the magnetic needles consisting of a band to which the needles are fixed extending from side to side of the rim and crossing below the center of the compass.

WATER FILTER.—William Hunter, San Francisco, Cal., assignor to John B. McGlew of same place. No. 594,695. Dated Nov. 30, 1897. This invention relates to water filters. It consists essentially in the combination with an exterior case of an interior removable chamber containing any suitable filtering substance, an inlet pipe with pressure regulating valve opening into the lower part of a main chamber beneath the filtering chamber, so that the filtering takes place by an upward pressure, a settling chamber and blow-off cock and a discharge pipe connecting with the upper clear water chamber above the filter, so constructed that the action of discharge serves to aerate the water at the instant when it is drawn off from the filter.

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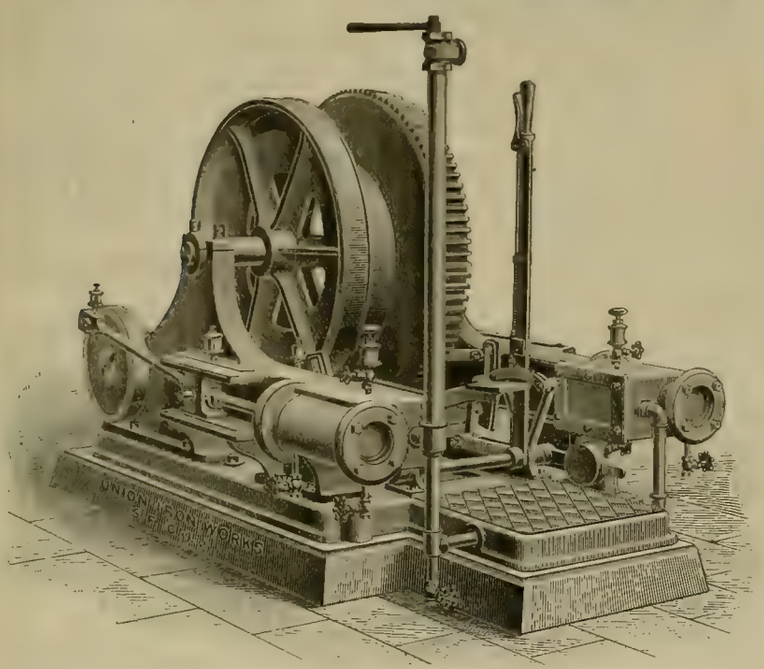
MAKE THIS SMALL

DOUBLE CYLINDER SINGLE DRUM HOIST



HOIST FOR PROSPECTING.

For Prospecting Purposes or Underground Work,

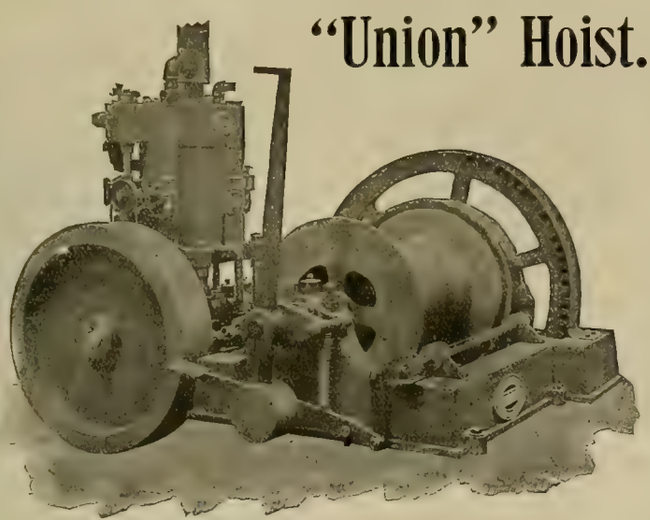
USING COMPRESSED AIR.

The entire hoist is self-contained, being mounted on an iron sole plate or bed which carries all the operating levers and provides a footboard for the operator. The engines are provided with reversible link motion and the drum with a broad strap brake, insuring safe and rapid work.

The general lines upon which this hoist is designed are neat, strong and substantial and all the operating parts are conveniently arranged.

The size herewith illustrated is the 4 in. x 10 in., rated at 15 horse power. The larger sizes, 8 in. x 12 in. and upwards are provided with post brakes.

"Union" Hoist.



The above cut represents our 10 h. p. Double Cylinder Engine of latest type, and Hoist combined on strong iron base. This hoist is designed to raise one ton 125 feet per minute from an inclined shaft, or 1500 pounds at the same speed vertical lift. The drum will hold over 600 feet of ⅝-inch cable. The outfit weighs 3500 pounds.

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"UNION" COMBINED HOISTS in Sizes from 2 to 40 h. p.
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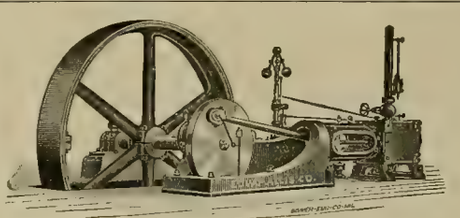
"UNION" ENGINES Are In Use All Over the United States.
"UNION" ENGINES Are Simple, Durable and Economical.

Office: 314 HOWARD ST., SAN FRANCISCO, CAL.



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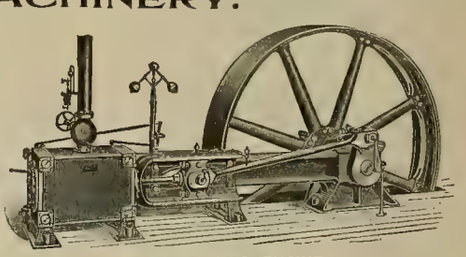

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Stern Wheel Boats, 25 ft. to 200 ft. in length. Light draught. Shipped--knocked down--and set up at St. Michael's ready to run. Send for Circulars and Prices.

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Coast Industrial Notes.

—An electric light plant is in course of construction at Keswick, Shasta Co., Cal.

—On the 1st inst. there were in California 115,992 barrels flour, 9,132,640 centals wheat, 3,136,020 centals barley, and 713,749 sacks beans.

—The Santa Fe Pacific Company is now consuming 850 barrels oil daily. The S. P. Ry. Co. is credited with a daily consumption of 350 barrels.

—A contract for a new steel ferryboat for the Southern Pacific east side and San Francisco bay service was closed this week with the Union Iron Works.

—There were only two disengaged wheat ships in San Francisco harbor this week. The tonnage on the way is 35,000 tons less than it was at this time last year.

—For some time there has been a movement on foot for a combination among the Columbia river salmon canneries, and there now seems no doubt of its consummation next season.

—Last Monday Representative Barham introduced in the House the bill introduced in the Senate in the last Congress by Senator Perkins providing for Nicaragua canal construction.

—The municipal authorities of the City of Mexico want bids for 30,000 feet of 42-inch and 40,000 feet of 30-inch straight steel riveted pipe, to be used in the City of Mexico water works.

—The Western Union Company at a cost of $250,000 has put in a new 2000-mile copper wire between San Francisco and Chicago. The company is also stringing a wire between San Francisco and Seattle.

—Santa Clara county, Cal., has produced this year 50,000,000 pounds prunes, as against 37,000,000 pounds last year. The total annual consumption of prunes in the United States at present is 70,000,000 pounds.

—At the Mare Island, Cal., navy yard the working force on the island has been decreased until now scarcely 800 men are employed there. This is not caused by a want of work; it is carrying out instructions received from Washington.

—The Costa Rica Congress has approved the Pacific railway survey to Tirives, on the Gulf of Nicoya, and has given the Department of Works authority to let construction contracts. The Tirives harbor will be improved at a cost of $1,500,000.

—It is estimated that the California lemon crop for the crop year of 1897 was in the neighborhood of 250,000 boxes, whereas the 1896 crop was not more than 150,000 boxes. From all indications California will have fully 500,000 boxes of lemons to market in 1898.

—Twelve thousand acres of the San Lorenzo ranch, Monterey county, Cal., have been purchased by Claus Spreckels from C. H. King for $275,000. About 7000 of the 12,000 acres are adapted to the cultivation of sugar beets, for which use the ranch has been purchased.

—Linemen of the W. U. Tel. Co. are at the Cascade tunnel, on the Northern Pacific railway, where a lead cable will be put under ground, carrying all the wires of the company and doing away with the old system of crossing the divide by means of the switchback.

—The U. S. steamer Alert is being put in readiness at San Francisco for a trip to the Pacific terminus of the Nicaragua canal, where she will be at the disposal of the United States commission now investigating the proposed route of the inter-ocean canal and report on its feasibility and probable cost of construction.

—The California Harbor Commissioners at a special meeting have accepted the ironwork done on the new ferry depot at the foot of Market street, San Francisco, by the Risdon Iron Works. The contract amounted to $183,000, and that amount has been paid, less $45,950, which the Commissioners will hold for thirty-five days, according to agreement.

—The Newhall, Los Angeles Co., Cal., country is now the center of interest among oil men. The oil is declared to be of paraffine base, registering 96° purity. A ready market at $4 per barrel is said to be waiting for the product in San Francisco for refining purposes. The discovery was made upon a grant that had been in litigation for the past seven years.

—The Pacific Cable Company proposes to connect San Francisco with the Hawaiian islands near Honolulu, and from there with Japan and Australia. It is expected that San Francisco and the Hawaiian islands will be connected by cable within two years. It will require 9000 miles of cable to connect San Francisco with the Hawaiian islands, Japan, China and Australasia.

—Steel and concrete in combination are being tried as foundations for pavements in San Francisco. The method of preparing the steel is as follows: A very thin, slight sheet steel is slit perpendicularly in short slits, say three inches long, the slits running in a straight line clear down the sheet, each new slit beginning about half an inch from the point where the preceding slit ended, and the lines of the slits being about half an inch apart. This leaves the sheet of steel cut into long strips of half an inch wide, but connected together every three inches or so. Then the sheet is grasped by the same machine on two opposite sides and pulled apart, or "expanded," so that all the openings appear in diamond shape. The sheet then looks like a light wire grating. It is now ready for use in the street. The earth of the street is then graded into shape and covered with a bed of sand. On this sand is laid the sheet of expanded steel. Over the steel is then laid a layer of concrete. The concrete is tamped into meshes of the metal, forming a perfect bond. This makes a foundation that will never give way. Upon it can be laid asphalt, bituminous rock, basalt blocks, wood blocks, brick or any kind of surface pavements desired, the permanency of the entire pavement depending entirely upon the character of the top work.

—Competent authority estimates that there will be next season nearly 100 sawmills operating in Alaska. Many of these will be portable, but the amount of lumber they will cut will be large. The product will be all for local consumption, and lumbermen in Alaska will not bother their heads over distant markets, the foreign trade, exacting rail rates or the scarcity of cars. They will not bother themselves about stumpage, or the price thereof. They will simply plump their mills down in the forest and saw wood and sell it. There will be mills on the coast, on the interior lakes and rivers, wherever there is mining, boat building, railway construction or the upgrowth of camps or towns. But that primitive kind of lumbering will not last long. If the realization shall be equal to the prospect for gold in Alaska and the neighboring British territory, there will be vast development in those boreal regions within a few years.

—At the meeting of the Santa Fe Pacific directors last week the details of the exchange between the Atchison and the Southern Pacific, whereby the former secures the Mojave division for the Sonora Railroad, were completed. The Mexican Government objected to a sale of the Sonora Railroad to the Southern Pacific outright, as was at first proposed, so the Sonora road has been leased to the Southern Pacific for a long term of years. The Santa Fe has purchased the Silver City & Northern Railroad, running from Whitewater to Hanover, N. M., eighteen miles, which road was owned by the Southwestern Coal and Iron Co. The road in 1897 did not pay cost of operation by $2845, gross earnings being $16,000, but the Atchison will extend the road three or four miles to the Santa Rita Copper and Iron Co. mines, where deposits of iron have recently been discovered. The Santa Fe have agreed to sell the branch of the Southern California Railroad running between San Diego and National City, about twelve miles, to the National City & Otay Railroad, owned by the San Diego Land and Town Co. This branch has not been profitable to the Atchison since the Southern Pacific Railroad shops were removed from the line of this branch to San Bernardino, and of late but one train a day has been operated.

Personal.

J. J. CRAWFORD has returned from Placerville, Cal.

ROSS E. BROWNE is back from a business visit to Idaho.

C. W. RAYMOND is Supt. of the Grand Victory, Placerville, Cal.

M. GRUYARD is Supt. at the Pelletin-Floris, Hillsboro, New Mexico.

F. A. HUNTINGTON is visiting Randsburg, Cal., and has bonded a mine there.

D. P. PIERCE, mining superintendent, is in San Francisco from Placerville, Cal.

M. HOSKINS has been appointed Supt. of the Cripple Creek, Colo., Con. Co.'s Geneva.

MANAGER F. WILSON has assumed control of the April Fool property, De Lamar, Nev.

T. A. HOUGHTON, late of the Grand Victory, is Supt. of the Pocahontas, El Dorado, Cal.

S. T. MURCHIE has been appointed Supt. of the Benton-Emery mine at Nevada City, Cal.

R. H. CAMPBELL, who has been at Ashcroft, B. C., this season, has returned to California.

ED MCCANNA, supt. Anaconda mine, has returned from San Francisco to Butte, Montana.

H. S. SABIN of San Francisco is the newly appointed Supt. of the Saucerman mine, Garden Valley, Cal.

D. W. C. MORGAN of Placerville, Cal., who was stricken with paralysis a year ago, is able to leave his rooms.

JOS. GRUSS, M. E., has returned to San Francisco from an examination of mines in western Australia.

TIREY L. FORD has removed his law offices to the 12th floor of the Spreckels B'ld'g, Third and Market Sts., S. F.

CHAS. STOCKS of Nevada Co., Cal., has returned from the superintendency of a South African mining property.

JOHN DAGGETT has gone to Santa Rosalia, Arizpe district, Sonora, Mexico, to assume the management of his mine there.

F. CORKILL, Supt. of the Holmes Mg. Co. and of the Candelaria W. & M. Co., Candelaria, Nev., is in San Francisco.

HAROLD WILSON and C. M. Henrie of Silverton, Colo., go to Tasmania this week to take charge there of a pyritic smelter.

C. A. PETERSON of San Francisco left last Wednesday for South America to take charge of gravel properties for an English company.

COL. TRUMBO has purchased the interest of Stilson Hutchins, proprietor of the Washington *Post*, in the Old Glory mine, near Tucson, Ariz.

J. B. MONTAGUE and Geo. P. Thurston were recently elected president and secretary, respectively, of the Orleans M. Co. of Grass Valley, Cal.

JEAN F. WEBB of St. Louis is general manager for the Bimetallic Co. of Montana in their new enterprise at the Pocahontas, El Dorado, Cal.

FRED BRADLEY, Supt. Bunker Hill mines at Wardner, Idaho, and the Spanish mine, Nevada Co., Cal., left San Francisco this week for Mexico.

GUS KARTSCHOKE, Pres. of the Champion M. Co., has returned to San Francisco from a business trip to the Champion and St. Gothard mines, Nevada City, Cal.

HON. J. H. NEFF, Pres. State Miners' Association, was in the city last Thursday to attend a meeting in reference to the approaching Golden Jubilee.

P. REARDEN, Gen. Supt. of the Abbott Quicksilver Mining Co., has just struck a ledge in the new Rearden tunnel at a distance of 700 feet, cutting a fine body of quicksilver ore. Mr. Rearden is in San Francisco purchasing machinery for the new tunnel.

H. B. ADSIT, late manager Tomboy, Colo., mine, this week paid $25,000, first payment on the Terrible and Butterfly properties, near Telluride, Colo., which he has bought for $150,000, and will manage for the purchasers, Wichman, Vautin & Roepel of London, Eng.

Recent Publications.

"*Operations of Electric Mining Plants*:" An elaborately produced pamphlet from the Power and Mining Department of the General Electric Co., Schenectady, N. Y., with detailed statistics of practical workings of electric mining locomotives in various parts of the country, from mining superintendents.

"*The Strength of Materials*:" A textbook for manual training schools, by M. Merriman; 12mo., $1. John Wiley & Sons, N. Y. city. A practical presentation of strength of beams, columns and shafts, with rules for investigation and design by simple algebraic and geometric methods. A chapter on resilience and impact, and one on the manufacture and general properties of materials, are also included.

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First-Class Air Compressor (Steam driven) and Drill, New.

Also, 3-Ton Capacity Pulverizer.

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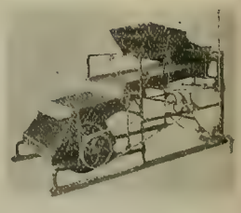

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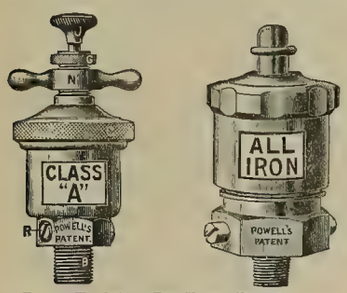

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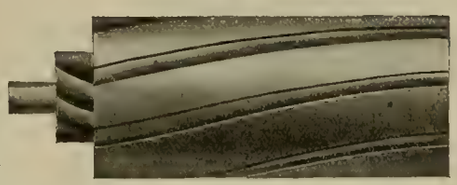

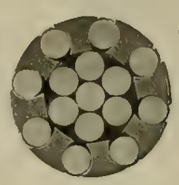

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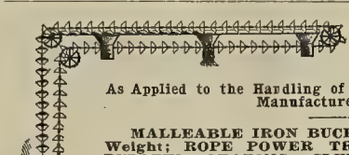

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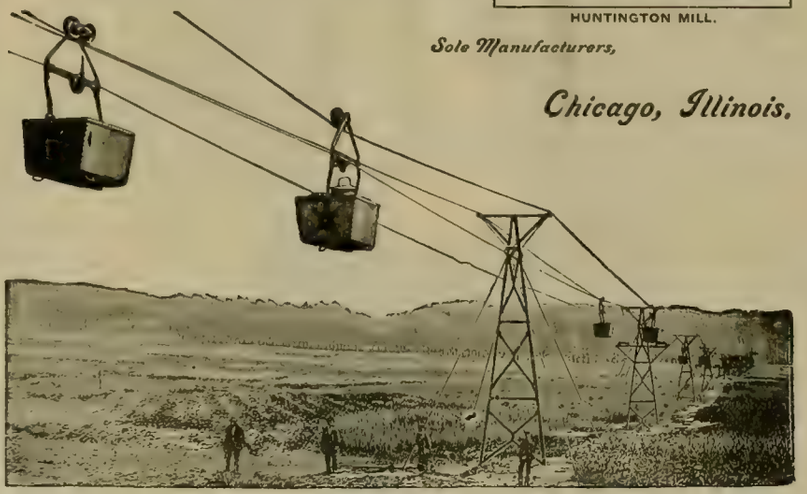

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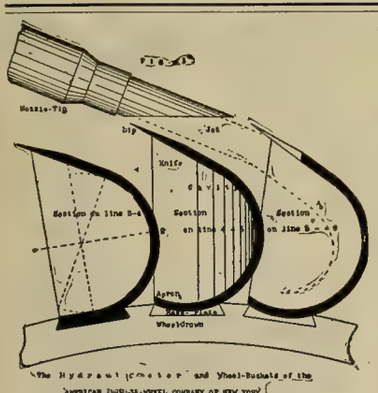

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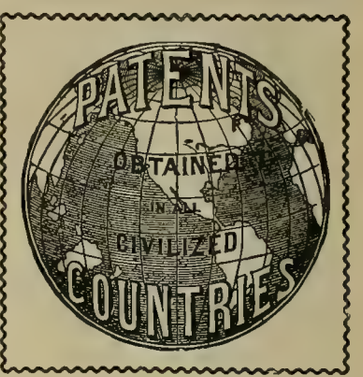

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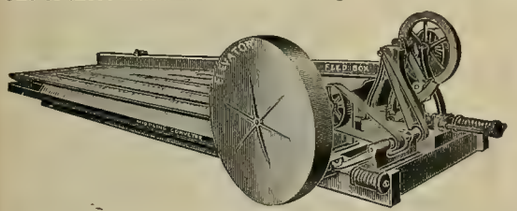

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Our Beams are the lightest on the market, and positively inflexible. They are unequaled in accuracy and sensitiveness. Edges and bearings are of Sapphire. All makes of balances thoroughly repaired at reasonable rates.
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THE GOLD and SILVER EXTRACTION COMPANY, OF AMERICA, LTD.
CAPITAL, - $550,000.
The Original Cyanide Process.
SIMPLE. RELIABLE. ECONOMICAL.
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(MACARTHUR-FORREST PROCESS)
Gold Medal, Columbian Exposition, 1893.
MINE OWNERS and others having Refractory and Low Grade Gold and Silver Ores and Tailings should have their material tested by
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Samples assayed and fully reported upon. Particulars upon application.
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OFFICE: McPHEE BUILDING, DENVER, COLORADO.

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100 William Street, New York.
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Trade Mark.
CYANIDE
Peroxide of Sodium
Hyposulphite of Soda
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And other Chemicals for Mining Purposes.

Established 1852. Incorporated 1895.
JOHN TAYLOR & CO.,
63 First Street, San Francisco, Cal.
Manufacturers and Importers of
Assayers' Material,

FURNACES, SCALES, BALANCES, WEIGHTS, ETC.
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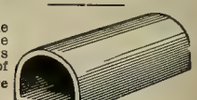

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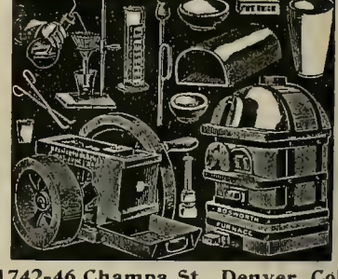

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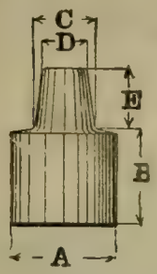

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We beg to call attention to our RISDON HAMMERED PROJECTILE STEEL SHOES AND DIES, which are made of a special quality of steel, are hammered and then compressed in moulds so as to give the greatest possible density.

These Shoes will outlast any other make and will not chip or cup.

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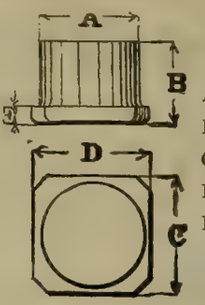
Our prices are as low as any, and the article we offer should commend it to all mine owners and mill men.



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FINLAYSON PATENT WIRE ROPE TRAMWAY.

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Our Line of Manufactures includes all kinds of Modern Equipments for the Successful Milling and Smelting of Metalliferous Ores. Special Catalogues on Application.

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FOR STEAM OR COMPRESSED AIR.

Noiseless!
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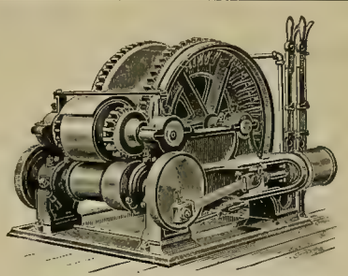

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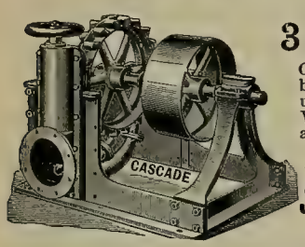

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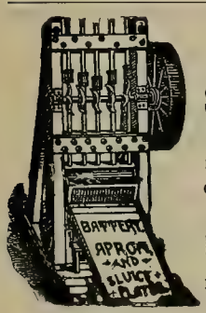

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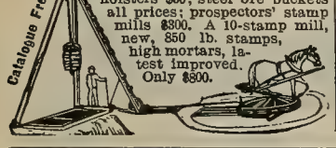

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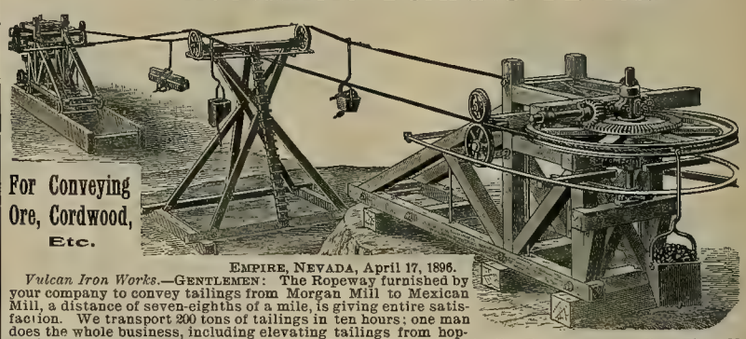

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EMPIRE, NEVADA, April 17, 1896.

Vulcan Iron Works.—GENTLEMEN: The Ropeway furnished by your company to convey tailings from Morgan Mill to Mexican Mill, a distance of seven-eighths of a mile, is giving entire satisfaction. We transport 200 tons of tailings in ten hours; one man does the whole business, including elevating tailings from hopper in the ground, operating Vulcan self-loader, and attending to the Ropeway generally. The self dumper requires no attention whatever. The Vulcan loader I consider the best feature in the whole Ropeway, making it possible for one man to load 200 tons in ten hours.

Yours very truly, J. P. WOODBURY, Supt.

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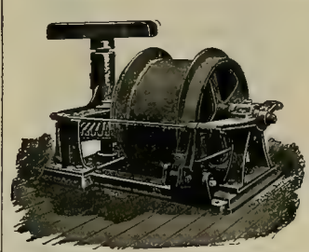

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CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

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These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

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Costs no more than is asked for inferior Steel, and is guaranteed equal to Jessop's best.

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OF EVERY DESCRIPTION.

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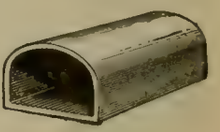

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New Illustrated Catalogue,
NOW READY FOR DISTRIBUTION.

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C. P. CYANIDE POTASSIUM (98-99 per cent.) Orders Solicited.
F. W. BRAUN & CO.,
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The IMPERIAL ENGINES.
Self-Oiling, without Oil Cups, Pumps or Tanks. Adjustable and accessible bearings. Renewable bushings for main and rocker arm bearings. Frictionless four-admission slide valve. Oil chamber entirely separated from steam cylinder contact. Rite's inertia governor. Perfect regulation. All sizes. Simple or compound. Belted or direct connection. High, medium or low speed. Designed for every use.

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Stamp Mills a Specialty (from two-stamp up). HOISTING ENGINES. Agents for Henry R. Worthington STEAM PUMPING MACHINERY and the ATLAS ENGINES AND BOILERS. General Foundry Work and all kinds of Heavy Forgings. Oil and Water Well Tools. CORRESPONDENCE SOLICITED.

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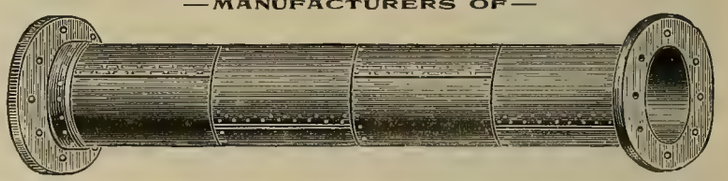

Steel Water Pipe for Hydraulic Mining and Irrigation.
WELL CASING.
Oil Tanks, and General Sheet Iron Work.
IRRIGATION SUPPLIES.
All Correspondence Will Receive Prompt Attention.
LOS ANGELES, CAL.
DEALERS IN CAST IRON PIPE.
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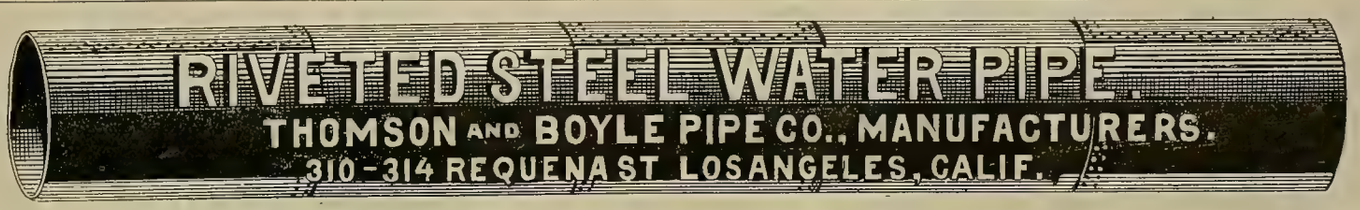


Water Pipe for Placer, Hydraulic and Quartz Mining a Specialty. Made up complete, or cut, rolled and punched to be riveted at mine. Well Casing; Oil, Water and Cyanide Tanks; Galvanized Air Pipe; Ore Cars and Ore Buckets, and all kinds of Sheet Iron and Steel Work. Mail orders promptly attended to. Correspondence Solicited.

Market Reports.

The Markets.

SAN FRANCISCO, Dec. 9, 1897.

General trade is good for the closing month in the year owing to the retail distributers carrying comparatively light stocks, which necessitates filling in or assortment buying. The general tendency of prices is to more ease for the remainder of this month, so as to begin 1898 with small stocks in all lines except those that promise a higher range of prices after the turn of the year. Foundrymen and machinists are quite hopeful. They look forward to a larger volume of business than before enjoyed. There can be no doubt that the present outlook is favorable for the larger works having more work than they can handle expeditiously unless they increase their plants, and the overflow will go to the smaller concerns. The East reports a fair degree of activity with iron workers, with the promise of large increased business next year. In expectation of this there have been liberal transactions in iron at the different producing centers.

The local money market continues on easy lines, with no friction reported in any direction, notwithstanding this is the month when many loans are drawn in for annual settlement purposes in January. The wholesale trade report that collections have been made with general ease. It is stated that the retail trade, taken as a whole, will commence 1898 on a better financial footing than for several years. The higher prices paid for dairy, farm and orchard products in agricultural sections, higher prices for logs and lumbering districts, and a general boom in gold mining have contributed to this condition. The banks in this city and also in the country have more idle money than usually obtains at this season of the year. The East reports general ease, notwithstanding the speculative movement in wheat calls for considerable, as does the carrying of cotton which is coming on the market.

New York Silver Prices.

NEW YORK, Dec. 9. — Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	27¼	59½
Saturday	27 9-16	59⅝
Monday	27¾	60
Tuesday	27¾	60
Wednesday	27⅞	59¼
Thursday	26⅞	58

	Copper.	Lead.	Iron.	Tin.
Fri.	10 75 @10 87½	3 75	10 00@12 25	13 75
Sat.	10 80 @10 87½	3 72½	10 00@12 25	13 75
Mon.	10 80 @10 90	3 72½	10 00@12 25	13 77½
Tue.	10 80 @10 90	3 75	10 00@12 25	13 77½
Wed.	10 80 @10 90	3 75	10 00@12 25	13 77½
Thur.	10 80 @10 90	3 75	10 00@12 25	13 77½

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	12½c Prem
New York Telegraphic Transfer	15c Prem
London Bankers' 60 days	$4.83¾
London Merchants	$4.82½
London Sight Bankers	$4.86½
Refined Silver, per oz., 1000 fine	58
Mexican Dollars nominal	46½

SILVER.—The market advanced to 60 cents here and New York and to 27¾d in London. At the higher prices it hung two days, after which it sold down. It is hard to affirm the underlying cause of the demand for silver that put up the market price, unless it was the Chinese New Year's demand. It is well known that the call from this source is quite active up to the end of the time when it is too late for shipments to reach China in time. Sales were made in our market at 60 cents for shipment by the last outgoing steamer, but now the demand is off and will be confined to the usual requirements. The last steamer for China took out $104,600 in bullion.

MEXICAN DOLLARS.—The demand has been exceptionally good for shipment to China in time to reach there for the New Years. The last steamer for Hongkong took out 1,252,319 in dollars. The call is expected to be comparatively light from now on.

COPPER. —The market has ruled fairly steady throughout the week both at home and abroad. The last circular letter received from James Lewis & Son, Liverpool, reports: "High conductivity copper has been in demand for the Continent, resulting in sales of 500 tons. A proposition has been laid before the Government to lay a cable from England to Australia via British possessions, the length being 13,684 nautical miles. The Schuckert Company of Nuremberg announces that they have orders on hand for electric lighting, power and tramways, amounting to sixty-two millions of marks—of which twenty-six millions are for foreigners—and have great difficulty in supplying the demand."

For the first ten months the consumption (in tons) abroad compares as follows:

Country.	1896.	1897.
England	71,823	72,039
France	30,841	34,211
Germany	37,610	46,828
Total	140,274	153,078

TIN.—The market has ruled quiet for both pig and plates. Free sales have been made of both for next season delivery. The markets at the East and abroad are unchanged.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

SHOT.—The market is steady.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 40
Drop, B and larger sizes, "	" 1 65
Buck, Balls and Chilled, do, "	" 1 65

POWDER. —The consumption continues to show an increase over the corresponding time in 1896.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9 to 11c, according to strength and quantity.

QUICKSILVER.—The market is steady. The last steamer for Mexico took out 190 flasks.

Our market is quoted at $39 for domestic consumption and $35@36 for export to the west coast of Mexico.

LEAD.—The market has held to fairly steady prices. The demand is slow.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	4 75	@	5 00
Sheet	6 30	@	6 80
Pipe	5 60	@	6 10

IRON.—There is nothing new to report so far as values are concerned. A press telegram from Chicago, Dec. 8th, reports: "The *Industrial World* says: December gives early promise of a record breaker in iron and steel in the West. The month is usually quiet and dull. This year it surpasses the expectations of the trade. Orders come chiefly from manufacturing sources wanting material for immediate consumption. There are also the beginnings of trade for 1898. Prices are generally steady. Pig iron is firm on the basis of $11 for No. 2 Foundry. Structural material tends somewhat toward easier quotations, though prices are unchanged."

NAILS.—The market is firm at an advance, with only a fair demand ruling.

We quote the following basis: 20d to 60d, inclusive—wire $2.50, cut $2.40.

COAL.—The market is fairly active for all grades, but particularly household. Values are maintained at combination prices.

Receipts of Coal for the week ending Tuesday were as follows in tons: Puget Sound, 11,802; Coos Bay, 1570; Sydney, 2385; Nanaimo, 2300; Swansea, 2076. Total, 20,133 tons.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$8 00@— —
Greta	6 00@ 6 50
Nanaimo	6 50@— —
Gilman	5 50@— —
Seattle	5 50@— —
Coos Bay	—@ 4 75
Cannel	9 50@— —
Egg, hard	12 00@— —
Wallsend	6 75@— —

TO ARRIVE—CARGO LOTS.

Australian	5 75
Liverpool Steam	6 75
Scotch Splint	7 50
Cardiff	7 50
Lehigh Lump	12 00
Cumberland, bulk	10 50
Egg, hard	9 50
West Hartley	6 75

COKE.—Imports the past week aggregate 363 tons from Swansea. The market is steady.

The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	— —	@	— —
" spot, in bulk	11 00	@	— —
" in sacks	12 00	@	— —
Cumberland	10 00	@	— —

PLATINUM.—The market is firm.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

BORAX.—The market is firm, with a free shipping demand to the East.

The market is quoted as follows:

Refined, in carload lots, in barrels	5½
Refined, in carload lots in sacks	5¼
Powdered, in car lots	5½
Concentrated, "	5

ZINC.—The market is firm.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

ANTIMONY.—The market is steady.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 8c for Cookson's, 7½c for Hallett's and 7c for Japanese.

Chemicals.

The market continues quiet. Stocks in general are not large and consequently a better demand is looked for soon by first hands, which may strengthen values. New York advices report a slow market with more or less weakness, which is usual to the close of the year.

SULPHURIC ACID.—The demand is quiet.

We quote in a jobbing way at 1¾c per lb for 66%.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported firm from store at 6½@7c per pound in carboys.

BONEASH.—There is a fair demand at quotations.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3¼c; No. 2, 2½c.

BLUE VITRIOL.—Our market is steady, with better inquiry.

We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is easy.

Our market is quoted in a jobbing way at $1.40 a pound.

SODA ASH, 58% (LeBlanc process).—The market is steady at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is weak at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—The market is quiet at 2½c a pound from stores.

NITRATE OF SODA.—The market is slow and in buyers' favor for spot.

Our market is quoted from store at 4c for 95%.

PHOSPHORUS.—The market is easy.

We quote in a jobbing way at 70 to 75 cents per pound.

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delinq't and	Sale	Secretary.
Alta S M Co, Nev	58	10c	Dec 3.	Jan 7.	Jan 28	J E Jacobus, 309 Montgomery
Belcher S M Co, Nev	57	20c	Nov 20.	Dec 24.	Jan 14	C L Perkins, Mills Building
Best & Belcher M Co, Nev	63	25c	Nov 2.	Dec 7.	Dec 28	M Jaffe, 309 Montgomery
Con Cal & Va M Co, Nev	10	25c	Nov 3.	Dec 8.	Dec 29	A W Havens, 309 Montgomery
Crown Point G & S M Co, Nev.	72	20c	Nov 10.	Dec 15.	Jan 5	Jas Newlands, Mills Building
E Best & Belcher S M Co, Nev.	6	15c	Oct 30.	Dec 3.	Dec 18	E W Sichel, 337 Pine
Exchequer M Co, Nev	40	5c	Nov 1.	Dec 6.	Dec 30	C E Elliott, 309 Montgomery
Gold Ridge Con M & M Co, Cal.	5	4c	Aug 3.	Sept 18.	Dec 16	H Sylvester, 43 Sixth
Gould & Curry S M Co, Nev.	82	20c	Nov 2.	Dec 7.	Dec 29	A K Durbrow, 309 Montgomery
Hale & Norcross S M Co, Nev.	11	10c	Mar 20.	Dec 28.	Jan 18	R R Grayson, 331 Pine
Kentuck Con M Co, Nev	14	5c	Oct 27.	Dec 1.	Dec 22	A Waterman, 309 Montgomery
Marguerite G M & M Co, Cal.	8	10c	Nov 4.	Dec 13.	Jan 15	F Mettmann, 237 Twelfth
N Gould & Curry G & S Co, Nev	19	10c	Nov 13.	Dec 17.	Jan 3	E W Sichel, 337 Pine
Occidental Con M Co, Nev	29	10c	Dec 7.	Jan 11.	Feb 1	A K Durbrow, 309 Montgomery
Overman S M Co, Nev	78	5c	Nov 17.	Dec 22.	Jan 12	G D Edwards, 414 California
Red Cap M Co, Cal	2	8$	Nov 29.	Jan 6.	Jan 29	H H Martin, 125 Beale
Thorpe M Co, Cal	8	2½c	Sept 28.	Dec 4.	Dec 27	A F Frey, Phelan Building

Mining Share Market.

SAN FRANCISCO, Dec. 9, 1897.

The market ruled heavy, with a slow but gradual decline, up to Tuesday afternoon, when there was a steadier tone, with a slight advance along the line at the close, in sympathy with a 30 per cent advance in Potosi. Wednesday morning the advance was maintained, with the Gold Hill shares, under the lead of Yellow Jacket, moving up a little, but at the close of the day there was a slightly easier feeling. While the writer still holds to the opinion that a strong moneyed pool is manipulating for a bull campaign some time in 1898, yet the market does not act as if they are ready now, although it may be. Judging from the past, more assessments ought to be collected and others levied first so as to freeze all out of their holdings that is possible. Besides assessments, the market ought to be made sicker than ever, with only spasmodic rallies, and to help it along on this line scare reports would be in order, such as closing up the Exchange and selling the building, shutting down of the mines and other equally false information. There has been no deal but it was preceded by some such reports and a very sick, dragging market of several weeks' duration. From all that can be learned it is quite certain that some time in 1898 some very important work will be started at two or more points on the lode, which will have direct bearing on the market for a bull campaign. It is possible that it may not be started until in the spring, yet indications point to an earlier date. It is stated that the returns from the 1000 tons of low-grade ore milled by the Gould & Curry Co. have proved so satisfactory as to induce a test of 2000 tons. If this should prove satisfactory, it is probable that other companies will extract and mill low-grade ore, of which there are millions of tons running from $8 to $16 per ton, mostly gold, particularly in Con. Imperial and neighboring mines.

From the Comstock mines official letters fail to give any news of any importance, but private advices are more encouraging, which is in direct conflict with bear points put out on the street by interested parties. It is the belief in well-informed circles that important delayed work will be started next year, probably toward spring. Some of this work was reported by experts appointed for the purpose. These reports were not made public, simply because members of the moneyed pool changed their minds and thought the time was not favorable for a bull campaign. In Utah they are still drifting in a northwesterly course, with no change reported. They continue to drift north on the 175-foot level in Andes. When exploiting work is commenced good results are looked for. In Sierra Nevada work is confined to three points—the Layton tunnel level, the 900-foot level and running the new tunnel. On the former level they are blocking out the ground and on the 900-foot level they are drifting north. In Union the west cross drift reported last week has been extended 16 feet, making a total distance at last advices of 43 feet. In Mexican they are crossdrifting east on the 1000-foot. The total length is 500 feet. They are out about 650 feet in the west crossdrift on the 1000-foot level of Ophir. The formation is favorable. No change in the work on the Central tunnel level. From Con. Virginia there is nothing new; the work is confined to exploiting on the 1550-foot, 1650-foot and 1750-foot levels. There is nothing new reported since our last issue. Best & Belcher and Gould & Curry are repairing the Bonner shaft. No change is reported by Savage. No work in Hale & Norcross, and none expected until the lawsuit is settled. No change in the Chollar-Potosi joint work. Active exploiting work is being done in Potosi with varying success. They are drifting south on the tunnel level. The same old stereotype advices come from Alpha. In Con. Imperial they are still running the surface tunnel and also the long joint west crossdrift of Con. Imperial, Confidence and Challenge. Favorable advices come from Yellow Jacket, but reports say they want another assessment before the ore will be shown up. It is toward Kentuck. Active exploiting work is being done by Crown Point around the 700-foot level. In Belcher they are crossdrifting east on the 1200-foot level and west on the 850-foot level. Both crossdrifts are important. From Seg. Belcher and Overman nothing new has come to hand. In Justice the work is both exploiting and developing. The management talk quite enthusiastic over the outlook.

Some experts have visited the Brunswick in the interest of large shareholders. It is stated that they are favorably impressed with the lode. In Occidental they are nearing the point where they expect to strike the downward continuation of the ore found above. Strong parties have faith in the mine and are still buying shares. In Potosi and also in Chollar there are no changes to report. The work is on the same levels and directions reported last week. Informed miners are watching the work in Potosi. The joint work by Con. Virginia, Gould & Curry and Best & Belcher is practically the same as reported last week. It is largely of an exploiting character.

The following illustrates the changes of the week:

Mines.	Dec. 2.	Dec. 9.
Alpha	$ 08	$ 07
Alta Consolidated	07	.....
Andes	.....	17
Belcher	20	.....
Best & Belcher	30	51
Bodie	.....	.....
Bullion	08	09
Challenge	25	.....
Chollar	39	41
Confidence	78	.....
Consolidated California and Virginia	1 10	1 35
Consolidated New York	.....	.....
Crown Point	14	11
Exchequer	.....	.....
Gould & Curry	21	44
Hale & Norcross	1 40	1 30
Justice	50	46
Mexican	32	.....
Ophir	72	.....
Overman	07	.....
Potosi	41	45
Savage	.....	23
Sierra Nevada	57	50
Union	25	.....
Utah	36	07
Yellow Jacket	40	.....

San Francisco Stock Board Sales.

SAN FRANCISCO, Dec. 9, 1897.

9:30 A. M. SESSION.

100 Best & Belcher	51	400 Justice	46
100 Chollar	41	100 Savage	23
200 Crown Point	11	400 Sierra Nevada	50
400 Gould & Curry	44	600 Utah	07
50 H. & N	1 30		

SECOND SESSION—2:30 P. M.

100 Gould & Curry	42	100 Sierra Nevada	49
50 Con Cal & Va	1 35	100 Bullion	09
100 Savage	23	150 Andes	17
200 Chollar	40	1000 Scorpion	01
100 Potosi	45	100 Utah	05
100 Alpha	07	200 Seg Belcher	08

Rainfall and Temperature.

The following data for the week ending 5 A. M., December 8, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

California Stations.	Total Rainfall for the Week.	Total Seasonal Rainfall to Date.	Total Seasonal Rainfall Last Year to Same Date.	Average Seasonal Rainfall to Date.	Minimum Temperature for the Week.	Maximum Temperature for the Week.
Eureka	.00	0.00	14.66	10.38	34	62
Red Bluff	1.22	5.44	5.79	6.43	34	58
Sacramento	.84	3.58	4.62	4.22	33	62
San Francisco	1.02	3.87	6.78	5.43	44	62
Fresno	.36	1.78	3.01	2.12	30	62
San Luis Obispo	.48	1.41	4.70	*	28	72
Los Angeles	T	2.48	2.99	3.22	36	74
San Diego	.06	1.15	2.08	1.72	42	78
Yuma	.00	.81	1.20	1.34	34	74

WILL NEGOTIATE with owners or their duly authorized agents only.

WILL INVESTIGATE only thoroughly bonafide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

E. N. BREITUNG,
Marquette, Mich., U. S. A.
Operator and Dealer in
Mines, Mining Properties and Mineral Lands,
Mining Stocks, Bonds, Options, Leases, Contracts and Securities.
MONEY LOANED ON BONA-FIDE MINES

WILL EXAMINE on reasonable terms all kinds of Mines, Mining Properties and Mineral Lands as to their value, method of working and the condition of their titles.

WILL GIVE Options, Leases, Bonds and Contracts on all kinds of Mines, Mining Properties and Mineral Lands.

Assay and Chemical Work Done on Reasonable Terms.

Have best of bank and other references. Use McNeill's or A B C Telegraphic Codes.

DO ALL OUR OWN EXPERT AND CHEMICAL WORK.

Working Capital for Mines.

PACIFIC EXPLORATION COMPANY

Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

Skeleton Mining Report.
NEEDED BY EVERY MINING MAN.
FIFTY CENTS POSTPAID.
Mining and Scientific Press, 330 Market St., S. F.

DELINQUENT SALE NOTICE.

GOLD RIDGE CONSOLIDATED MINING AND Milling Company.— Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 5) levied on the 3rd day of August, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
John A. Heninger	16	250	10 00
Nils Johnson	120	100	4 00
Nils Johnson	121	100	4 00
Hattie E. Gray	124	100	4 00
Wm. Westhoff	144	250	10 50
A. O. Lindstrom	148	250	10 00
Wm. Westhoff	177	500	20 00
Richard Phelan	188	5	20
Wm. Westhoff	200	100	4 00
Wm. H. Little	202	10,500	420 00
Mark Strouse	208	5	20
P. E. Robertson	215	250	10 00
Sarah Spalding	218	100	4 00
Abe MacCreadle	220	500	20 00
Alfred H. Hogg	221	300	12 00
Abe MacCreadle	222	250	10 00
J. W. Brown	231	4,099	163 96
C. D. MacNeill	236	200	8 00
Paul Muller	239	50	2 00
Paul Muller	240	100	4 00
Paul Muller	242	1,000	40 00
Chr. W. Heyer	243	755	30 20
Chr. W. Heyer	246	606	24 24
Abe MacCreadle	247	200	8 00
Wm. Westhoff	250	200	8 00
Mary Ann Robertson	251	250	10 00
Mary Ann Robertson	252	250	10 00
R. H. Daley	268	1,000	40 00
C. M. Howe	272	1,000	40 00
C. M. Howe	274	500	20 00
R. H. Daley	275	1,500	60 00
Francis Brady	277	700	28 00
R. H. Daley	278	100	4 00
Dr. H Sylvester (2,000 shares of this cert. have been paid by H. Sylvester, being part of his stock.)	280	51,278	1,971 12
L. V. Merle	286	10	40
J. T. M. Kelly	289	500	20 00
R. H. Daley	290	100	4 00
R. H. Daley	294	750	30 00
R. H. Daley	295	185	7 40
E. Swenson	296	1,750	70 00
Mark Strouse	297	5,000	200 00
Mark Well	299	750	30 00
C. W. Heyer	300	400	16 00
Mark Strouse	301	100	4 00
Geo. Day	302	1,000	40 00
Dr. H. Sylvester, Trustee	305	1,105	44 20
Dr. H. Sylvester, Trustee	306	5,000	200 00
R. H. Daley	307	250	10 00
R. H. Daley	308	240	9 60
F. Heard	309	125	5 00
Mark Well	310	125	5 00

And in accordance with law, and an order from the Board of Directors, made on the 3rd day of August, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Rooms 12 and 13, No. 43 Sixth St., San Francisco, California, on SATURDAY, the 9th day of October, 1897, at the hour of 12 o'clock M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

The day of sale of the above delinquent stock has been postponed by order of the Board of Directors to THURSDAY, October 28th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, the 4th day of November, 1897, at the same hour and place.

H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, November 11th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to TUESDAY, November 16th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to TUESDAY, November 23rd, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, December 2nd, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, December 9th, 1897, at the same hour and place. H SYLVESTER Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors the day of sale of the above delinquent stock has been postponed to THURSDAY, December 16th, 1897, at the same hour and place. H. SYLVESTER, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth St., San Francisco, California.

DELINQUENT SALE NOTICE.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 8) levied on the 28th day of September, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
A. F. Frey, Trustee	178	4,200	
Balance due.			13 10
A. F. Frey, Trustee	211	100	2 50
R. Z. Johnson	385	1,525	38 13
Emma Rosenbaum	325	1,000	25 00
Emma Rosenbaum	326	300	7 50
Emma Rosenbaum	327	200	5 00
Fr. H. Rosenbaum	343	417	10 43

And in accordance with law, and an order from the Board of Directors, made on the 28th day of September, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, room 44, Phelan building, San Francisco, California, on MONDAY, the 27th day of December, 1897, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

Assessment Notices.

MARGUERITE GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 4th day of November, 1897, an assessment (No. 8) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 237 Twelfth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 13th day of December, 1897, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on SATURDAY, the 15th day of January, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

F. METTMANN, Secretary.

Office—237 Twelfth street, San Francisco, Cal.

The secretary will also receive payments from 12 to 5 P. M. at his business office, 225 Sansome street.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 29th day of November, 1897, an assessment (No. 2) of Five Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, No. 125 Beale street, city and county of San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of January, 1898, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 29th day of January, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

H. H. MARTIN, Secretary.

Office—125 Beale street, city and county of San Francisco, California.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of September, 1897, an assessment (No. 8) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of November, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 29th day of November, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Thorpe Mining Company the day of delinquence in the above assessment notice has been postponed to November 20th, 1897, and the day of sale to MONDAY, December 13th, 1897.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Thorpe Mining Company the day of delinquence in the above assessment notice has been postponed to November 27th, 1897, and the day of sale to MONDAY, December 20th, 1897.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT

By order of the Board of Directors of the Thorpe Mining Company the day of delinquence in the above assessment notice has been postponed to December 4th, 1897, and the day of sale to MONDAY, December 27th, 1897. A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

Lunkenheimer's "STANDARD" AND "EMERALD" BOILER OIL INJECTORS.

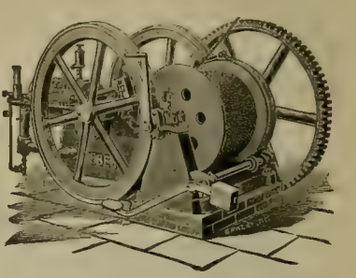
Prevent formation of scale in your boilers. Prevent foaming, pitting and leaky joints. Save fuel bills. Will work where others fail. Have but one connection, are simple and strong, visibly feed oil drop by drop. Specify "Lunkenheimer's" Boiler Oil Injector, if you want the best. Satisfaction guaranteed. Made in the following sizes: ½ pt., 1 pt., 1 qt., ½ gal., 1 gal., 1½ gal., 2 gal. Thousands in use and giving entire satisfaction. Supplied by dealers when specified. Catalogue of superior brass and iron steam specialties free for the asking.

THE LUNKENHEIMER CO., Cincinnati, Ohio, U. S. A.,
SOLE MANUFACTURERS,
26 Cortlandt St., NEW YORK. ✦ BRANCHES: ✦ 35 Great Dover St., LONDON, S. E.

Weber GASOLINE HOISTING ENGINE.

MONEY SAVERS.

Costs to run One Cent per Horse Power per Hour. No Coal or Wood and very little water required.



This cut represents our 10, 15, 20, 30, 40, 50 H. P. Geared Hoist.

"Never Lost an Hour's Work."

PERRIS, CAL., March 7, 1897.

WEBER GAS & GASOLINE ENGINE CO.,
KANSAS CITY, MO.

GENTLEMEN—I am using one of your 6 H. P. engines for hoisting. There are several other makes of engines around here hoisting, but none of them can compare with your engine for that work. I have been running this engine for three and a half years and have never lost an hour's work.

Yours truly, A. L. ROOD.

WEBER GAS AND GASOLINE ENGINE CO.,
430 S. W. Boulevard, KANSAS CITY, MO.

ALTA SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Gold Hill, Gold Hill Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3d day of December, 1897, an assessment (No. 58) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of January, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 28th day of January, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. E. JACOBUS, Secretary.

Office—Room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 7th day of December, 1897, an assessment (No. 29) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 11th day of January, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 1st day of February, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

ANNUAL MEETING.

The Regular Annual Meeting of the Stockholders of the Gould & Curry Silver Mining Company will be held at the office of the Company, Room 69 Nevada Block, No. 309 Montgomery Street, San Francisco, California, on MONDAY, the 20th day of December, 1897, at the hour of 1 o'clock P. M., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting.

Transfer books will close on Friday, December 17th, at 3 o'clock P. M.

ALFRED K. DURBROW, Secretary.

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Conducted on both the European and American plan. This favorite Hotel, located in the best and most central portion of the city (being in the same block as the Mills Building and immediately adjoining both the Telephone Building and the First National Bank), is under the experienced management of Chas. Montgomery, and is as good, if not the best Family and Business Men's Hotel in San Francisco. Electric return call bells in rooms.

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THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from A. A. Pond, in the Red Hill Mine at Todd's Valley, Placer Co., to deposit tailings in Todd's Valley Canyon; from Ralph Farnham, in his mine near Indian Diggings, El Dorado Co., to deposit tailings in Farnham Creek; from John Spaulding, in the Red Dog Mine at Red Dog, Nevada Co., to deposit tailings in Greenhorn Creek; from George Standart, in the Grizzly Mine near Pike City, Sierra Co., to deposit tailings in Grizzly Canyon; and from Thos. Wayman, in the Sunshine Mine near Pike City, Sierra Co., to deposit tailings in a ravine below the mine, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on December 13, 1897, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from George Rieber in the Badger Hill Mine, near Placerville, El Dorado Co., to deposit tailings in Iowa Canyon; from F. W. Cook, in the Try Again Mine near Placerville, El Dorado Co., to deposit tailings in a ravine; from Matt Yoner, in the Hoosier Mine near Georgetown, El Dorado Co., to deposit tailings in Bear Creek; from Otto Reichel, in the Mountain Ranch Mine near Mountain Ranch, Calaveras Co., to deposit tailings in a ravine; from J. F. Gurney et als., in the Johnston Placer Mine near San Andreas, Calaveras Co., to deposit tailings in a ravine; and from J. G. Underwood and W. N. Lamb, in the Chris Limpher Mine near Plymouth, Amador Co., to deposit tailings in Indian Creek, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., December 27, 1897, at 1:30 P. M.

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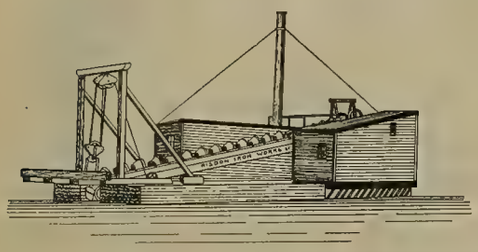

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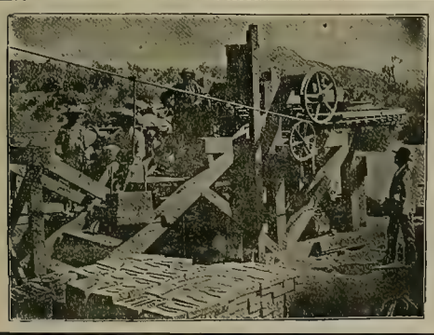

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OUR TRADE WITH THE MINES IS CONSTANTLY GROWING, BECAUSE OUR COMPOUND DOES CLEAN BOILERS.

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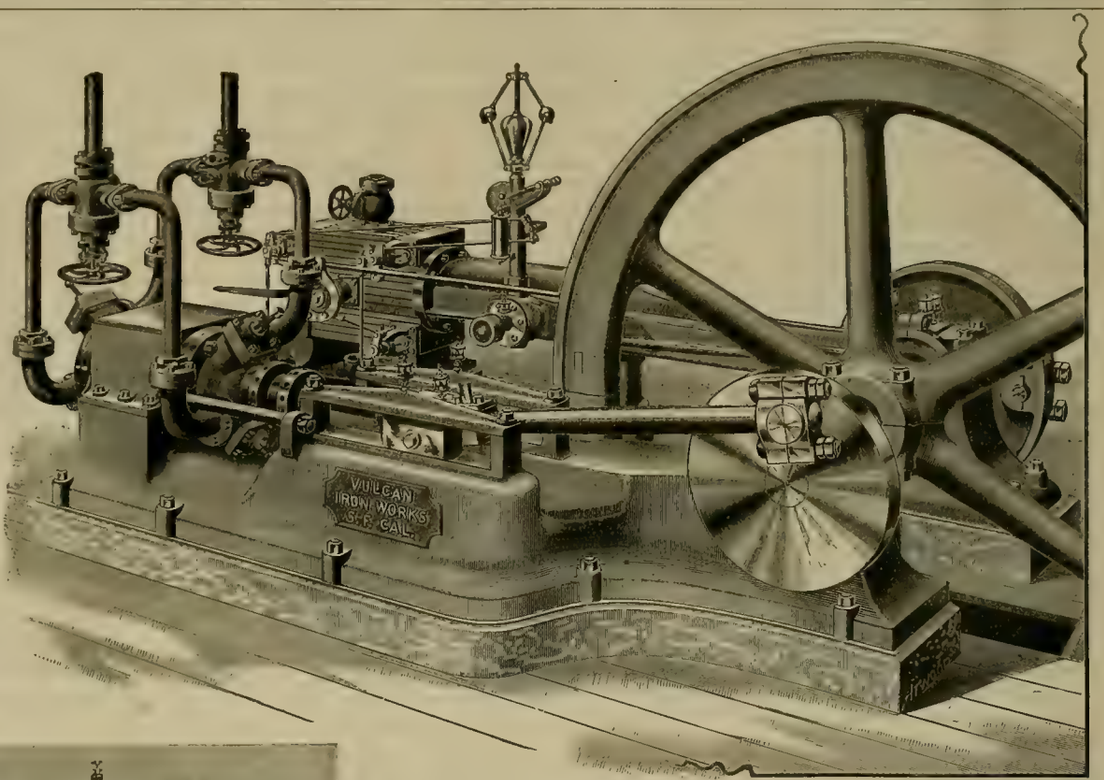
MINING AND SCIENTIFIC PRESS.
AND PACIFIC ELECTRICAL REVIEW.

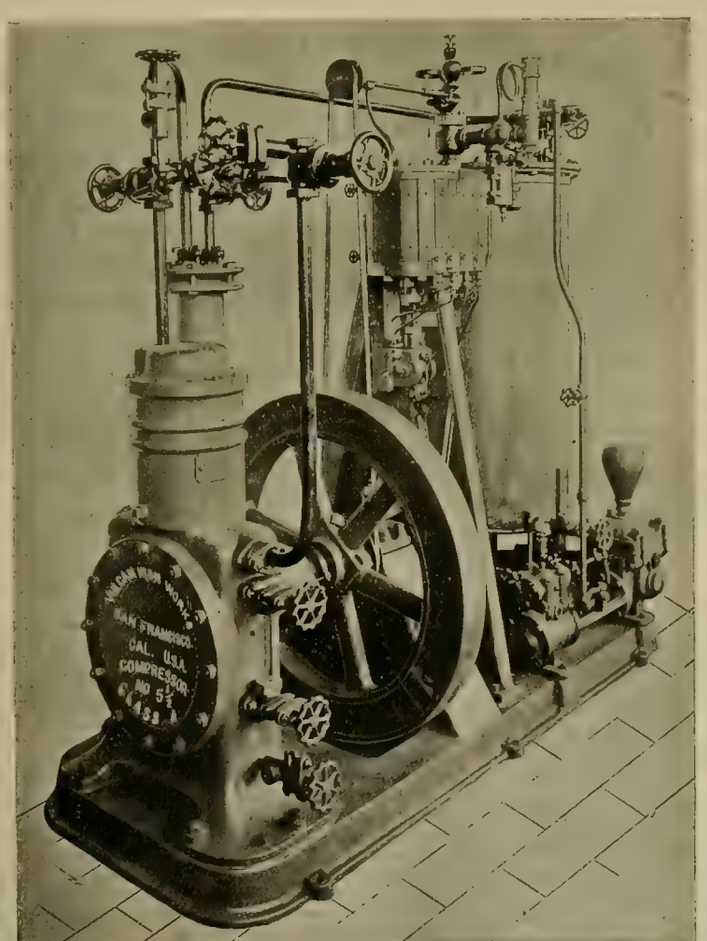
No. 1954.—VOLUME LXXV. Number 25. SAN FRANCISCO, SATURDAY, DECEMBER 18, 1897. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Refrigeration and Artificial Ice-Making.

Although the manufacture of ice in a primitive way is an ancient custom, it is only within the last twenty years that scientific and mechanical progress have so improved the refrigerating and ice-making machine that it has become an established commercial success, and an absolute necessity in many lines of business. These machines are in general use in breweries, packing houses, cold-storage establishments, ice factories, on steamships, up-to-date markets, hotels, public institutions, creameries, etc., and are being introduced in other lines of business. The process now generally recognized as of the greatest efficiency and economy, also of the widest application, is that which uses liquid ammonia to produce the desired refrigerating effect. This process was the one adopted some twelve years ago for the first Vulcan ice and refrigerating machines that were put on the market. One of the first of these machines was furnished to the Hotel Del Monte, Monterey, and this machine has been in constant operation since that time, giving satisfaction to its owners.



VULCAN REFRIGERATING AND ICE MACHINE—TYPE OF LARGE MACHINES.



VULCAN REFRIGERATING AND ICE MACHINE—TYPE OF SMALL MACHINES.

The Vulcan refrigerating and ice-making machine is manufactured by the Vulcan Iron Works of San Francisco, Cal., who have made a specialty of manufacturing ice and refrigerating machines, and about sixty machines of their manufacture are in operation on the Pacific coast and elsewhere, which they refer to as evidence of their success in this line of work. Aside from local machines, the Vulcan refrigerating and ice-making machines are in use in Oregon, Washington, British Columbia, Arizona, New Mexico, Mexico, Guatemala, Salvador, Costa Rica, Hawaii, etc.; also on twelve different steamships. Among their customers may be mentioned the Kern County Land Co., the Hawaiian Commercial & Sugar Co., the Pacific Improvement Co., the Pacific Mail Steamship Co., Goodall, Perkins & Co., the Mountain Copper Co., the Gambrinus Brewing Co., and numerous breweries, packing houses, ice factories, etc., etc.

The Vulcan Iron Works are located at the corner of Francisco and Kearny streets, San Francisco, comprising foundry, machine and erecting shops, pattern and wood-working shops, etc., and when full-handed employ about 200 men. The erecting shop has a heavy overhead crane that travels the entire length of the shop, about 140 feet; the machine shop has a lathe that will turn a wheel 16 feet diameter; the foundry has three cupolas of combined capacity to melt twenty-five tons of iron per day, and other facilities are in proportion for handling large and important work.

The Vulcan Iron Works have built up their present extensive business through a reputation for good, careful work and fair dealing with their customers, and deserve the continued recognition that such a course demands.

It is estimated by Professor Vernon Harcourt that the total quantity of alluvium discharged by the river Hooghly into the sea is 90,000,000 cubic yards annually. The proportion of solid matter to the total discharge of the river, including the clear cold weather discharge, when no alluvium is brought down, he estimates at 1 in 2444, or, including the clear cold weather discharge, 1 in 2000. Hooghly valley residents seem to have a good opportunity to institute a quarrel with the Almighty by organizing an anti-debris association.

Uranium, one of the "rare earths," is now reported discovered in commercial quantities at Black Hawk, Colo. It has of late become of economic value, being principally sought for hardening gun metal and armor plate, and is at present quoted at $2.50 per lb.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

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J. F. HALLORAN.....General Manager

San Francisco, December 18, 1897.

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WITH the issue of the 25th inst., will be sent to every subscriber a correct map of Alaska, the Yukon region, etc., specially prepared and lithographed for this paper.

SECRETARY OF THE TREASURY GAGE has decided to practically abolish the New Orleans mint after Jan. 1, '98, reducing it to the grade of an assay office. The expenses will be cut from $100,000 to $12,000 per annum.

IN a long communication W. Van Devanter, Asst. Att'y-Gen'l U. S., gives an opinion that locators of mining claims within the Yosemite, Cal., reservation, prior to Oct. 1st, '90, who have complied with all legal requirements, hold unassailable title thereto, and can build and maintain necessary roads. The opinion is approved by Secretary of the Interior Bliss.

ACTIVITY in mining matters contrasts with apathy in some branches of business. Creede, Colo., announces an advance in wages after Jan. 1st from $2.50 to $3 per day. The Chapin Mining Company, the Pewabic Company, the Antoine Ore Company, the Aragon Ore Company and the Pennsylvania Iron Mining Company, of Iron Mountain, Mich., and vicinity have announced a 10 per cent increase in wages to take effect on Jan. 1st. That increase affects more than 2000 men.

MENTION was made in last week's issue of a Colorado suit wherein a tunnel company claimed the right to pass through a patented mining claim against the protest of the owner, who had made the location prior to the location of the tunnel company. The court has decided against the tunnel company, holding that a mining location properly made and maintained could not be the subject of adverse location or operation, which is a pretty good Monroe doctrine for the miner.

REGARDING the report of the Committee on Revision of Mining Laws, recently published in New York City and Denver, a word is due, stating the reason that the report did not appear herein. The report was received at this office, confidentially, with the plainly stated wish that it be not published till "released." The MINING AND SCIENTIFIC PRESS kept faith with the committee, as is its habit in such cases. Ex-Gov. Prince, president of the National Mining Congress, and C. J. Moore, chairman of the committee making the report, together with the other members of the committee, regret the violation of their confidence. The two members named further state that the committee has no authority to present the report direct to Congress, but must first submit it to the meeting of the Congress at Salt Lake City, Utah, July 1st, '98.

California Mineral Lands.

In the United States Senate last Tuesday the mineral land bill relative to Oregon was called up and would have passed with the California measure, without objection, but for the unfortunate fact that Senator Stewart of Nevada, who was temporarily absent, happened to have some inkling of what was going on, and reached the Senate chamber just in time to object. The Senator from Nevada can always be counted on to do something of that kind, and is certainly a faithful representative of the opposing forces, whatever may be said of his rectitude as a representative of public interests.

These mineral land bills have had a difficult career. Much intelligent effort has been given to the entire matter, and twice it would seem as though success was certain; at the critical moment, however, the opposition each time scored a point. Of late but little has appeared in these columns regarding this question. The corporations seem to have their paid attorneys where they will do the most good—or harm. Sometimes, one is retired from Congress by justly aroused public opinion, as recently in Oregon; others, elsewhere, are kept in by skillful corporate influence and legislative inertia. The entire matter is of great importance, more especially to California, and now deserves a little further mention at the close of the year.

California's future as a great mineral producing State is beginning to be appreciated, after a period of long depression. The hard times of the past four years have stimulated prospecting for gold, and the result is that new discoveries are being made, and lands which were supposed to be of no value are proving to be rich in mineral.

While the people of California have been sleeping on their rights, the Central Pacific Railroad Company and its associates have been quietly gathering in some of the best mining ground in the State, as non-mineral land. In this they seem to have been assisted by several of the Commissioners of the General Land Office, who by circulars and various other methods have promoted the object and favored the efforts of the railroad companies.

When the Government surveys public lands it is the duty of the surveyor to report and map out his observations on the ground, whether the lands are of mineral or non-mineral value. In practice these reports usually amount to little. A surveyor passing over the ground once in his lifetime on the out boundaries of each square mile cannot be said to have very definite information as to the mineral character or the possibilities of the lands which he surveys. Ordinarily he would not know the difference between gold and iron pyrites if he should see it on the ground, and when it comes to his opinion as to particular or geological formations and mineral deposits his reports thereon afford but little protection to the miners. The grant of Congress to the railroad companies embraced each alternate additional section for ten miles on each side of the roads, as completed, and excludes all minerals except iron and coal from the grant. As fast as the lands were surveyed the companies applied for patents. They went through a form of furnishing an affidavit of some one in their own employ to the effect that the land applied for was not mineral in character—a mere formality and of no real value as evidence. Where the lands were not actually returned as mineral in character by the surveyor the Land Department took no further steps to determine their character.

Having complied with the Federal and local mining laws in taking up and working their claims, the miners supposed they were amply protected. But, under the Land Office methods, their claims may be patented to the railroad companies and they never hear of it. When the surveyor returns lands as mineral, this return can be disproved in the simplest manner imaginable. First the railroad company files an affidavit of one of its agents that it is not mineral; then a notice, calling upon all persons who are interested in the matter to appear at a certain day at the local Land Office and show cause why the land should not be patented to the railroad company, is published in some newspaper said to be of general circulation in the neighborhood. On the date set the railroad company sends two of its paid agents to the Land Office, who swear that they know the land and to the best of their belief it is not mineral in character.

All of this is very easy to the railroad company, and the chances are ten to one that if there are any miners having claims on the ground they never hear of these proceedings. They are not watching the newspaper advertisements to see what the railroad company is doing. They might not know the description of their land if they should see it in the paper. They simply know that they went on their lands in good faith and under the protection of the mining laws and do not know that their claims have been patented by the United States to the railroad company as agricultural land until the patent has issued.

The absolute necessity for delaying the issuance of patents and the necessity for the most careful investigation before patents are issued have been demonstrated by experience all through the mining regions; for instance, at Randsburg: some of the lands there were surveyed forty years ago, and their mineral character was never known until within the past two years. In other parts of the State the miners have been mulcted and the mining interests of the State seriously injured by undue haste in transferring titles.

There is no remedy at law for the greater part of the conditions that have resulted from our liberal land laws, but there is a remedy for cases where titles have illegally passed to mineral lands. The homesteader or pre-emptor claiming but 160 acres has been watched and brought under the most rigid rules; but the railroad companies have grabbed their lands by the wholesale. General and sweeping affidavits as to the character of the lands from persons utterly ignorant of the subject matter, and with but little knowledge of the lands as to which they were testifying, have been received, and advertisements never seen by those interested have been admitted as a basis for obtaining railroad lands which were known to be mineral and actually being worked for that purpose. As to these lands, it is proposed to try and recover the title. With this end in view, Mr. A. H. Ricketts, a mining lawyer of San Francisco, a prominent member of the California State Miners' Association, and chairman of the committee on mineral lands of that body, has prepared a bill to be presented at the present session of Congress.

The purpose of the bill which he has drafted is to get back from the railroad companies those lands for which they have received patents that were known to be mineral before the patents were issued, and when they have not passed into the hands of innocent purchasers. Such a bill is eminently proper and it would be taking from the railroad companies only those lands which they ought to never have received and which the California Miners' Association sought so strenuously to prevent them from obtaining during Smith's and Lamoreux's administration.

It is said to be the practice of the railroad companies when they receive patents for lands to which they know they were not entitled, to transfer them to some outside party who claims to be an innocent purchaser. A sale of that kind, of course, is a mere subterfuge and can be set aside. The miners generally are determined that the railroad companies shall not hold mining property that never was granted by Act of Congress.

Following is the full text of the proposed Act as drafted by Mr. Ricketts:

An Act to provide for the examination of certain lands in the State of California and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that the President of the United States as soon as practicable after the passage of this Act shall appoint a commission consisting of three persons, all of whom shall be residents of the State of California, whose duty it shall be to examine any lands that have been patented to any railroad company in the said State since January 1st, 1893, when it shall appear by affidavits presented to said commission that prior to the date of such patents the said land had been worked or claimed as mineral lands, or wherein valuable mineral deposits were known to exist. The word "mineral" when it occurs in this Act shall be held to include gold, silver, cinnabar, copper, lead, borax, asphalt, petroleum, oil, salt and sulphur.

SEC. 2. That said commission shall make examination of the lands so claimed to be mineral, and

may also take the testimony of witnesses as to the character of any of said lands and receive any other evidence relating to said matter, and shall have power to summon witnesses to appear before them and to administer oaths, and if it shall appear that any of said lands were known to be valuable because of their mineral deposits, or were worked or claimed as mineral lands when patents therefor were issued, said commission shall report such facts in writing to the Secretary of the Interior; and if it shall appear to the satisfaction of the Secretary of the Interior that the said lands should not have been patented to the railroad company because of their mineral character, then it shall be the duty of the Secretary of the Interior to immediately call the attention of the Attorney-General of the United States thereto; and if the title to said lands have not at the date of this Act been transferred by the railroad company to an innocent purchaser for a valuable consideration, then it shall be the duty of the Attorney-General of the United States to commence suit as soon as practicable in the proper court of the United States to set aside and vacate such patents.

SEC. 3. That the commissioners shall each receive for their compensation ten dollars for each day they may be actually engaged in the performance of their duties, which shall include their transportation and subsistence expenses, and these amounts shall be audited by the Secretary of the Interior and paid monthly.

SEC. 4. That the said commission shall continue in office for one year after its appointment.

SEC. 5. That there is hereby appropriated, out of any money in the treasury not otherwise appropriated, the sum of ten thousand dollars, or as much thereof as may be necessary, to be expended to carry into effect the provisions of this Act, the same to be paid out upon the order of the Secretary of the Interior.

Under the laws of the Association the bill must be passed upon by the executive committee before being submitted for passage by the national legislature, but it is deemed probable that that body will endorse the proposed measure.

THE question arises: "What effect will the Klondike craze have upon California?" Probably a beneficial one. It will bring 100,000 men to this coast, many of whom, sooner or later, will see the superior advantages of California as a gold producing region, and who may ultimately make California their home. San Francisco has prepared a valuable and interesting practical object lesson for the modern argonauts in the shape of an exhibit at the Alaska Trade Bureau, where everything likely to be needed in provisions and outfit is represented. It is thought that the Klondike trade of '98 will occasion considerable local business activity. It is calculated that 3,000 miners will go from California, 5,000 from Colorado, 500 from Arizona, 500 from Utah, 1,000 from Montana and 500 from Idaho. Those going from this section will supposedly be experienced and well equipped.

MOST SATISFACTORY ACCOUNTS are received from members of the committees regarding the progress of the California Golden Jubilee Mining Fair. Sufficient money has been secured to guarantee its success. It has been decided that the Mining Fair will open on January 29th, 1898, immediately after the close of the Golden Jubilee celebration, and continue to February 24th. Already several of the mining counties, realizing the importance of the matter as an appropriate advertisement, have stirred themselves, secured the necessary appropriations, made arrangements for space, etc. Every mining county in the State should be properly represented on this occasion, and it is hoped that all will realize the opportunity. Whatever the degree of experience or information, the Fair will be well worth visiting by every one at all interested directly or indirectly in the mining industry.

ACTING COMMISSIONER OF PATENTS GREELEY has made some important amendments to the rules governing the practices of the Patent Office and they have been approved by Secretary Bliss. These rules will apply to all cases filed after January 1, '98, all cases filed prior thereto being subject to the old rules, and provide that no invention submitted is patentable if it has been described in printed publications two or more years before the filing of the application. Heretofore, if a foreign patent has been taken out before an American patent the term of the latter was limited to the expiration of the foreign patent, which often resulted in the practical loss of many valuable patents by giving them a very short life. The new rules do not make this limitation, but if the period between the two patents is over seven months no American patent will be granted. Heretofore preference in acting on applications was given to inventions deemed of special importance to the Government, especially to the army and navy. Now such cases will be made special only when the department interested is personally represented before the Patent Office and asks for such preference. One year is named as the period within which failure to prosecute will be held to constitute an abandonment of the application for a patent.

Acute Klondicitis.

At the risk of repetition it is desired—perhaps unnecessarily—to warn would-be investors against taking any stock in the wild vagaries of Yukon transportation companies, Yukon investment companies, Yukon navigation companies, etc., which are now forming the usual parasitic attachment to the main craze, which in itself is bad enough. Circulars from all parts of the country, mainly New York, Chicago and St. Louis, and a few from this State, are received, setting forth in the most ridiculous manner preposterous propositions. One in particular received this week seems to be honest on the part of its producers. It is noticed here as being the most promising and least meretricious of any of the brood. From its prospectus it is learned that this company

"Proposes to establish a complete line of river boats, with steam ice train combination, to run between St. Michaels and the upper waters of the Yukon; proposes to purchase two flat-bottomed river boats with stern paddle wheel, size 200 feet long by 25-foot beam, with capacity of 500 passengers and 500 tons of freight; to purchase two steam launches with stern paddle wheel, size 50 feet long by 10-foot beam, with capacity of 24 passengers and 15 tons of freight each, all to be built of iron and steel, and so constructed as to be convertible into steam ice trains for use in the long winter months, the small boats and trains to be used in distributing goods in the various mining camps, the large boats to cost $30,000 each and the launches $2000 each. These ice trains have been thoroughly tested, and are considered as simple and practical as any steam conveyance now in use; they have great speed, and are strongly built, having an abundance of surplus boiler and engine power. The river boats can be converted into ice trains in a few days, which will enable the company to navigate the Yukon river nine months, instead of three months, each year. The company proposes to do a general merchandising business, and will establish trading posts on the Yukon and its tributaries, which will be supplied from general store at Dawson, etc."

It is of course but natural that such a stir as is at present going on in the Eastern States, looking to a wholesale hegira Alaskaward, would incite a multitude of questionable enterprises; and it is but stating the plain truth that to anyone who knows anything of the facts of the situation there is not the slightest likelihood of any stockholder in such silly schemes securing any return but experience on his investment.

When it is said that the above is most entitled to the respectful consideration of any which has, so far, been noted, it will readily be seen how absurdly comical the others must be. Of course, anyone who knows anything at all about it knows that the propositions quoted above deserve to be classed with air ships, wave motors, gold manufacture, and all the other schemes which collectively have about as much tangible effect as a chimera revolving in a vacuum.

The wildness of the Klondike craze on the Atlantic slope and in the central Mississippi valley must indeed be of wonderful dimensions to justify in the remotest degree the birth of such a lot of monstrous schemes in connection therewith as are at present being foisted upon the American people.

WHEN the first rush of poorly-prepared Klondikers started last July, the MINING AND SCIENTIFIC PRESS suggested it was none too soon to begin organizing relief expeditions. By September it was manifest to all that much suffering would result, and when Congress met this month one of the first bills introduced was to afford relief for the misguided multitude starving in the shadow of the pole. Last Thursday the House passed a bill appropriating $175,000, and the Senate the same day passed a joint resolution appropriating $250,000 for the relief of Yukon miners. A conference will be necessary to make the appropriation regular. The next question will be how to immediately make practical application of the money.

For Newer Readers.

Publication of the article on page 573 on the "Modern Barrel Chlorination Process," written by Mr. John E. Rothwell of Colorado, may occasion some surprise to many old subscribers of the MINING AND SCIENTIFIC PRESS, the same as similar explanatory articles on other mining matters have in the past few years, as however correct the information, the necessity for its appearance may be questioned by old-time readers. Such articles, giving practical and technical information on subjects with which many miners are presumably conversant, may at times seem out of place in this journal. The principal reason for their appearance is the present general demand for just such clear, comprehensive information as is contained in Mr. Rothwell's article on that subject, which is not so thoroughly understood by many beginners as old-timers might suppose.

It may seem strange to many readers of this paper that the MINING AND SCIENTIFIC PRESS, which first published full accounts of the leading mining processes, which have been universally in use for many years, should apparently revert to rudimentary information on the same topics. While it is true that for the last forty years the chlorination process has been in operation in this State, and that Mr. Deetken and Mr. Aaron explained this matter in these columns, as other eminent practical miners in other branches of mining business explained their processes herein, yet it must be borne in mind that, in this new era of mining, thousands of men have entered into the field who are not conversant with much that is a matter of old information to older and more experienced men, and that even relative to those points much additional has been recently added. The many letters weekly received at this office testify to the general desire for information regarding matters already well understood by many; and it is for this reason that so much has of late been published that may possibly seem superfluous to some of our readers. In the year drawing to a close a vast amount of information concerning the cyanide process has also appeared herein, covering everything procurable and the latest results from practical workers. So also with hydraulic mining, dredging, etc. Right here, where nearly all that is successful in mining appliance originated, and has been improved, there exists to-day a general demand for plain, common sense data regarding those things. It is the pleasure and the province of this journal to furnish just such information. Mining is a progressive science, and the MINING AND SCIENTIFIC PRESS proposes to be at all times fully in accord with present requirements.

It is also to be remembered that the circulation of this paper is no longer confined to California; for nearly five years past considerable successful effort has been devoted to wide extension of its circle of readers until now its circulation outside of this State equals that within its borders, and the thousands of mining men in this west half of America naturally look to the MINING AND SCIENTIFIC PRESS for all their requirements in the way of mining information.

Mr. Rothwell's article is simple, comprehensive and timely, and the matter is merely referred to here to illustrate the demand for just such information by many earnest men who are comparatively new in the business.

A LONDON gold mine operator writes: "I think, as far as Europe is concerned, practically speculation during the next five years will be much devoted to gold mines, owing to the improved methods of extraction. People, and especially continental investors, are being educated up to this kind of investment, owing to the success of the Rand mines. It is mainly a question of providing sufficient working capital. In no case on the Rand has a mine of any size, which has subsequently proved successful, been opened with an expenditure of less than £300,000 or £400,000. I believe that we shall have a Klondike 'boom' when there is something more in the way of exact information to go on." So far as the United States is concerned, the Klondike "boom" will soon burst, as it deservedly should.

IT is alleged in Eastern dispatches that the effort to form a combination of silver smelters and refiners, to control the price of silver, is not a success; but reports from better informed quarters indicate probability of getting together next month.

Hydraulic Mining.

The miner's inch of water, measured by the rule most in use in California, means the quantity of water that flows from an opening 1 inch square through a 2-inch plank, with a head 6 inches above the center of the orifice, the water being at rest. Different methods of measurement obtain, however, among the several water companies throughout the State, the quantity represented by a miner's inch varying from 1800 to 2600 cubic feet per twenty-four hours' flow. These companies, acting in the start without concert or much theoretical knowledge on the subject, adopted each such system of measurement as seemed most convenient or as fancy might suggest, and, although efforts have been made to establish a uniform rule either by general consent or legislative enactment, this has not yet been effected.

The "duty" of the miner's inch, being the quantity of gravel it is capable of breaking down and carrying off in the course of twenty-four hours, varies according to the character and condition of the material to be handled, grade of sluice, style of riffles, etc., ranging all the way from 2 to 20 cubic yards, the average being about 4.

The average in seven different localities in this State, as estimated by the State Engineer, amounted to 3.6, as shown in the table appended:

Name of Stream.	*Inches of Water Used in 24 Hours.*	*Duty per Inch—Cubic Yards.*	*Amount Moved—Cubic Yards.*
Table Mountain	833,250	3½	2,916,375
Butte Creek	24,000	3	84,000
Feather River	1,259,363	3½	4,407,770
Yuba River	5,458,171	3½	19,103,598
Bear River	1,117,082	3	3,351,246
Dry Creek	44,229	3	132,687
American River	1,914,500	4½	8,615,250
	10,650,595	3.6	38,610,926

The above result, 3.6, is somewhat below the general average in California, rendering it probable that the gravel run off in making these tests was coarse and heavy, if not cemented.

At the Hobson mine, Iowa Hill, Placer county, piping a bank of light gravel, using 500 inches water, on usual sluice grade, and under a pressure of 360 feet, the duty of a miner's inch was found to be 24 cubic yards, elevating here the grade to 18 inches and substituting iron riffles for the rock pavement. The duty was raised to 36 cubic yards, this experiment illustrating the gains due to the introduction of these new factors, the average result of the two trials being 30 cubic yards. Running on coarse bottom gravel, this company under same conditions was able to move only 10 cubic yards.

At the North Bloomfield mine, Nevada county, handling 1,500,000 cubic yards top gravel, the duty of the inch was 5.39 cubic yards, while running on the lower and more indurated stratum, extending to a height of 65 feet above bedrock, the duty of the inch was reduced to 2.34 cubic yards, the miner's inch here being equal to 2.230 cubic feet.

In making choice of a hydraulic property three principal things are to be taken into consideration. First, the percentage of gold contained in the material to be utilized, of which there must seem enough to warrant the expenditure required for the purchase, equipment and cost of working the property, interest on capital invested included; second, water in ample supply, easily available and capable of being delivered in the washing pit under a head that will insure effective piping; and, third, sufficient fall or "dump" immediately below the mine to prevent the tailings accumulating to a troublesome extent, unless, as sometimes happens, the latter can be dropped directly into a stream large and swift enough to carry them away. The above conditions being present, a hydraulic enterprise, well conducted, may be expected always to reach a fair measure of success. If there is timber in or near the mine for making sluice blocks, sluices, flumes, trestles, etc., if it is accessible for teams, not far from railroad or river transportation, and the winter climate is not so rigorous as to form much ice or otherwise interfere with outdoor operations—these, though secondary, are by no means unimportant elements of success.

In making tests of the auriferous gravel to be examined, samples should be taken from every accessible part of it; from open cuts, if any there are made by former workings, and from shafts sunk for the purpose; this prospecting work being carried always to as great depths as practicable, or as may seem necessary. For washing the samples of gravel so obtained, the pan sometimes, though more often the rocker, is employed. Where there exist facilities for using it, and there is much work of this kind to be done, the sluice should be availed of, and even the hydraulic pipe, if the ground has already been opened and equipped for active operations; the point sought to be enforced on the attention of the expert being that he should perform this part of his work with thoroughness and accuracy. For a mistake committed in most other matters there may be found a partial remedy, but to go much wrong here is fatal and irreparable. And yet it is just here that the gravel inspector is apt to be deceived, if he does not deceive himself.

In this State, where all the conditions are first-class, gravel yielding a total of not over 4 cents per cubic yard can be worked by the hydraulic process with profit. As the conditions are less favorable, the grade requires to be higher; nor is it often safe to invest largely where the grade falls much below 6 cents per cubic yard, this being about the average yield of the gravel handled on the Pacific coast. If reports on the Ecuador gold fields may be credited, the deposits there will yield at the rate of 40 cents per cubic yard, but these reports have not been substantiated by actual workings; moreover, the gravel banks of that country are by no means so deep as most of those in California.

A hydraulic property having been acquired and prospected in accordance with the rules above prescribed and proving satisfactory, the next thing to be done is the construction of a ditch for bringing in water for washing purposes. The cost of this ditch will, of course, vary according to size, length, natural obstacles encountered and difficulties to be overcome, these various hindrances, owing to the rugged character of the country traversed by these artificial waterways, being many and formidable.

In the endeavor to surmount these impediments, recourse has been had to structures of various kinds, such as flumes, trestles, open cuts, tunnels, iron pipes, etc., the flume in one instance, where was presented no other practicable way for carrying forward the water, having been bracketed to the face of a towering cliff in Butte Co.

In selecting and locating the line of a ditch the avoidance of the above obstacles should be kept in view, earthwork, where the cost is not too great, being preferable to the building of flumes, especially where the latter require to be supported on elevated trestles, as these structures are comparatively short lived, needing also much repairing while they last. Beside being exposed to the wind and the likelihood of being blown down or destroyed by fire, they speedily decay, their average life not exceeding ten or twelve years. Better, as a general rule, carry your ditch by a considerable deflection around the head of a canyon than build a flume for transmitting the water across the depression encountered by a much shorter route.

But what is of still greater importance in this connection is securing an ample supply of water to continue, if possible, through the summer months, as then, the days being long, work can be prosecuted to better advantage than during other seasons of the year, while the water, warmed by the rays of the sun, promotes the action of the quicksilver, causing it to amalgamate with the gold much more readily than when the water is cold. In this style of mining, water failing, all work is intermitted—a good reason why the supply of water should be made perennial, if possible.

Again, the source of supply should be high enough to command the entire gravel deposit for which it is intended, as well as any other, if such there be, for the washing of which this water might at any time be made available. Being sufficiently high at the start, the ditch, in being carried forward, should be maintained at as great an elevation as practicable, to the end that ample head be insured for effective piping. Through faulty engineering, some of our pioneer ditches, when finished, demonstrated the soundness of the hydraulic theorem that water can not be made to run up hill. It is always desirable that the head of the ditch be located below snow-line and have, as far as may be, a southern exposure. All water-courses on its line should be secured and disposed of in such a manner that they can be emptied into or passed over it, accordingly as this additional supply may be needed or not. The ditch should be furnished with an abundance of waste gates, located at points where the escaping water will not be likely to wash away the ground and endanger the ditch, which, by means of these escapes, can be speedily emptied when a break occurring makes this necessary.

The route of the ditch having been selected with proper care, equal care should be observed in making the survey, in the prosecution of which the size and shape of the ditch and also the grades must be fixed. The character of material to be excavated must be examined; sites for flumes and tunnels determined, and where sustaining walls and trestles will be necessary—in short, all the information needed to enable the contractor to eliminate the cost of building the ditch should be furnished by the engineer and surveyor. While a fall 10 feet to the mile—three-eighths of an inch to the rod—has generally been deemed desirable as insuring a free flow of water, and at the same time protecting the sides of the ditch from excessive erosion, many of the ditches in the mining districts of California have a fall of 15 and some as much as 20 feet to the mile—narrow and deep ditches with steep grades, rather than broad and shallow ones, being here the rule; this rule, however, being departed from where deepening the ditch is likely to involve much additional rock work. Owing to the solid nature of the ground traversed by these ditches a swift current works but little harm. If at any point an extremely heavy grade becomes unavoidable, the water, unless it can be dropped at once, should be shot down through a flume, thereby obviating any harmful washing away of the banks. While all ditches tend to enlarge themselves by the process of erosion, their banks gradually become solidified and thus, through diminished leakage and absorption, their carrying capacity is somewhat increased. In view of the loss of water caused by evaporation, absorption and seepage, it has been suggested that the ditch at its upper end be somewhat enlarged, tapering gradually to its normal size, thereby supplying water to make good the losses occasioned by these several causes of waste, that due to evaporation being very considerable during the California summer.

In length the ditches range from a few miles up to a hundred miles or more, exclusive of branches, the entire ditch system of some of our larger water companies covering a linear extent of nearly 300 miles. Generally the ditches in the counties central to the main gold belt are much longer than in the more northerly counties of the State because of the water supply of the mountains in the latter being so much nearer the mines. The cost of the main trunk of our larger ditches has ranged from $100,000 to $1,000,000, which sums have in many cases been increased from $50,000 to $500,000 for construction of branches. The capacity of these ditches varies from 600 or 800 to 7000 miner's inches—grade from 4 to 30 feet per mile, with an average of about 12 feet.

(*To be Continued.*)

Notes on Present Western Practice of Metallurgy Economically Considered.

By W. B. Devereux.*

As a rule, only a few metallurgists in the West are able to devote themselves to metallurgical problems pure and simple. It is only in the large custom smelting works that they are relieved from business transactions, and have only to concern themselves with the purely scientific side of the problems which come up for solution, and, of course, it is these great establishments which afford the best opportunities to make improvements, and to try experiments looking toward improved processes. Western metallurgy has for its object the treatment of ores produced in the great mountain region between the Western plains and the Pacific coast, which reaches from the Arctic regions down through the United States and Mexico. It may be truthfully said that the ores from all these regions come to one or the other of the various metallurgical establishments in the United States, and, in addition to these, in the past few years large works have been established in Mexico and in the British possessions on the north. Ores of every possible description come to these works, but it by no means follows that these ores are all treated at the works nearest the mines which produce them. In nearly all of the smelting works of this country ores are constantly coming in from distant regions, owing to the fact of the particular works in question being able to pay a higher price than works nearer at hand. This is due to the fact that a given ore may supply a desirable ingredient for one locality and at the same time be undesirable or unnecessary at another.

A knowledge of metallurgy and metallurgical conditions are necessary for every mining engineer. The two professions of engineer and metallurgist almost invariably overlap in the West, especially in remote districts. The conditions vary so much even in localities near together that the determination of the proper metallurgical treatment of any ore becomes a problem of the greatest nicety. Of course, where mines are within reach of large custom works, the metallurgy of the mine is of little importance, although the mine manager must know the value of ores from a smelter's standpoint, in order to so mine them as to obtain the best returns. But there are thousands of mines which are so far distant from metallurgical centers that the questions of transportation preclude the shipment of ores, except where the values are very high, and hence local treatment becomes a necessity. Those who are called upon to pass upon these problems and to carry out the plans ultimately adopted, must have not only a knowledge of general metallurgy, but of a thousand other things which are no part of metallurgy itself. In fact, there is very little information which will not, sooner or later, be found useful.

Suppose one were to consider the possibility of smelting an ore at a distance from the railroad in one of the Western deserts. One of the first requisites to determine would be the available supply of water. There might be available a stream which would contribute no water in the dry season and a flood in the wet. Storage reservoirs might therefore be a necessity, and this would involve extensive engineering knowledge. Long distance pumping might be a necessity from which would arise another sort of problem.

There might be an underground current in the bed of the stream in the dry season which would furnish the necessary water, and this could only be determined by sinking wells. The available supply of timber and its suitability would be another factor, also the relative cost of coke, coal, and charcoal. If fuel was to be brought in by rail, knowledge of railway conditions might materially affect the rates of transportation ultimately decided upon. At the same time, the question of wagon transportation would determine an important proportion of the total cost of fuel, and, in addition, the cost of

* Condensed from School of Mines Quarterly.

getting the product of the works to its destination.

It would hardly occur to one as a first experience that the fact of grass growing along the line of the wagon road, and being available throughout the year, might determine the question as to whether ore could or could not be smelted at the mine in question, or that the price of hay and oats might determine the amount of profit or loss. And yet just such conditions as these are determining to-day the profit and loss account of active mining operations. The reason of this is very simple. If grass is available for feed, freighting can be done with oxen, which are turned out at night to graze. If no grass is available, hay and grain must be fed, and the price of freighting is correspondingly greater.

(To be Continued)

The Modern Gold Chlorination Process for the Treatment of Gold Ores.

Written by JNO. E. ROTHWELL, Denver, Colo

Chlorination is the dissolving of gold out of its ores. The chlorination process is based on the fact of the solubility of gold in a solution of the element chlorine and water.

The Modern Barrel Chlorination Process.—The modern barrel chlorination process is so called to distinguish it from the method of chlorination first employed by Plattner, in 1849, on oxidized residues from arsenic production works, and a similar arrangement on a larger scale put in operation by the late Mr. G. F. Deetkin in California in 1857, and at a later date by the late Mr. C. H. Aaron on the mineral concentrates resulting from concentration of the tailings of the free milling gold ores, this process being carried out in leaching tanks of comparatively small daily capacity; also from the method employed by Dr. A. Thies, in which similar concentrations are treated in small revolving barrels, also of limited capacity. The beginning of the modern barrel process dates from 1890, in which year the process was put in practical operation by the writer on a large scale on the ores of the Golden Reward Mining Company at Deadwood, South Dakota. The ores to be treated were not amenable to either free milling or concentration, and had to be treated in bulk as mined, therefore requiring methods for the economical handling of large amounts of material, in a region where labor and supplies were expensive.

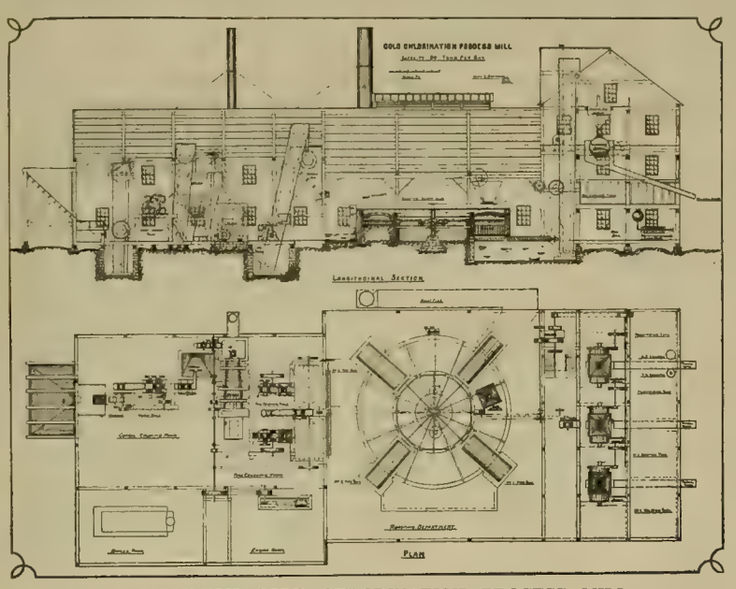
There are no patents on the process, and therefore no royalties to be paid to anyone.

Description of the Barrel Chlorination Process.—The ore from the mine is received in ore bins of reasonable capacity, and from them is fed by hand to a rock breaker, where it is crushed to 1½-inch cubes, and from thence passes through heavy, coarse crushing rolls, in which it is reduced to a 2 mesh, or ⅝ inch, and finer product. In the event of the mill being a custom mill, that is, one that buys the ore from the miner, the ore is now sampled either automatically or by hand quartering, after which it is trammed to a bedding floor, where all classes of ore are mixed to a uniform product. In the case, however, of treating the ore of one mine this extra work is omitted and the ore, after being crushed in the rolls, goes direct to a storage bin having one-half the daily capacity of the plant, so that all the coarse crushing is done on the day shift. From the storage bin the ore is fed automatically to a drying apparatus, and from thence goes to the fine crushing department. This department consists of fine crushing rolls, belt elevator and sizing screens.

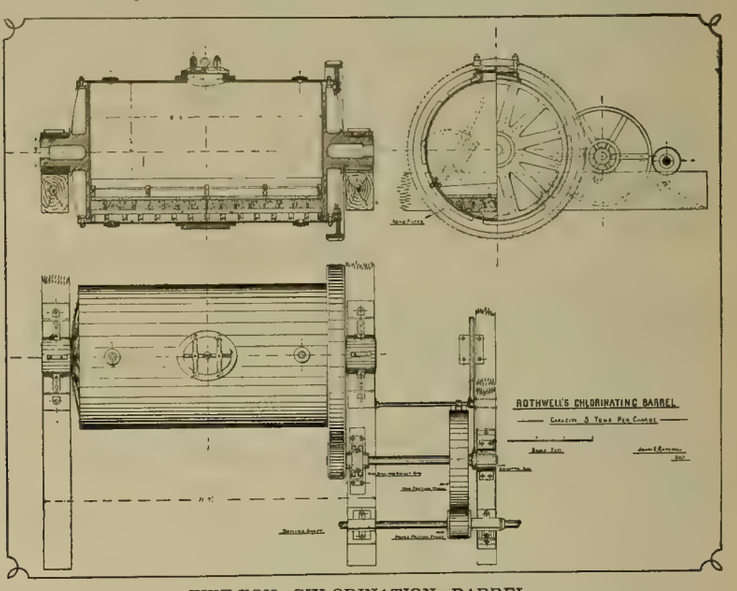
The prepared pulp, the size of which has been determined beforehand by tests, is stored in bins, and from them is automatically fed to the mechanical roasting furnace of the cylindrical or hearth type, the object of the roasting or calcining being to eliminate volatile and enclosing substances and leave the gold free, in a metallic condition, in which condition it is soluble in chlorine water solutions; also to convert what would otherwise be chlorine decomposing minerals into insoluble compounds, and also to improve the leaching quality of the pulp being treated.

The ore, after being roasted, is cooled automatically and conveyed to bins or hoppers directly over the chlorinating barrels, each hopper holding exactly the amount required to charge the barrel.

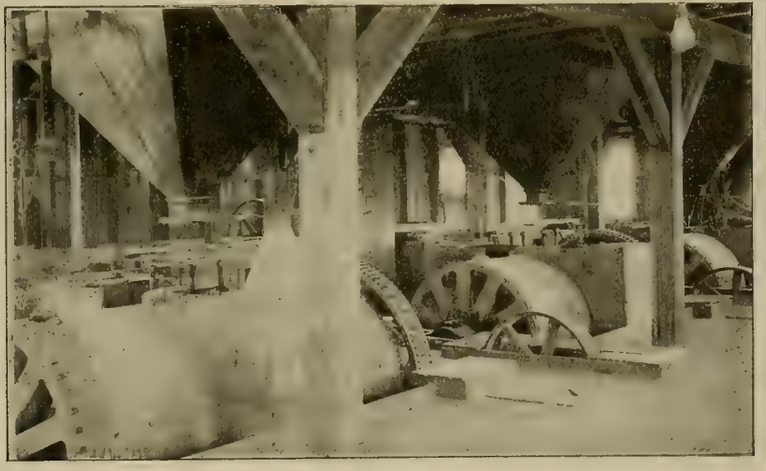
The chlorinating barrels are cylindrical, sheet steel vessels lined with sheet lead. They are arranged to be revolved either on trunnions or encircling tires. The sizes vary from three to twenty-five tons capacity per charge each, to suit the ore and the capacity of the plant required. Each barrel is fitted with an internal filtering diaphragm, to separate the gold chloride solution from the pulp after chlorination.



FIFTY-TON GOLD CHLORINATION PROCESS MILL.



FIVE-TON CHLORINATION BARREL.



BARREL ROOM IN FIFTY-TON CHLORINATION MILL.

In operation the roasted ore is charged into the barrel, with sufficient water to make a liquid pulp, and a weighed quantity of chloride of lime (bleaching powder) and sulphuric acid added. It is then closed tight and the whole mass agitated and mixed by revolving the cylinder slowly. After a certain length of time, from one to four hours, as found necessary by preliminary tests, the barrel is stopped and the gold chloride solution is drawn off through the filter, assisted by air or water pressure, and collected in lead-lined tanks. A precipitant, usually hydrogen sulphide gas, is added to the solution, and the gold precipitated and collected in a filter press in the shape of a sulphide cake. This is dried and roasted to eliminate the sulphur, and the residue charged into a crucible with the necessary fluxes, melted and cast into a bar or ingot of comparatively pure gold. In the treatment of concentrates from the stamp mill or otherwise these are handled in the same way as the ore in bulk, the operation starting with the roasting process.

Chemicals.—The chemicals required for the process are sulphuric acid, chloride of lime, sulphide of iron and sulphur. Sulphuric acid is shipped in drums of sheet iron of about 1600 pounds each; also in tank cars, similar to oil tank cars, of 24,000 to 50,000 pounds. The price of acid varies from 90 cents to $1.10 per 100 pounds at the chemical works. Chloride of lime is put up in sheet iron drums of 500 pounds each; also in casks of about 1200 pounds. The present New York quotation for it is $1.80 per 100 pounds. Sulphide of iron can be purchased in casks of about 700 pounds at a cost of $3 per 100 pounds, or can be made on the ground from crude sulphur and wrought iron. Sulphur can be purcasks of 300 pounds at a cost of $2 per 100 pounds.

Application of the Process.—The process can be used to treat: (1) All classes and values of siliceous oxidized gold ores; (2) concentrates from the concentration of tailings of free milling gold ores; (3) telluride gold ores; (4) iron and arsenical pyrites, zinciferous and antimonial ores carrying gold; (5) ores that will not concentrate effectively and do not carry over 3 per cent copper or 5 per cent lead, and are not excessively high in alkaline minerals; (6) siliceous tailings carrying a valuable quantity of gold. The process saves gold values only. Silver can be saved when this process is used by an auxiliary method.

EXPENSE OF RUNNING A PLANT OF 75 TONS DAILY CAPACITY.—CUSTOM MILL.

LABOR.

Where Used.	*No. Men.*	*Occupation.*	*Shift Hours.*
Mill at large	1	Superintendent.	
	1	Assayer. (Will also take charge of mining operations when mine is in connection with mill.)	
	1	Assayer's helper.	
	1	Bookkeeper.	
	1	Night foreman	12
	1	Machinist	10
	1	Carpenter	10
	2	Roustabouts	10
	1	Night watchman	12
Crushing and sampling	*2	Carmen	10
	1	Crusher man	10
	*1	Sampler	10
Fine crushing	2	Roll men	12
	2	Oilers	12
Engine and boiler	2	Firemen and engineers	12
Roasting department	2	Firemen	12
	2	Feeding and cooling and delivering ore to chlorination depar't	12
Chlorination department	2	Headmen on barrels	12
	2	Helpers on Barrels	12
	1	Precipitator.	

FUEL.

	Coal or *Wood.*
For power	3 to 5 tons. or 6 cords.
For roasting	8 to 9 tons. or 9 to 10 cords.

The amount of fuel required for roasting varies with the character of the ore and the roasting apparatus installed.

CHEMICALS.

		Lbs. per Ton.
For chlorination	Chloride of lime	10 to 12
	Sulphuric acid	15 to 25
	Iron sulphide	1
For precipitation	Sulphur	¼
	Sulphuric acid	2½

*Men marked thus are not required when the mill is treating the ore of one mine.

Miscellaneous supplies, including assay materials, fluxes, filter press cloths, lubricating oils, incandescent lamps, etc., can all be covered with a charge of 12 cents per ton. Renewals and repairs will cost, depending on the location of the plant, from 15 to 30 cents per ton. The amount of water required can be safely estimated at 500 gallons per ton—for steam power and chlorination. This can be reduced if settling tanks are added, and water used over again.

Mining Summary.

CALIFORNIA.

Amador.

One of the results of the attachment recently levied upon the Plymouth Con. M. Co's. property at Plymouth is a sheriff's sale of the ditches, land and mines owned by the company in Cosumnes Township, on December 27th. The suit was brought by H. G. Stevenson to recover $27,468.73.

Record: The tailings of the Belden, which have yielded $30,000 to the cyanide process, are to be worked over by the same parties and the same process.

The case of the Argonaut vs. Kennedy was argued in the U. S. Circuit Court last Monday, on plaintiff's motion to remand the case to Amador county. Plaintiffs want the case tried in Amador.

The Centennial near Plymouth is unwatered. Sinking will be resumed. The shaft is 350 feet; it is intended to sink to the 1000 level before starting a drift.

Work continues on the Pocahontas near Drytown.

Record: At the Central Eureka the shaft is 950 feet and sinking is progressing.

At the Potazuba drifts are being run on the ledge at the 500-foot level north and south.

Supt. Ross begun work on a new shaft 1000 feet east from the present Wildman hoist. It will have three compartments, to be sunk to a depth of 2500 feet, which will reach 1300 feet below the deepest workings. A temporary hoist is to be erected for use this winter.

A $20,000 brick from the Argonaut 40-stamp mill was the result of cleaning up from the outside plates in twelve days run.

Butte.

The Supervisors have appropriated $600 for an exhibit at the Golden Jubilee Mining Fair.

The company owning the Katskill at Bangor has decided to run a three-mile tunnel to tap its blue gravel lead.

The Big Butte is taking out quantities of ore; thirty men are employed.

The Hooper M. Co. have their ditch and flume completed. Work is resumed on the mine.

Calaveras.

Prospect: The Mountain King, near Copperopolis, is bonded to a Chicago company. Work commences at once, and a 20-stamp mill is to be erected within six months. All these properties have been developed and the ore showing is good. On the Mountain King there is a shaft 270 feet and one of the conditions of the bond requires that this shaft shall be sunk 230 feet deeper. On the Big Seven there is a shaft 110 feet and also a tunnel. The Homestead has three tunnel developments—one 275 feet deep, another 65 feet and the third 40 feet.

Chronicle: Col. Robinson has purchased the Spanish Bar and Bloomer placer mines on Mokelumne river, which will be operated by hydraulic elevator.

El Dorado.

(Special Correspondence).—A. E. Head & Co. have given a short bond on the Blue Gouge to an Eastern company. The property comprises fourteen claims, is well wooded and watered and has considerable development work. It is a low-grade proposition, but possesses every desirable advantage for cheap mining and milling. It is twenty-six miles east of Placerville.

Placerville, Dec. 14th, '97.

The Larkin's clean-up last Monday from five stamps was $1770.

The Newton gravel mine, ninety-seven acres, with 10-stamp mill, was sold last week by C. H. Clark of San Francisco to I. N. Proctor, M. D. of Placerville.

The 10-stamp mill on the Big Sandy, at Kelsey has been in operation for some time, and the returns are satisfactory. This mine is owned in Toledo, Ohio. J. T. Kelly is Supt.

J. D. Murphy has resumed operations on his placer mines in Kelsey district. He will operate on a large scale.

At Greenwood Lee Bros. are down 100 feet on their mine, and drifting on.

At the Ohio the force of men has been increased.

A. Gerard is completing a 20-stamp mill on his property a few miles below Placerville.

C. R. Wallace of Georgetown, Supt. of the Bright Hope, one mile east of Georgetown, is putting up a mill on his mine.

At the Grover Cleveland a ledge 9 feet wide of $5 ore is said to have been discovered.

Placerville citizens have petitioned the County Supervisors to appropriate $500 for the Golden Jubilee Mining Fair.

Humboldt.

The black sand mining plant near Little River beach was wrecked last week. During the storm breakers cut their way through the sand dunes behind which was located the mining plant, destroying the water-wheels used for driving the machinery, carrying away the piping, demolishing buildings and filling the pit from which the auriferous sand is taken with water and wreckage.

Inyo.

Supt. McDonnell on the line between Inyo Co., Cal. and Nye Co., Nevada, has a 20-foot ledge at a depth of 120 feet, and is erecting a 20-stamp mill.

P. Geelhoed and H. S. Kennedy have two locations near Benton, one showing a ledge assaying gold and silver.

Kern.

(Special Correspondence).— On the Gold Hill, incorp., the deepest shaft is 70 feet on a 2-foot ledge of $60 ore. A tunnel on the ledge is 270 feet. The company owns six claims. The property is in the Rademacher district, fifteen miles from Johannesburg. E. Bind is superintendent.

Johannesburg, Dec. 13th, '97.

B. Maginnis and S. J. Montgomery have struck a ledge on the Annex that mills $47 per ton.

The Visalia mill started its pumps last week.

T. Bull has bonded a half interest in the Pinmore from F. W. Clift and F. G. W. Spencer for $3000.

A mill test of 29 tons from T. Pheby's mine in the Panamint yielded $15 per ton.

Randsburg *Miner*: From 6240 pounds of ore W. J. Bryan obtained 7⅛ ounces of gold.

J. A. McCusker has uncovered a 3-foot vein on the King George. The rock mills $48.

Mariposa.

The Mount Gaines, under bond to G. Crocker, is down 600 feet. In the bottom there is a 5-foot vein. In another part of the mine they have a 2-foot vein from which a milling test averaged $25 per ton. M. L. Rogers is superintendent.

The Boston News Bureau of the 6th inst., says: "The Merced Gold Mining Co. has secured the $60,000 wanted for development of the Mary Harrison vertical shaft, and more can be obtained if required."

The following is from the Boston *Herald* of the 3rd inst:

"A loan of $60,000 at 6 per cent is being arranged by Merced mining people, the money to be used to sink the Mary Harrison vertical shaft and connect it with the old incline shaft. An assessment may follow if the openings are sufficiently favorable. Why not the assessment first? Some shareholders would prefer to pay an assessment and keep the company out of debt. A debt is a bad thing for a new mining enterprise. How about Merced profits from operations lately reported? Are they insufficient to earn other profits? An official and definite statement about Merced would shed needed light on the situation."

Mono.

Despite the act of the last Legislature abolishing mining district recorders, etc., a district to be known as the Black Lake mining district has been organized, running six miles west, north, east and south to place of beginning, six miles northwest of Benton.

Nevada.

(Special Correspondence).—The 10-stamp mill rebuilt on the Gaston Ridge mine for prospecting purposes, began operations last week and will run all winter. There are 1800 tons of ore on the dump. Dana Harmon is superintendent.

Graniteville, Dec. 16th, '97.

(Special Correspondence).—R. K. Schockley, Supt. of the Phœnix M. & I. Co., Nevada City, Cal., is lowering the water in the old shaft by an ejector at the rate of an inch per minute. This property is the old Sneath & Clay, renamed by the new company the Phœnix Mg. & Impr. Co. The owners are Eastern people excepting Dr. A. H. Tickell of this city.

Nevada City, Dec. 14th, '97.

McHugh, O'Hearn & Co., at Grass Valley, have leased the New Eureka Mining Co.'s mill for their claim, which produces ore valued at $8 per ton without sulphurets.

The Mistletoe, near Rough and Ready, has reached a depth of 50 feet. The ledge ranges from 3 to 8 feet.

Supt. Kirkham of the Mountain Chief has begun cleaning and extending the old tunnel.

The expenses in October of the Brunswick were about $3,450, receipts $4,400. There was milled during October 390 tons of ore. Supt. Mallen says work at that mine is progressing well. There is considerable fair ore in sight and it is expected that more will soon be uncovered.

The South Fork Co.'s mill at Graniteville has closed for the winter.

At the annual meeting of the Gold Point C. G. and S. M. Co., Jas. Watt was elected Supt.

The new mill at the Reward was started this week.

Telegraph: The Red Dog M. Co. has been granted a permit to hydraulic.

Telegraph: The clean-up made last week from the No. 5 level of the Illinois mine from thirty-four loads was $32 per load.

Placer.

The Herman, on the upper Forest Hill divide, has been in successful operation for two years.

On the Page & Buckman the crosscut tunnel is 300 feet. The ledge is from 5 to 8 feet. The ore averages $5 per ton.

Supt. Wilkerson has six men at work in the Green Mountain, at Crescent, cleaning tunnels, etc.

Herald: The hoisting works at the Marguerite is completed. The company intends sinking the new shaft, which is 165 feet, to a depth of 500 feet before crossing to the main ledge.

The Mountain View, near Auburn, has resumed operations, W. A. McNaughten of Oakland having contracted for the purchase of the property.

Independent: C. E. Pike has completed the debris dam for the Upper Dutch mine.

The Claybank Co., A. Moore, Supt., is extending its main tunnel.

Sentinel: The French company owning the Red Point gravel mine have sixty-seven men on the payroll. About 135 cars of gravel per day are brought to the dump. Seven horses are used in pulling trains. The company is in the channel a distance of over 11,000 feet. Forty-seven miners' inches of water flow from the mine. This is taken up with a pipe at a distance of 4000 feet in the tunnel, giving 90 feet pressure, which is used to drive the blower. The company has secured estimates for an electric plant and have taken the matter under advisement.

At the Herman mine, near Westville, Supt. Barton says the pay chute in tunnel No. 3 has been worked 290 feet on the ledge. Tunnel No. 5 is in 400 feet.

San Diego.

Several mines near Fallbrook have been sold to a company. Four of them sold for $8000.

The *Union* reports the recent location of large deposits of gypsum on the desert, twenty miles southeast of Borrego springs.

San Bernardino.

A strike of gold-bearing ore has been made within ten miles of San Bernardino.

Shasta.

The Diestelhorst dredge on the Sacramento river is operating about three miles above Redding. The engine is 20 H. P. and raises an average of two and a half tons of gravel per minute. The largest piece of gold taken from the river averages $5. The dredge is in operation day and night, and five men are employed.

Taylor brothers have been prospecting in western Shasta and claim to have found a ledge 4 feet in width assaying $100 to the ton in gold and $5 or $6 in silver.

The Keno is under bond to Oakland men for $3000. It has a tunnel 300 feet following a 2-foot vein. A shaft has been sunk 40 feet. Both the shaft and tunnel will be continued until they meet. The ore is said to assay as high as $80.

Stoddard & Watts are at work on a crosscut tunnel 200 feet, which will tap the ledge at a depth of 100 feet.

Salee & McDonnell, at Copper City, have completed the new tunnel started two years ago. It is 1400 feet in length and crosscuts the ledge at a depth of 400 feet. The ledge is 6 feet. The ore is base and carries gold, silver and copper. Two carloads were shipped to the smelting company at Vallejo Junction; one car netted the sum of $422, the other car gave a net return of $445.

Last week two buckets of earth on W. Murray's ground, near Shasta, is said to have yielded $26.

Sierra.

(Special Correspondence). In the Lucky Dog Gravel mine the grade in the tunnel has finally been overcome, and the 600 foot tunnel, cutting through bedrock, partly, is into 4 feet of gravel that is paying $3.25 per car. The property is owned by San Francisco people. J. D. Jones is Supt. This is one of the three extensive gravel properties about Forest City operated under the general management of F. W. Page.

Forest, Dec. 10th, '97.

The Copeland-York started the mill and pump last week.

W. York & Sons have traced their ledge across the river and also done work on a new location. They have completed their arrastra.

Siskiyou.

D. N. and C. E. Custer of Montana have a ledge in Quartz valley, eighteen miles from Yreka, with a tunnel 300 feet long, and 380 feet of backs. The ledge is pockety, and these pockets yield from $600 to $1000 in gold. On the ledge between these pockets the ore is said to average $15 per ton. They have a 5-stamp mill.

Most of the placer mines in the Salmon river section have started up.

The Spangler Bros. claim at the mouth of Humbug creek is well supplied with water and has begun work. A double-action Westinghouse engine is used for hoisting.

A large amount of snow fell on all the mountains and mining in this county will be unusually active this winter. The big plants on the Klamath will accomplish a great deal of work this winter, several of them being already in operation.

Trinity.

(Special Correspondence).—The Bloss and McCleary hydraulic property comprising 1,000 acres situated at the edge of this village is sold for $53,000. The purchasers are L. McDonald, J. Porter and four others. L. Reel, one of the purchasers, will be superintendent. Work is already in progress.

Trinity Center, Dec. 13th, '97.

A tunnel in the Boulders, owned by G. L. Carr, is in 250 feet. He expects to crosscut the ledge by running 400 feet farther.

Tuolumne.

The mill on the Gerrymander has been completed and will start as soon as the delayed pipe arrives and connection can be made with the canal. The property is owned by Oakland and San Francisco people.

The marble quarry near Columbia has been leased to Poniatowski & Bullock of the Sierra Railway Company for ten years, with the privilege of buying the property. The price is said to be $200,000 and the lease $7000 per annum.

The Pennsylvania mine has been unwatered and Supt. Nagle is putting in a first-class hoist.

Independent: The ore recently struck at the Marble Point assays $800 per ton. This mine was bonded by its present owners for $8,000.

The 20-stamp mill at the Shawmut has started. Ninety men are employed.

The Gold Bug has decided to sink another 100 feet; a steam pump will be immediately put in to relieve the shaft of water.

The Columbus is drifting north from its lowest level and extracting ore.

Democrat: On the Estrella a tunnel taps the ledge at 140 feet and 50 feet of vein matter has been gone through, all of which will pay to mill. Assays vary from $30 to $200. D. Y. Browne is Mgr.

The old shaft on the New Era has been cleaned and sinking commenced. At 50 feet the vein shows 3⅝ feet of quartz.

The new shaft on the Grizzly has reached 200 feet; the vein shows from 6 to 18 feet of quartz that mills from $10 to $12 per ton. Supt. Sharwood says there is rock in sight to keep a 20-stamp mill jumping right along.

Ventura.

A 2-stamp mill has been erected at the mine owned by T. J. Harris & Bros. The first run of twelve tons produced $300.

Yuba.

T. A. Phillips, director of the Florida Central Railway, and M. V. Raley, Gen. Supt. of the road, are at Indiana Ranch to inspect the Good Title mine and new mill, in which they are interested. J. E. Poingdestre is the Gen. Mgr.

NEVADA.

The Gold Eagle, near Winnemucca, C. H. Wilbur Supt., owned by Utah people, within the last few months shipped 800 tons of gold and silver ores, which netted $100 to the ton. Ten men have been employed for two years.

At Eppenger & Griswold's soda works at Soda lake, Churchill county, they run a twelve horse team between the lake and Desert, a station on the C. P., five miles east of Wadsworth, making four trips a week. At the lake they are fitted up with pumps, vats, etc., to pump the water into the vats and extract the soda by solar evaporation. It takes all summer to work a vat and 25 vats produce 500 tons of soda. At Little Soda lake, F. Small is operating a small plant.

Eureka *Sentinel*: The new mill and cyanide plant at Lane City are in operation. The stamps were started Tuesday; the cyaniding branch commenced its work on Wednesday.

The Thorpe mill at Lewis has been closed down after running a month. The ore is silver and so low grade that it did not pay.

The concentrator plant of the Glasgow M. Co. at Golconda was started for a trial run this week.

Eureka *Sentinel*: The mill and cyanide plant at Lane City are in full and complete operation.

OREGON.

Three miles north of Cape Foulweather, on the ocean beach, are the placer black sand mines of B. F. Jones of Toledo. There are three claims, lying between two small creeks running across the beach. The paying sand lies in a strip three-fourths of a mile long, 300 feet wide and about 5 feet deep. The mine is operated by water brought in ditch and run through the old-fashioned sluice box. The bottom boards are from logs sawed in a line oblique to their length so as to expose a rough grain the whole length. As the sand is washed through the sluice box, the rough, fuzzy surface of the boards catches more or less of the fine, flour-like gold. There is scant water for operating the sluice, but after improvements in contemplation are made there will be an abundance. In the present poor state the claims pay good wages. The last work was done last April, when three men and team in twenty days' work, ten hours a day, washed out gold to the value of $208 and also ten ounces of platinum. The value of the platinum itself insures fair wages. Capt. Jones says the gold is given a standing of 18½ fine at the mint, where he has sent the most of that taken from the claims. Aside from this there is no belt of black sand in paying quantities on the Oregon coast north of Alsea bay.

A New York company, represented by J. Johnson, bought eight developed claims near Baker City.

W. Cable is Supt. of the Climax mine, Baker City, upon which a tunnel 400 feet in hard rock has been run.

W. J. Connors, Mgr. of the California Cable Cove, Josephine county, has his new 10-stamp mill completed.

An Eastern company is developing the Silver Gem.

At Hanover an Eastern company is developing on the Lynch Tabor properties.

Union county, it is estimated, this year will produce $2,172,000 of gold; Baker county, $2,000,000 and Grant counny, $200,000, making the total for three of Oregon's leading mining counties nearly $4,400,000, and that when full reports are in from Douglas, Jackson and Josephine counties, Oregon's gold product for '97 will reach nearly $5,000,000.

The *Observer* says the shaft on the Black Pocket near Grants Pass is 30 feet deep and has paid $100 per foot.

The Champion near Ashland has been sold to J. Woodruff of Chicago, for $10,000.

BRITISH COLUMBIA.

(Special Correspondence).—The Cariboo Gold Fields', Ltd., pipe line and elevator are in place, the drain tunnel completed and everything ready for active work next season.

The Dragon Creek M. Co. is developing a fine hydraulic property under the management of Gus Lange. The head of sluice will be on bedrock next year. Last winter the ground was prospected by drifting, exposing gravel carrying as high as 2 ounces per cubic yard.

Laird on Willow river, Hopp on Slough creek and Dow on Big Valley creek are drifting with from fourteen to twenty men each.

The drain tunnel on Hardscrabble is in 1100 feet, and Manager Fry expects to strike bedrock and pay gravel very soon. Fry, who recently bought Henry Boursin's lease on Cornish creek, has men at work sinking a shaft there.

John Pomeroy and Henry Boursin have bonded a lease on Canadian creek to John Kavanaugh for $2400.

McGregor & Thompson are drifting 2-oz. ground on Cunningham creek.

Hassock & Hansen are getting fine prospects on the property of the Devil's Lake M. Co., Ltd. They expect to strike the channel and big pay a few weeks hence.

The Oriole Syndicate, Ltd., is having a test by the cyanide process of 50 tons of ore at the Government reduction works. The Syndicate's property is on Lowhee creek.

Ogden & McKenna made an ounce per day per man shoveling in during the fall freshet on their claim at Eight-mile lake. Jacob Sherman, on the adjoining claim, has struck $5 rocker diggings, and is now running a tunnel to prospect his ground.

Barkerville, Dec. 10th, '97.

The Le Roi is now working at its fullest ca-

pacity, 245 men. Supt. Hall will raise 200 tons of ore daily. Sinking the main shaft to the 700-foot level has begun.

The mineral exports of southern Kootenay for November was $824,362, $10,000 short of October. The value of exports for the month are classified as follows: Gold, $300,514; copper, $88,454; lead, $86,719; silver, $348,675. For December the exports for the first four days aggregate 2110 tons of ore and matte, valued at $213,563.

R. J. McKenzie has taken a bond on the Enterprise, Anchor and Lake View in Long Lake camp for $50,000.

An English company has bonded the Athelton claim in Wellington camp from Mack brothers for $15,000, paying 10 per cent cash.

Number One mine on Red Mountain, Rossland camp, is sold to an English syndicate represented by A. Dick of Rossland, for $200,000. Number One is an undeveloped prospect but has a fine surface showing.

ALASKA.

In Helm bay, southeast Alaska, a stamp mill will be erected on the Gold Standard group of seventeen claims on Cleveland peninsula, sixty miles south of Fort Wrangel. The locations embrace five parallel veins.

H. G. Blackwell of Spokane, F. N. Gove and associates have bought 240 acres of placer ground on Indian creek, a tributary of Turnagain Arm inlet. The deal involves a purchase price of $100,000. It is a hydraulic placer proposition.

UTAH.

The new mill for the Last Chance, Bingham, replacing one destroyed by fire in August, is completed. J. P. Turner is Supt.

The Old Jordan and Galena, Bingham, is said to be turning out ninety tons per day, the concentrates containing 30 per cent lead, 25 per cent iron and from 7 to 10 ounces silver. A. Mayberry is the Supt.

G. S. Peyton of Salt Lake City, and Eastern associates secured control of undeveloped ground in the great Mercur gold district, being the Overland group of nine claims, all patented. Mr. Peyton immediately after the New Year will commence work with as large a force as necessary, his intention being to get the property in shape to maintain a heavy extraction for a plant to be erected in June or July. As has often been told, Mr. Peyton was the first to introduce the cyanide process in the recovery of gold in Mercur.

The West Mountain Placer M. Co. and the Watson & Chandler P. M. Co. of Bingham, Utah, have consolidated.

The Mercur *Miner* says Col. Wall has bonded the Hecla and $2000 has been paid on it.

P. and H. Morgan, stockholders of the Morgan Silver M. Co., have disposed of the bulk of their stock, which is now in control of Walker Bros. and J. J. Daly. The Morgan Co's. ground consists of ten patented claims, near Park City.

J. Y. Hale, representing Pittsburg men, has a $10,000 bond on the Golden Eagle at Albion.

A placer mining deal between E. C. Spicer and R. J. Anderson is closed. The property is on Boise river. The price is understood to be $20,000.

Tribune: The concentration of high-grade copper matte is now going on at the Hanauer smelter. There are about 400 tons of it in stock, and this will be handled at the rate of 40 tons a day.

IDAHO.

The Golden King M. Co., Elmore county, has closed a contract for a cyanide plant of fifty tons capacity. D. Reher of Mountainhome is Mgr.

Latest statistics of the Boise assay office is the report of Assayer Church for 1896, which gives the gold output of Idaho for that year at $2,323,700.

Work on the Crescent mine, at Kendrick, operated by Willis Sweet, is being pushed.

At Florence six 5-stamp mills are crushing, and arrangements are being made for putting mills on properties developed sufficiently to warrant their use.

The Banner has enough ore in sight to run their mill for three years.

The Franklin group of mines at Pine Grove, Idaho, has been sold to the Franklin G. M. Co. of Spokane for $20,000. The property embraces three claims and a mill. L. C. Barton, secretary.

MONTANA.

The Anaconda Co. is shipping 215 cars per day. About 6,000 tons is taken from the mines each twenty-four hours.

The St. Lawrence has closed for repairs. It is the intention of the Anaconda to retimber the shaft from the surface to the 1,000-foot station. This will keep the mine closed till March 10, '98.

W. A. Clark on the 13th sold his Butte property to the Colusa Parrot M. & S. Co. of Spokane for $1,000,000. Mr. Clark and his son, C. W. Clark, are stockholders in the new company. The sale includes four mines and the Butte reduction works. A. J. Johnson and A. H. Wethy of Butte and C. A. McBroom of Spokane are interested in the company.

WYOMING.

Wire gold on the Whippoorwill, at Grand Encampment, has been discovered in rose-colored quartz. The vein is 3 feet wide, in a diorite formation.

COLORADO.

The Modoc dumps sent out ten tons of screenings which from assay tests run as high as 1¼ ounces to the ton. Griswold & Co. are washing rock from the dump, and saving 200 pounds daily of clay that runs as high as $93 to the ton.

Keith & Co. made a shipment from the Homestake. A new shaft has been started and at a depth of 55 feet the vein was encountered.

The Acacia Co., crosscutting at 342 feet depth, found the vein 16 feet wide; finding no pay at the point of intersection, they are drifting for the chute.

Eldora, Boulder county, claims thirteen shipping mines.

Thorpe, Habrell & Co., of the St. Louis, Boulder county, are drifting on a 4-foot vein of sulphide ore, which averages $30 per ton. The main shaft has been sunk 170 feet. Sixteen tons returned $125 per ton in gold. This is in the Caribou silver belt. The ore on the surface was free milling sugar quartz; deeper it showed hematite, and in the lower workings sulphides of iron, with streaks of tellurium quartz.

The Dolly B., at Leadville, P. R. Connolly Supt., is a new producer.

The Lady Alice, in Adlaide Park, has resumed operations.

The Central Aspen S. M. Co. has been wound up and the New Aspen S. M. Co. Ltd., organized and the Badger group deeded to the new company.

The Denver *Republican* says that ore has been coming out of Cripple Creek the first five days of this month at a rate never equaled in the district.

S. Dyer has sold to the Dorcas Co. his Kyle and Gurley claims for $20,000, of which a cash payment of $7000 was made.

About 205 cars of ore were shipped from Ouray during November, and one car from the Bimetallist.

No department of business shows greater increase in economy and improvement of methods than mining. Herewith is a table showing cost of supplies, labor and treatment in 1870, as compared with the present time in Ward district, Boulder county:

Article.	*1870.*	*1897.*
Giant powder, per lb	$ 1 00	$ 12
Steel, per lb	40	08
Rope, per lb	60	15
Iron, per lb	25	03
Giant caps, per 100	3 00	55
Fuse, per 100 feet	3 00	55
Lumber, per 1000 feet	60 00	14 00
Candles, per box	20 00	4 00
Nails, per keg	20 00	3 00
Coal oil, per gallon	3 00	20
Wood, per cord	8 00	3 00
Picks, each	3 75	1 00
Shovels, each	2 75	1 00
Miners, per day	4 00	3 00
Teaming, per day	12 00	4 00
Stamp mill charges, per ton	5 00	2 00
Smelting charges, per ton	60 00	7 00

During all these years gold, the product, remains the same, $20.67 per ounce.

The latest dividend declared by the Portland, payable December 15th, is the twelfth this year, total amount paid stockholders $1,267,080. The total gross production of the Portland Co. for 1896 was $1,116,128.29; net earnings for that year $897,089.48. The dividend expense account for the same year was $360,000.

The Peerless, at Aguilar, has passed into the hands of the Northern Coal Co. Wm. McNeil is Supt.

The Congress, at Ouray, is shipping two cars per day.

Manager DeMasters of the Lucky Gus, at Goldfields, made a shipment of thirty tons of $75 ore.

The tonnage from the Isabella, Cripple Creek, for November, was the largest in the history of the company. A total of 1568 tons was shipped. The net smelter earnings for the month will aggregate fully $80,000, with a mine operating expense for the same period of between $21,000 and $22,000, leaving a net profit for the month of between $8000 and $9000.

Development work on the Golconda, Cripple Creek, is being pushed under the management of Supt. Argersinger.

At Aspen, for handling their low grade ores, the Mollie Gibson and Argentum-Juniata companies contemplate buying the old Holden lixiviation plant. This plant was erected in 1891 by the Holden S. & M. Co., costing $250,000. Since 1893 this plant has lain idle.

The output from the Portland, Cripple Creek, averages 60 tons per day. The big pump at the 800-foot station is raising at the rate of 625 gallons of water per minute. Sinking to the 1000-foot point has commenced.

The Strong has its ore bins full. The daily production is kept down to 100 tons. This ore without sorting is good for $50 per ton. The vein in place at 500 feet is 30 feet wide.

The Independence is sending from 50 to 60 tons per day to the smelters. There is more and better ore blocked out in Mr. Stratton's famous bonanza than at any time in its history.

NEW MEXICO.

The new mills in South Santa Fe county have started up. The new Cerrillos smelter began running Dec. 1st. Many silver-lead mines in the Cerrillos district, idle for years, are now actively worked in anticipation of this fresh demand for their ores.

The McGee M. & M. Co. started its new mill at Dolores.

Reports from Cochiti confirm the sale of the Lone Star group to W. B. McFarland and others of Chicago and the sale of the Albermarle group to O. P. Posey of Los Angeles, Cal.

The Silver City *Enterprise* reports a strike of rich gold ore near Santa Rita. Samples were assayed and gave returns of 80 ounces gold per ton. The vein lies on the southwest slope of Santa Rita mountain, a mile and a half from the Kneeling Nun.

The Crown Point tunnel, Golden Santa Fe county, is in 565 feet. C. Wegan is the manager. The lode has an 80-foot shaft.

J. C. Bender, San Pedro, sold his interest in four claims to Dr. Bailey for $5000. The mine is opened by a shaft 137 feet. One shipment gave a net profit of $28.

The Maggie G. prospect, Santa Fe county, is opening a body of gold-silver-lead ore showing a 3-foot lode.

At Allerton R. W. Woodbury has organized a company to build a 50-ton custom mill, with a capacity for enlarging to 200 tons. J. P. Whitney of Boston, the largest owner of the Cochiti grant, upon which the new mill will be situated, is a member of the company.

Marks & Luthe of Springer closed a deal with A. D. McDonald and S. D. Gardom for an interest in The Gallhale and have put on a crew. They have over 2 feet of pay ore to start on.

The *New Mexican* says the Gusdorf Bros. of Taos, in crosscutting, encountered a streak 14 inches wide that averages $100 per ton in gold. They cut through 7 feet of mineralized quartz. The quartz on either side of the rich pay streak runs from $4 to $25 per ton, and, with suitable milling facilities on the ground, the entire ledge can be treated at a profit.

On the Pinos Altos G. M. Co., Silver City, the Gillette shaft will be sunk without cessation of work until the 1,000-foot level is reached. It has reached 570 feet. At the Hearst shaft drifts are being run at the 500 level. At the Thayer drifts are being run at the 450-foot level. D. B. Gillette is the Mgr.

ARIZONA.

Work on coal properties near Benson is being pushed. P. Jensen owns a group upon which he has drifts and shafts to the extent of 600 feet.

The Old Dominion Copper M. & S. Co. has completed its shaft to a depth of 850 feet.

A large body of iron was recently encountered on the Black Copper, one of the Black Warrior Copper Co.'s group.

The Planet Saturn is putting in a stamp mill. They have a 6-foot ledge that is said to run from $10 to $14 per ton. W. A. Clark is Supt.

Reports from the Gold Cliff, at Pearce, under the superintendency of F. P. Hewett, are encouraging. The force is being increased and the cyanide plant is working constantly. Crushing machinery is being placed and the capacity of the cyanide plant increased.

The chute on the Six Mile Hill, near Tombstone, has been opened up, displaying nearly 6 feet width. Assays show returns of $300 per ton—five-eighths gold.

Five claims are being developed in Walnut Grove district, Yavapai county, by J. McNary and sons.

White Picacho Dist., Yavapai county, numbers several mines, among them one owned by G. Burnell, on which 30 inches of $280 rock is said to have been struck at a depth of 110 ft. The vein was reached by a 75-foot tunnel.

The King of Arizona mine is locally reported sold for $750,000 by Epis Randolph for Eichelberger & Duncan of Yuma. One year ago this mine was unknown.

J. I. Coleman purchased an interest in the Christmas Gift and Good Luck on Salt river. The C. G. ledge is 6½ feet wide and the ore mills from $15 to $20 per ton.

R. W. Groom has sold a half-interest in the Swansea and Jones to the Bessemer Copper M. Co. for $75,000.

According to the local papers, John W. Mackay, G. D. Roberts and J. W. Payne have bought the Grand Reef, 50 miles north of Wilcox, and bids have been let for a pipe line for reduction works. The last payment of $60,000 was made on the 16th inst.

H. J. Allen and E. W. Johnson of Jerome made entry of 320 acres in Bernalillo county, as coal land. They paid the land office $6400, at the rate of $20 per acre. They will commence development work at once and will erect an electric plant for power and lighting. The coal is at Gallup. Allen and Johnson are acting for the Arizona Copper Co. at Jerome. They say that the mines will have good machinery.

A company has been formed to operate the Guadalupe in Yuma county, thirty-five miles east of Ehrenberg. The incorporators are Chicago men. They will put in a large plant. The local office will be at Quartzite.

The report circulated that the Congress Co. contemplates closing down the cyanide plant is without foundation, says Pres. E. B. Gage.

The Gold Wave north of Congress has an owner and a Supt. of the same name, J. H. Costello.

The Anglo-Continental gold syndicate of Great Britain has instituted suit in Denver against Messrs. Bashford and Keating for $50,000 alleged damages. It is averred that the defendants "salted" the Jersey Lily group of mines in Yavapai county, A. T., thereby deceiving Expert Roepell as to their value, and on his favorable report the plaintiffs paid the defendants $25,000 for stock in the Jersey Lily Company and expended $25,000 more in developing the property and ascertaining its true value. The Jersey Lily Company, besides sueing Bashford and Keating for $50,000 damages, asks to have certain contracts entered into with the defendants declared void.

MEXICO.

E. A. Dolan says that "the Yaqui country has enough gold in it to attract a whole lot of people, but the same amount in California wouldn't take people two miles. The greatest amount that I learned of any one making while there was $2 per day, and few doing that. A great many have rushed in and located claims from which they find it difficult to wash out half a dollar a day. Naturally provisions are expensive, and the result of the average day's work won't pay for a man's living. There is some gold there, but it is exceedingly fine and is scattered over a whole lot of territory. The most of the people who are going to the Yaqui country now are either from Arizona or California, where there is ten times as much placer gold easy of access as the Yaqui river sands contain."

The Bonanza in the Sierra Pinta has been sold and first payment made.

Nogales *Vidette*: The Chucubabe, Sonora, has been paid for and a new mill erected. At 80 feet a body of gold ore was struck.

Mr. Menager of the Cerro Prieto has opened an ore body at a depth of 200 feet with a ledge varying from 5 to 12 feet. Assays averaged from $9 to $15 in gold.

Denver people have made final payment on the Chanate, near Altar.

Facts Regarding the Klondike Region.

J. D. McGillivray, of the MINING AND SCIENTIFIC PRESS, who went to the Klondike last July, sends the N. Y. *Herald* an authentic report from a practical mining man actually on the ground. He went under what was probably the highest priced contract in the history of mining correspondence, and by the terms of which he was precluded from furnishing any news for any other paper. This last is stated in answer to the many inquiries, why, among the correspondents from the Klondike for this paper, Mr. McGillivray's name has not appeared. In the issue of the *Herald* of the 8th inst. is a letter from him dated Dawson City, October 17th, which illustrates his practical way of stating the facts and which fully corroborates all that the MINING AND SCIENTIFIC PRESS has hitherto said about that much boomed, widely and wildly advertised region:

Nine out of ten of the numbers who have come to the Yukon in the rush now wish they were back home. They have learned that there are no mines for them, and that wages at $15 a day is a myth. It should be borne in mind by all who think of coming here that with all the prospecting that has been done by hundreds of experienced men during the past ten years only one discovery has been made of ground that will under present conditions pay large profits, and that is on Bonanza and its tributary, Eldorado creek. None who come here now may hope to obtain mines on these creeks, except at exorbitant prices. There have been many stampedes of late, but there have been stampedes for years along the Yukon upon the reports of rich discoveries, and all who have joined in these rushes have been disappointed with the exception of those who came to the Klondike. There has been a rush to Munook creek and locations are selling there for as much as $5000 each. This is all based on the fact that one man found a good prospect at the bottom of a shaft last spring, and the further fact that food is more accessible there than elsewhere. It is possible that Munook will turn out to be another Eldorado, but no more probable than that Coal creek, Mission creek, American, Nation, Henderson or a dozen others will turn out rich. The chances of finding another creek as rich as Eldorado are very small. One may be found—a dozen may. It is possible that another Cripple Creek will be found in Colorado, but that is no reason why all the world should rush to Colorado. There is nothing left for those who are now coming, or are here and waiting for some one to start a stampede, to do but go out prospecting or work for wages. Wages will probably be $1 an hour. If they shall be $1.50 an hour the mine owners will say that they will not employ many men. In winter men can work but seven or eight hours a day. Fifteen dollars a day has seldom been earned at wages except in a few summer claims. The only other alternative is to go out prospecting. To simply live here involves hard work. But to prospect means hardship and privation that none but the most hardy can endure. One must carry his tools, bedding, stove and food on his back over the most wretched roads, or after the winter has set in pay freight at the rate of 10 or 15 cents a pound. In summer freight is from 25 cents to $1 a pound from Dawson or Circle City or Forty Mile out to the creeks. To the prospector this is prohibitive, for to move out to one of the creeks with a small outfit takes a long time. One must build a cabin or sleep in a tent with the thermometer registering at times 70° or 80° below zero. Prospecting itself when on the ground involves much more labor for the results than in any other mining district in the world. It is seldom that the pay dirt is to be found uncovered, and shafts must be sunk to bedrock by thawing the ground with fires and digging out.

The pay channel, as it is called, is generally from 15 to 50 or 60 feet wide. In order to locate it, prospect shafts must be sunk at short distances across the valley of the creek, which may be from 100 to 1000 feet wide. A season may be lost in prospecting in one or two rows of holes. They may be sunk where there is no good pay in the creek, while rich ground may be found later a few hundred yards above or below.

In California in early days prospecting along the creeks was simple and easy. The pay was in or near the creek beds. One could follow up a stream and pan out a little here and there until he came to rich ground. To prospect miles of creeks was the work of a few days. Here it is all different. In the first place, the gold is not in the beds of the present streams nor in such bars as bordered the California creeks, but in the "till" or ground moraines of ancient glaciers left there ages before the streams began to cut their present channels, and a week's hard work is necessary to reach it through the muck and gravel that covers it. A man could prospect miles of creeks in California in those days in a week easier and more thoroughly than he could 100 yards of one of these creeks in a year.

To understand this it must be remembered that the gold of the California streams was probably first crushed and milled from the quartz veins of the Sierras by glaciers; that it was then washed by the ancient rivers with the gravel such as is found and being worked now by drifting at a depth of hundreds of feet in places under lava caps on the divides between the present rivers. Those ancient river channels were later cut into and in part washed away by modern rivers and creeks, and along them the gold has been found in their bottoms and in the bars and benches along their sides and formed by them. From these deposits more than five hundred millions of dollars in gold was taken within ten years after Marshall made his discovery in Sutter's mill race at Coloma. The quartz was crushed and the gold concentrated by the glaciers, further concentrated by the ancient rivers and still further concentrated by the modern streams.

Here it is different. Nature has had only the first of these forces at work—that of the glacier. Practically all the rich gold-bearing deposits of the Klondike district on Eldorado and Bonanza creeks are but the ground moraine of great glaciers of the ice age. In all parts of the Yukon country are to be found alluvial deposits in the shape of bars and benches, which contain gold, it is true, but so far none has been found to compare in richness with the gold-bearing deposits of Eldorado and Bonanza creeks, which have been the cause of this useless influx of thousands from the outside world. The best proof of the fact that there are already here many more persons than can hope ever to obtain claims without going far away is in the figures of the Gold Commissioner as to the number of locations that have been made. The whole length, practically, of every creek within a distance of forty miles, and in some directions more, has been located. These creeks include Eldorado, Bonanza, Hunker and other tributaries of the Klondike river, as far up as All Gold, fifty miles away; Sulphur, Dominion and Quartz, branches of Indian; Henderson, a branch of Stewart, and Bryant, Montana, Deadwood and Adams, branches of the Yukon. Yet all these locations, together with a few in the Forty Mile district, do

(*Continued on page 579.*)

Mechanical Progress.

Mechanical Loader for Wire Ropeways and Tramways.

Herewith is illustrated one of the latest patents of Mr. A. S. Hallidie of San Francisco, California, which is a device for loading the carriers of wire trams and ropeways.

Fig. 1 is a side view of the loader, showing the ore bin, the chute, the pendulum with the loading box at its lower end, and the ore carrier.

Fig. 2 is a front view of the same, showing the pendulum and the loading box swung out from its resting place, having discharged its contents into the carrier.

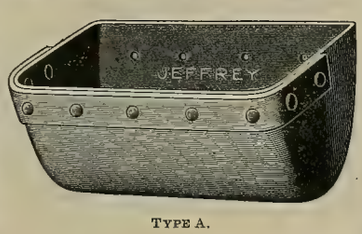
Fig. 3 is an enlarged view of the lower part of Fig. 2, in which the essential parts are shown more in detail.

The apparatus is exceedingly simple and efficient, and with the aid of one man can easily load 300 tons in twelve hours. There is nothing to get out of order and very little to wear out. It is placed in front of the ore bin and receives the ore from the chute, whence it is discharged into a loader box at the foot of the pendulum. The device consists substantially of a pendulum swinging on trunnions about 16 feet above the level of the moving cable. The pendulum is made from No. 16 sheet iron tubing 12 inches in diameter. At the lower end is attached a loading box which contains, when loaded, enough ore to fill one carrier of the ropeway. The loader box has two sides, a back and a sloping bottom. The front of the box is open. With an open front the ore dumped in would, of course, slide out immediately; but while the box is being loaded it is held between a guide and a fixed partition or bulkhead. The loader box containing the ore is thus held in a stationary position by a hooked latch, which forms part of a tripping device consisting of a lever working on a fulcrum, and will be held there until the latch is released from its keeper. The releasing of the loading box is done by the clip on the moving ropeway cable, to which the ore carrier is suspended, and which, as it moves along, strikes the end of the lever and raises the latch. This releases the loading box. At the time the loading box is released the ore carrier is immediately under the nose of the loading box, ready to receive contents. The clip on the moving cable pushes the pendulum along in the direction of the travel of the cable and out from the partition, and thus opens up the front of the loader box and lets the contents pour into the carrier. Both the loader box and ore carrier move together at the same speed for a sufficient distance to allow the ore to be discharged from the loader box into the ore carrier. The swing of the pendulum raises it sufficiently high to clear the rope clip, and the pendulum with its loader box swings back in between the guide and the bulkhead, ready to receive another load of ore from the ore bin.

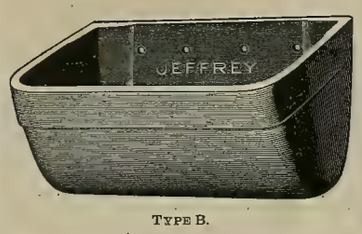
The loader is manufactured by the California Wire Works, whose office is at 330 Market street, San Francisco, California.

Malleable Iron Buckets.

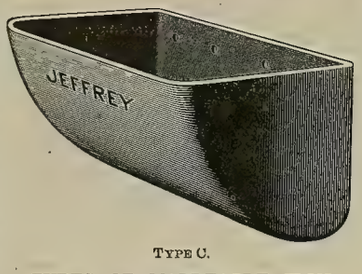
On this page are illustrated several of the various iron buckets manufactured by the Jeffrey Manufacturing Company of Columbus, Ohio, with branch at Denver, Colorado. These types were brought out to meet the special requirements in concentrating and stamping works, and are used in a number of up-to-date plants. Type A shows the standard malleable bucket with renewable steel bands. Type B, special bucket with reinforced heavy front edge and back. Type C, large body bucket. The "A" renewable steel band bucket has found favor in the hands of practical men, for the reason that when the steel band becomes worn it can be replaced. Style "B" bucket is an extra heavy pattern, and in the handling of ores where the water is bad this pattern has been found to wear evenly. Style "C" bucket was specially gotten up for handling water in connection with ores, and is of a shape to insure a large capacity.



TYPE A.



TYPE B.



TYPE C.

TYPES OF MALLEABLE IRON BUCKETS.

These buckets are carried in stock by the Jeffrey Manufacturing Company, who are in position to fill orders promptly. They also manufacture to order buckets of other types, and will quote prices on any special forms.

American Ingenuity.

Recently a French officer of engineers was shown through a large machine shop in Philadelphia, and his attention was called to the great traveling cranes, the enormous planing machines, the big lathes and other large tools; but the visitor appeared to be quite unimpressed and very taciturn. This was attributed partly to the fact that, although he understood what was said to him fairly well, he could speak English only with difficulty. He appeared to be unobservant of the large tools, but was greatly interested in a small, insignificant looking machine used for sharpening the little cutting tools belonging to the big lathes and planing machines. When he had completed his tour of the works and was about to depart he delivered an interesting little speech, of which the following is the substance:

"I have been in America six months, and have visited the mines and manufacturing establishments in the East, West, North and South. I have seen the most gigantic engineering operations and the most powerful machinery in the world; but I shall report to my Government that the biggest things in America are the little things. * * * The French people are experts in domestic economy, and live comfortably by saving what your average families throw away. But Americans are, on the other hand, experts in industrial economy. You make money by saving wastage in business, and you lose some of it by wastage in your domestic economy. The attention paid to small details in your big works is amazing to me; I have visited some establishments where I believe that the profits are made not in the manufacture proper, but in the saving of materials and labor by close attention to details that are with us unconsidered trifles. For example, I saw in your shops just now a little grindstone in operation automatically sharpening lathe and planer tools. This machine costs, probably, as much as a hundred of our ordinary grindstones cost; but I see that it automatically grinds all the tools for 300 high-priced mechanics, and it only works a few hours each day. The skilled mechanics in our country frequently stop their regular work to grind their own tools, and then they do it imperfectly. Your tools are all accurately ground to the best shape by the machines, so that they do more and better work on this account in a given time. I believe that that machine has brains—the brains of the inventor—and it has no doubt revolutionized work of this kind in American machine shops. This is but one case out of many that I have noted."

This visitor was more observant than he appeared to be; for he correctly defined a peculiar characteristic of American inventive genius. The great engineering undertakings, the immense manufacturing establishments and the leviathan machinery are, of course, most conspicuous and impressive; but these big things are comparatively few in number, while the novel improvements in little things—usually classed as "Yankee notions"—are legion, and each one contributes its mite toward the general sum of prosperity of the business of the country.

There is a large tin can manufactory in this city, where cans for holding coal oil are made by automatic machinery. Even the soldering is performed without the aid of human hands. Formerly a small globule of solder collected at each corner of the cans. A "wiper" was devised for removing this drop, and the saving in solder thus effected amounted to a large sum annually. At the great beef-packing establishments not a hair nor a hoof nor a drop of blood is wasted, and Mr. Armour has stated that his fortune was made not in the profits on the sale of meat, but in the saving of parts of the animals that are always thrown away by the ordinary country butcher.

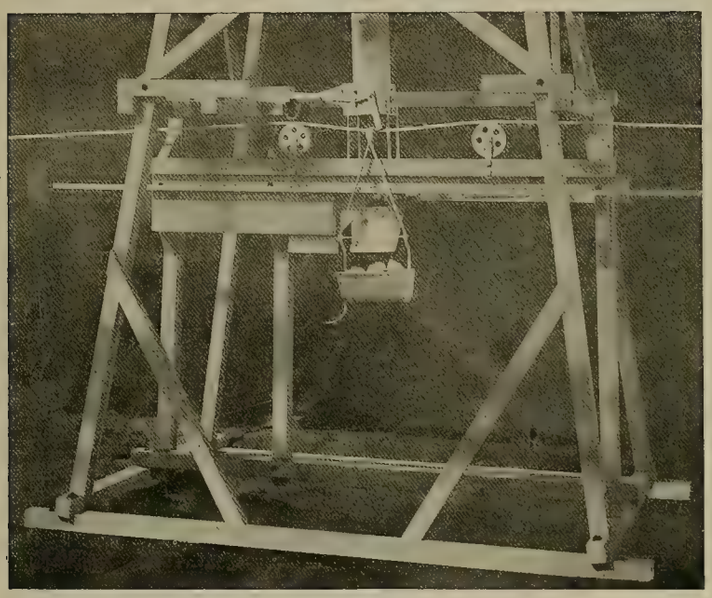


FIG. 1.

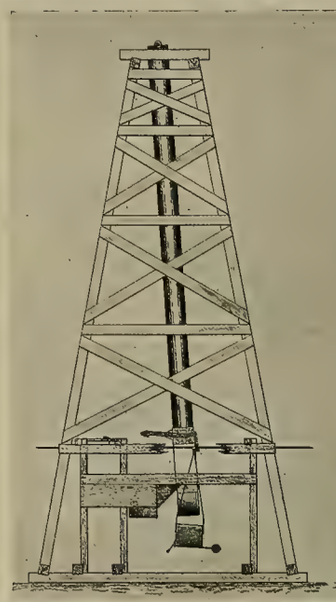


FIG. 2.

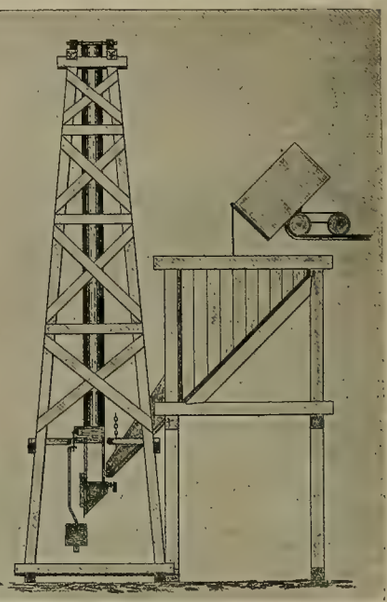


FIG. 3.

MECHANICAL LOADER FOR WIRE ROPEWAYS AND TRAMWAYS.

Scientific Progress.

Working Cost of Some Witwatersrand (S. A.) Mines in 1897.

Fischer Wilkinson furnishes the following table showing the working costs of some Witwatersrand mines in 1897:

Stamps.	Cost per Ton.* s. d.	Value of Yield. s. d.	Profit per Ton. s. d.
30	22 5	33 1	10 8
40	21 5	38 5	17 0
40	32 8	40 1	7 5
50	33 11	71 6	38 7
60	23 1	27 3	4 2
70	22 6	45 4	22 10
100	23 3	38 8	15 5
120	19 2	38 4	19 2

*Cost of working per ton milled, including mining, milling, development, cyaniding and general charges, but exclusive of depreciation of plant.

He says: How long the mines will last, whether the large population supported by them will be transient or permanent, are important questions, the answer to which must have a direct influence on the legislation of the Government, on the scale of construction of public works, on the in-

vestment of private capital. For the purpose of showing the great possibilities of these gold fields, I have taken into calculation the twenty-seven and one-half miles of reef which I have analyzed above. The data assumed are:

1.—Depth of mining, 5000 feet vertical.

2.—Length of reef on dip, 10,000 feet, on a basis of the Bezuidenville and Rand Victoria's borehole sections.

3.—One ton—12 cubic feet.

4.—Average thickness of reef milled, allowing for waste, 4 feet. This figure is probably the most liable to error, as the thickness that it will pay to mine depends on that uncertain quantity, the cost of working.

The following shows the valuation of the section of main reef, New Blue Sky to Banket, to 5000 feet vertical: Section A—Crown Reef-Wemmer; B—Henry Nourse-New Heriot; C—Banket-Durban Roodepoort; D—Salisbury-George Goch; E—Paarl-Langlaagte Estate; F—Jumpers-New Blue Sky; G—Kimberley Roodepoort-United Langlaagte.

	1	2	3	4	5	6
	FEET.	Million tons.....	Shillings.....	Million £.....	Million £.....	Million £.....
A	11,200	37	70	129	83	92
B	8,200	27	55	74	40	47
C	12,500	42	45	94	42	52
D, E, F	72,550	242	35	423	121	181
G	41,300	138	25	172	.....	34
	145,750	486	36.8	892	286	406

1. Approximate outcrop distance in feet.
2. Million tons to 5000 vertical feet.
3. Estimated value per ton, in shillings (yield).
4. Gross value in million pounds sterling.
5. Profits with working cost at 25s per ton in millions of pounds.
6. Profits with working cost at 20s per ton in millions of pounds.

It may be useful for reference if I give similar estimates which have been made from time to time:

	Year.	Greatest Vertical Depth in Feet.	Million Pounds.	Miles Outcrop.
Hamilton Smith.	1893	3000-3500	325	11¼
Schmeisser	1893	3900	350	11¼
Hatch & Chalmers.	1895	5000	592	27
Becker	1896	5000	700	20
Hays Hammond	1895	5000	9	...*

* Per one mile outcrop 1000 feet depth.

SAN FRANCISCO has just put in successful operation a garbage crematory, in which is incinerated the garbage and daily refuse of the city. The garbage of a great city is worth a fortune every year, if properly utilized. It is placed in vertical cylinders, surrounded by steam jackets, which evaporate the 75 to 80 per cent of water in the garbage. The fatty substances are dissolved, and, as a result of a number of processes, a fertilizer is produced worth from $9 to $12 per ton. One of the purest and best soaps of the country was made of garbage grease before cotton seed oil entered the field. It is now proposed to light London by electricity for nothing. It now costs that city $1.12 (4s. 8d.) to get rid of a ton of garbage. A combination of boilers and other apparatus has been devised that can burn the garbage at 24 cents (1s.) per ton, and generate steam sufficient to run dynamos to light the entire city. London can thus save 3s. 8d. on each ton, and, in addition, illuminate the city without cost. Garbage, by a machine called the "dust destructor," is converted into clinkers, which can be used for roadways, as artificial stone for sidewalks, and as sand for mortar and cement. In Paris the invisible particles of iron worn from the shoes of horses are rescued by passing powerful magnets through the sweepings.

Origin of Petroleum.

The current number of the *Zeitschrift fur anorganische Chemie* contains a review of the recent work on the genesis of petroleum and other natural hydrocarbons. Engler's hypothesis is that petroleum is formed by the distillation of animal fats at high pressure. Lobry du Bruyn has described a demonstration of this method of formation as a simple laboratory experiment. Heusler calls attention to the fact that Engler's distillate contains a considerable quantity of unsaturated hydrocarbons, which is not the case with petroleum. By treatment with aluminum chloride these hydrocarbons are changed into a high-boiling lubricating oil; hence it is probable that petroleum formation took place in two stages, the first distillate being changed by metallic chlorides into petroleum. According to Ochsenius, petroleum was formed from plant and animal remains by heat and pressure under the influence of the salts derived from sea water. On the other hand, Moissan finds in his work on the metallic carbides, a confirmation of the theory first proposed by Mendeleef—that petroleum originates from the action of water on metallic carbides in the interior of the earth. Uranium carbide, for example, yields with water both solid and liquid hydrocarbons. These are, indeed, in part unsaturated, but at a higher temperature saturated hydrocarbons might be formed from them by the action of hydrogen, which is often evolved from carbides by water. Aluminum carbide and glucinum carbide give with water pure methane (marsh gas). D. Holde claims that the theory that petroleum has originated from animal remains should be known as the Engler-Hofer theory, Hofer having first proposed the theory in 1888 in his "Das Erdol und seine Verwandte," and Engler having by his experiments shown that petroleum can be thus formed. Moissan, in the *Comptes Rendus*, states it as his opinion that, according to its geological relations, the formation of petroleum is to be ascribed to three different causes: (1) The decomposition of organic substances under the influence of pressure and heat; (2) the purely inorganic reaction between water and the metallic carbides; (3) volcanic processes. In many localities it is possible that all three of these factors may have contributed to the formation of petroleum.

THE correct altitude of Mt. Rainier, Wash., is 14,519 feet above sea level.

Electrical Progress.

Great Fall Not Always Necessary.

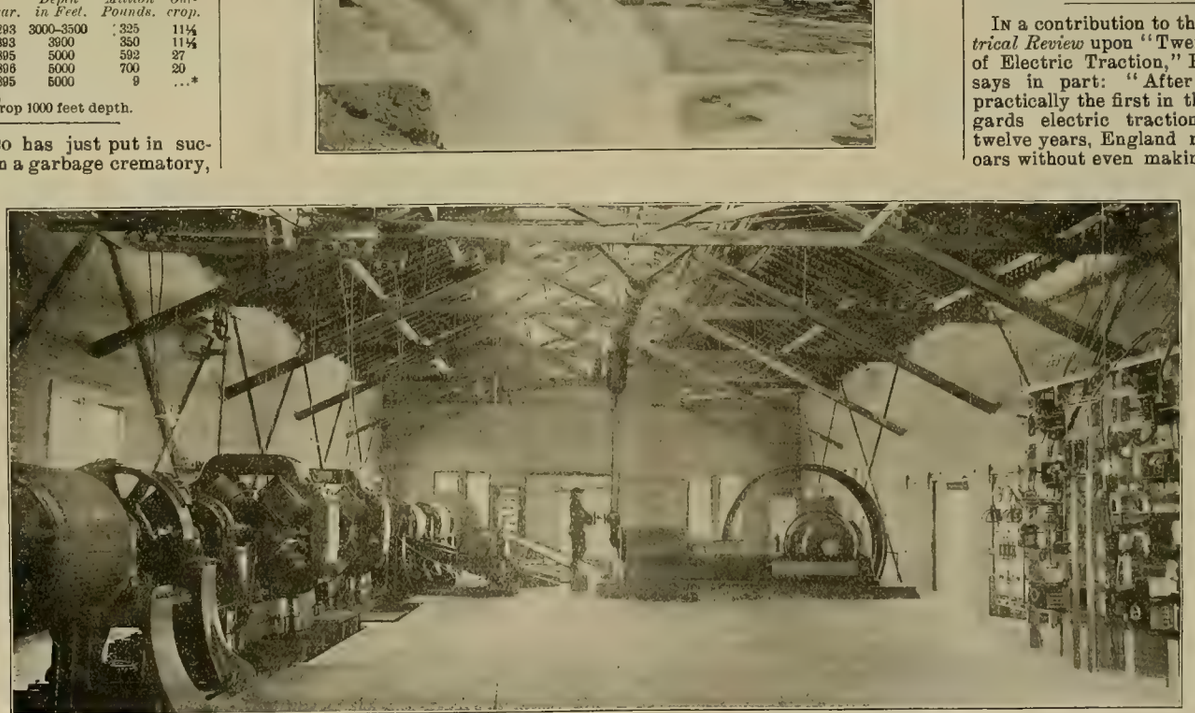
California is pre-eminently the region for success in long distance electrical transmission of power. The water flowing from the Sierras and Coast

borough river, Florida, by the Consumers' Electric Light and Street Railway Company of Tampa, which shows what can be done by good engineering and business sagacity in a level country where natural water power is wanting. This is not only a water power but also a steam power plant. The owners decided not to dispose of the steam plant, but install it in connection with the turbine plant, to be used when water is low and in any other contingency. The station is located six miles above Tampa. The weir dam, shown in the smaller illustration, is constructed of solid masonry. The flumes occupy a space 110 feet long, 24 feet wide and 30 feet high from the base, the weir, 19½ feet high, being joined to the flumes.

Two pairs of horizontal water wheels are installed in the flumes. Two pairs are used for operating the dynamos furnishing power for the street railway and two drive the dynamos furnishing light and power for general use. Each set of turbines is belted to a jackshaft in the power station, 35 feet from the turbine shafting. Clutch pulleys couple the dynamos to the jackshaft on either end, two 30 K.W. alternators for lighting and power to one shaft and two 200 K. W. generators for railway current to the other. The four pairs of wheels develop 1500 H. P. Eight miles is the longest transmission.

CONSIDERABLE progress is being made in Central and South America, with water power for the generation of electricity. Coal is scare and dear, but water is cheap and plenty. In Mexico the Pueblo Lighting Company transmits 965-horse power nine miles into the city; at Pachuca 3300-horse power is sent sixteen miles; the San Rafael Paper Mills have 750-horse power; the Mazipal Copper Company of Conception del Oro has a 400-horse power plant; an 800-horse power plant is to convey power eight miles for the Jalapa Light Company, and San Miguel and Chihuahua are supplied in like manner. In Argentina 5000-horse power is conveyed sixteen miles to Cordova; at Lima, Peru, 150-horse power is sent five miles; and Escuintla (Guatemala), San Salvador (Salvador), San Christobal (Venezuela), and San Gil (Colombia), are all supplied with electricity by water power.

IN a contribution to the London *Electrical Review* upon "Twenty-five Years of Electric Traction," Philip Dawson says in part: "After having been practically the first in the field, as regards electric traction, for nearly twelve years, England rested on her oars without even making an attempt to find out what was being done in America and on the Continent of Europe, or to profit by the experience of others. The American manufacturers soon realized the fact that England would shortly be a fine field, and they therefore took every conceivable trouble to educate tramway companies, engineers and corporations, and with



NEW WATER POWER ELECTRIC STATION NEAR TAMPA, FLORIDA.

such success that now, when at last we have overcome the bugbear of esthetic objections, and when nearly all tramway companies and corporations are going in at once for electricity for their whole systems, there is not one English manufacturer who is able to compete in price or quality with American made goods. No corporation or tramway company can possibly afford to put in experimental work, or to allow contractors who have not done good work before to gain their experience at the expense of tramway owners, or those who are going to work the line and wish to make it a financial success."

AN Italian scientist, Francesco de Vita, has succeeded in making an electric glow lamp in which the filament consists of a very thin platinum wire coated with a layer of some incandescent compound, the nature of which is not yet made known. The filament works well in air, but best in a closed bulb containing dry air. If the bulb contain air the light is a pure white; if it contain other gases the light assumes different colors according to the gas employed. Instead of 2½ to 3½ or 4 watts per candle per hour it is said this lamp used, during an uninterrupted experiment of 480 hours, from 0.41 at first to 0.435 at the end of the experiment; and at the end of this period no change in the filament could be discovered by the microscope.

HIRAM S. MAXIM says of his new electric lamp that he has been attempting to produce a lamp in which a very high resistance might be obtained with a short and thick filament; also to produce a filament which will stand a higher temperature than those ordinarily used, as it is well known that a slight rise in the temperature greatly augments the light given in proportion to the current used. The preparation, however, of the carbon and other materials which form the filament requires a very expensive apparatus, but the cost of the finished filament—excepting first cost of plant—is no greater than with the ordinary lamps.

THE value of the exports of electrical apparatus from this country has amounted in a little more than half a year to over $2,000,000, which represents a gain of about $500,000 over the corresponding period last year. Noteworthy as this improvement has been, it is likely to be small in comparison with the increase which will be seen before another year has elapsed, as the demand for American electrical supplies is apparently growing stronger than ever. And since most of the exports are patented articles, it is fairly sure that the business, whatever measure of growth it may attain, will be a permanent one.

PRACTICAL electricians are inclined to doubt the commercial value of the wireless telegraphic experiments of Marconi and Tesla. What possibilities may develop themselves in this field can only be left to conjecture and the unfolding of the future, but it seems reasonable to predict that the systems recently and widely discussed will be found to have more interest than utility. In a system of telegraphy, speed, simplicity and solidity of the apparatus employed must be united with secrecy and certainty. These requisites are indispensable for either civil or military uses.

SILICON CARBIDE has found a new use. Mixed with about nine times its weight of pure carbon, it is made up into carbons for the electric arc. It resists oxidation better than any substance known, and when hot it gives out a very bright light. It could not be used alone for the purpose, for by itself it is a non-conductor of electricity; but mixed with carbon it is said to serve exceedingly well.

THE Yuba City, Cal., Board of Supervisors have granted to John Martin a franchise to erect poles and wires throughout the county, to conduct electricity for lighting and power purposes. The power is to be generated at the plant on the Yuba river.

The Golden Jubilee Mining Fair.

E. H. Benjamin, Mgr. Mining Dept. Golden Jubilee Mining Fair which opens in San Francisco Jan. 29, 1898, in an interview last Thursday said:

The Miners' Fair, which will open upon the close of the Golden Jubilee at the Mechanics' Pavilion, will be one of the most interesting and instructive exhibits that has ever been shown in this State. If the plans in contemplation by the committee at the present time are carried out, and I have no doubt they will be, there will be practical illustrations of hydraulic, drift gravel and quartz mining. Several quartz mills will be in operation; compressed air drills and compressed air machinery, as well as electrical appliances, will all be shown in detail.

There will be a spectacular exhibit of hydraulic mining that will convey an accurate idea of this great industry that is at the present time laboring under difficulties in California. It will show a section of the great North Bloomfield mine in Nevada county, with two large giants in operation, and also will show a hydraulic elevator in operation on a large scale. Sluice boxes and undercurrents will be introduced to show the methods of saving gold in this class of mining. Nearly all of the prominent mining machinery men in San Francisco will have working exhibits in place. As far as the counties are concerned, but little information is at hand regarding their intention, but I have no doubt that liberal displays will be made of ore and mining appliances. Calaveras county will be ably represented, as will also be El Dorado, Butte and Nevada counties. It is the intention of the committee to make this fair a great instruction as to our methods of mining, and to give the public some faint idea of the magnitude of our mining region and the facilities it will afford to miners or prospectors who will engage in mining in a legitimate way.

Recent California Mining Incorporations.

Gold Home M. Co., San Francisco; capital stock $500,000, subscribed $25; A. S. Tuchler, J. C. Stinson, J. B. Stetson, L. T. Haskell, M. J. Waldheimer.

Mars G. & S. M. Co., San Francisco; capital stock $500,000, subscribed $257,495; A. J. Bailey, W. M. Sullivan, A. L. Emery, W. T. Shurtleff, T. H. Lawler.

Gold Hill M. & M. Co., Riverside; capital stock $300,000, all subscribed; M. W. Clay, D. T. Jackson, I. A. Witherspoon, E. H. Grunwell, I. S. Logan.

Pinami M. Co., Los Angeles; capital stock $200,000, subscribed $6000; A. B. Dresser, M. Zernetti, E. E. Lefebore, W. Declez, D. P. Stone.

Yaqui E. & M. Co., San Francisco; capital stock $100,000, subscribed $25; J. H. Culver, G. Holz, B. Wentworth, C. D. Rogers, B. F. Hook.

Jupiter Con. Gravel M. Co., Auburn; capital stock $100,000, subscribed $25; R. F. Rooney, C. A. Wikman, W. S. Graham, T. J. Nichols, B. B. Dening.

Mayflower M. Co., San Francisco; capital stock, $1,000,000; subscribed, $250; C. A. Malm, W. E. Shepman, J. B. Duggan, J. Zederman, A. H. Winn.

Recently Declared Mining Dividends.

Bunker Hill and Sullivan M. Co., Idaho, 5 cents per share, $15,000; Dec. 4th.

Holy Terror M. Co., South Dakota, 3 cents per share, $9000; Dec. 9th.

Utah M. Co., Utah, 1 cent per share, $1000; Dec. 23d.

Mercur, Utah, 18 cents per share, $36,000; payable Dec. 20.

South Swansea, Utah, 5 cents per share, $7500; payable Dec. 21.

Chloride Point, Utah, 1 per cent, $5000; payable Dec. 24.

Champion, Nevada Co., Cal., 44th dividend, 25 cents, $8500; payable Dec. 21st.

The El Paso G. M. Co., Colo., 1 cent per share; payable Dec. 10th; total amount thus disbursed, $5,402.50.

Elkton Con., Colo., 2 cents per share; payable Dec. 20.

Reco, Slocan, B. C., $100,000; Jan. 1st. This is the Reco's second dividend within a year, making a total of $287,500.

Idaho, Slocan, B. C., $30,000; payable immediately. Total to date, $240,000.

Coast Industrial Notes.

—Engineer Storey says that the Valley road will reach the Kern river by Jan. 1, '98.

—The Mexican Minister of Finance has been authorized to issue a new series of 5% silver bonds of the interior debt to the amount of $20,000,000, making the total authorization $60,000,000.

—At the meeting of the California State Fruit Growers' Convention, held in Sacramento last month, a committee of fifty was appointed to solicit subscriptions to a fund of $10,000 to advertise California fruit products in European markets.

—To avoid the necessity of maintaining a ferry across the Columbia river at Kalama, Wash., the N. P. R. Co. will build up the north side of the Columbia from Kalama to Vancouver, cross the river by a bridge at the latter place and enter Portland over the O. R. & N. Co.'s track.

—Sulphur deposits owned by the Mexican Sulphur Company on the Colorado river below Yuma, Arizona, are to be developed, and a railroad is to be constructed from the mines to the Colorado river. According to the Yuma *Sun*, as soon as the shipment of sulphur in large quantities begins the company will charter ocean steamers and ship by the gulf route.

—The amount of mortgages canceled in fourteen counties of Oregon the past year is as follows: Marion, $546,763; Linn, $489,000; Umatilla, $450,000; Washington, $240,000; Union, $235,405; Lane, $201,540; Douglas, $137,680; Benton, $79,528; Jackson, $73,857; Crook, $65,477; Malheur, $61,044; Wallowa, $25,600; Morrow, $12,446; Clatsop, $10,000; total, $2,628,342.

—An agreement has been signed by President Asana of the Japanese Steamship Company, Toyo Kaisha, and S. P. Schwerin, representing the Pacific Mail and the Occidental and Oriental Companies. An agreement has been entered into by the steamship lines named whereby the steamers of the Toyo Kisson Kaisha Line will be put on between Yokohama and San Francisco early in 1898. President Asana was in San Francisco not long ago in the interest of his company. When he returned to Japan there was considerable doubt as to whether he would have his steamships touch the port of San Francisco. This sets the matter at rest and insures for this city a more frequent service between San Francisco and the Orient.

—Relative to the report that machinery would be admitted into Russia free of duty after January 1, 1898, it is to be said that there will be no change in the existing rates. The duty is 2 roubles 10 kopecks per poud. The Russian poud is 36 pounds. A rouble is 50 cents of our money, and there are 100 kopecks in the rouble. The duty is equivalent to $1.05 for 36 pounds, or nearly 3 cents per pound. Our manufacturers might infer from this that they could not get into that market. This is not the case, as large amounts of American and German machinery are now going into Russia. It would pay our manufacturers in all lines to investigate that market, as there is a great development now in progress, and for the future in Russia. The high duties enable the few manufacturers there to ask enormous prices, and get them.

—A gentleman who has recently made some minute inquiries into the life of the coolie classes of Japan has furnished to the *Osaka Mainichi* the results of his investigations of the earnings and expenses of 100 laborers and their families. He finds that the average daily expenses per family amount to 46 8 sen (about 23 cents), made up as follows: House rent, 5.5 sen; rice, 24.5; other food, 5.5; firewood and charcoal, 2.7; clothes and utensils, 2.6; bath, 2.0; sundry expenses, 4.0; total daily expenses, 46.8 sen. The average earnings of the head of a family are 10.50 yen ($5.25) per month, or 35 sen (17½ cents) per day. This would show that the family expenses exceed the earnings of the man by 11.8 sen per day; but this investigator found that other members of the family earn an average of 18.8 sen per day, giving a total of nearly 54 sen per day. This leaves a margin of about 7 sen, or 3½ cents, per day to cover any other expenses.

—The Southern Pacific Company has advanced its freight tariff on some west-bound commodities. The new rates to California terminal points on some items, as compared with the prevailing rates, are as follows:

COMMODITIES.	*From New York by Sunset Gulf Line, and from Chicago*		*From New York by the All-Rail Route*	
	New Rate.	*Old Rate.*	*New Rate.*	*Old Rate.*
Cast and wrought iron pipe.	66	50	75	50
Brass goods, including butts, bolts and castings	85	75	85	75
Roofing composition	75	65	85	75
Iron, including boiler and plate iron, butts and hinges	66	60	75	75
Iron rivets	66	50	75	75
Bailing ties	66	50	75	75
Quicksilver flasks	66	60	75	75
Nails and spikes	66	50	75	75
Barbed and fence wire	66	50	75	75

The rates quoted are in cents per 100 pound on carload lots only.

—The Peruvian Government has decided to establish a permanent exposition for all classes of manufactured articles in the lines of machinery, giving preference to such as are mostly used in Peru, viz., agricultural implements, mining machinery, electrical appliances of every description, and apparatus for labor-saving machinery. This is done as a means to increase trade in the machinery and kindred lines with manufacturing countries. The Peruvian Government has never before given such inducements to foster trade, and the facilities offered to American manufacturers are advantageous. The exposition was opened on the 9th inst., at Lima. All exhibits are exempt from custom house duties as well as from consular fees. Exhibitors will have the option to show their wares for a period of six months; should longer time be required, arrangements may be made by applying to the officials in charge. The Bureau reports the recent discovery of gold fields in the eastern part of Peru, which are richer than any hitherto found in that country, already noted for its wealth in precious metals. The Departments of Cuzco and Puno, in which are located the fields, are reached by railroad from the Pacific port of Mollendo. A railroad is already in operation from that point to the Department of Puno. At present the journey from Puno to Cuzco is made on muleback, but it is stated a projected line will shortly complete the railroad connection.

—Professor Frank Soule of the civil engineering department of the Berkeley, Cal., University has completed a series of tests undertaken to ascertain the strength of California marble. He found that the product of this State compares very favorably with the best in the country. The strongest found in California was from Mount Slover, San Bernardino county. A 3-inch cube of marble sent by George A. Moore from quarries near Colton, San Bernardino county, was placed between the steel pistons of a rock-testing machine and subjected to a pressure of 118,800 pounds, at which point it crumbled. This shows that the marble can resist a pressure of 13,200 pounds to the square inch. A second cube of Colton marble crumbled at 9350 pounds pressure to the square inch. The most remarkable marble tested was a cube of white dolomite from the Inyo quarries, from which it is proposed to build the San Francisco postoffice. The rock did not crumble until a pressure of 30,500 pounds to the square inch was exerted. Scarcely anywhere else in the world is marble of such strength to be found. Its great density makes it proof against fire, frost and water. "The University of California is anxious to assist new industries," said Prof. Soule. "Any one who contemplates opening a new quarry can have the rock tested free of charge if he will send six dressed cubes of the rock, three inches on the edge, to my care, freight charges prepaid. The university asks a fee sufficient to cover expenses if the enterprise is already commercially established. We are now experimenting on the strength of rocks, piles, structural iron and other building materials."

Personal.

D. B. GILLETTE is in Santa Rita, New Mexico.

E. BIND, Placerville, Cal., is in San Francisco.

H. A. KELLER has returned from Butte, Montana.

J. M. THOMAS is Supt. of the Oak group, Mercur, Utah.

J. P. TURNER is Supt. of the Last Chance, Bingham, Utah.

J. K. HARRISON is Supt. of the British Columbia, at Grand Forks, B. C.

CAPT. G. H. NIHELL, from Nevada City, Cal., is visiting San Francisco.

A. TRITTENBACH, Supt. Dutch mine, Tuolumne Co., Cal., is in San Francisco.

H. E. ARMITAGE has resigned as Supt. of the Sun Dance, in Yavapai Co., Arizona.

T. GEDDES, Mgr. of the Swansea at Tintic, Utah, has returned from Denver.

W. F. ENGLEBRIGHT, M. E., of Nevada City, Cal., was in San Francisco this week.

H. E. WINSLOW is Supt. of the Colorado and Idaho M. & M. Co., at Centerville, Idaho.

ALEX MCCLURG is the Mgr. for the new company of the Flourine, Cripple Creek, Colo.

E. V. ZUMBIEL succeeds Mr. Zeek as Supt. of the Red Hill M. & M. Co., Jackson, Cal.

H. L. CURTIS succeeds Dr. Woodruff as Mgr. of the Northern Light, Mercur, Utah.

R. V. HOLTON, Supt. of the Ormonde, Washington, Nevada Co., Cal., is in San Francisco.

J. S. GOODWIN of You Bet, Cal., made his annual visit to San Francisco during the week.

MGR. T. F. BRUBACK of the Bingham, Utah, Placer M. Co., returns from London next week.

OTTO STAHLMEYER is superintending trial operations at Golconda, Nev., for the Glasgow M. Co.

A. B. BELL of Nevada City, Cal., has taken charge of the Ray mine, near Grants Pass, Oregon.

L. REEL has been appointed Supt. Bloss & McCleary hydraulic mine, at Trinity Center, Cal.

E. W. CHAPMAN, El Dorado, and I. N. Chapman, Oakland, were in Tuolumne Co., Cal., last week.

G. W. STARR is expected to arrive at his home in Grass Valley, Cal., from South Africa next month.

CY MULKEY, Mgr. of the Mulkey & Spreckels mine, El Dorado Co., Cal., left this week for the mine.

W. J. ELMENDORF of Denver is the new superintendent of the Geyser mine, Silver Cliff, Colo.

J. H. MARCOM, superintendent the Colorado Iron Works, has returned from Salt Lake City to Denver.

ALEX MCDONALD of Oakland is slated for

the superintendency of the Zantgraf, in El Dorado Co., Cal.

MR. COLEMAN of California succeeds L. Lindsay as Supt. of the Santa Rosalia, Nogales, Arizona.

SYDNEY SMITH of San Francisco is in Nevada City, Cal., to start work on his Bismarck and Gladstone lodes.

W. J. NELSON succeeds O. B. Hardy as superintendent of the Boston-Nevada smelter at Mason Valley, Nev.

H. E. PICKET, manager and part owner Grand Victory, Placerville, Cal., has again assumed personal charge.

CHAS. BUTTERS is about to return from South Africa and is expected in San Francisco shortly after the first of the year.

L. MOORE of Cincinnati, Ohio, Pres. of the Pend d'Oreille G. M. & M. Co., is on his annual visit to Spokane, Wash.

J. R. NUTTALL, Pres. of the W. Y. O. D., at Grass Valley, Cal., returned to San Francisco from the mine last Tuesday.

CECIL C. MORGAN is on his way to Europe to consult with his company concerning the turquoise mines in New Mexico.

GEO. W. DICKIE of the Union Iron Works has been elected vice-president of the American Society of Mechanical Engineers.

J. PARKER WHITNEY of Boston, Pres. of the Santa Rita Copper and Iron Co., New Mexico, has arrived in San Francisco.

GEO. MAINHART, Supt. Omaha Con., Grass Valley, Cal., attended a meeting of his company in San Francisco last Monday.

E. H. AIRIS of the Mercur, Geyser-Marion and Northern Light, bought a one-sixth interest in the Snowstorm, Mercur, Utah.

H. WILSON, Mgr. of the Silverton, Colo., smelter, has gone to Tasmania, where he will direct the construction of a pyritic smelter.

GEO. MAYNARD, who was here with J. W. Mackay and party, has returned to New York. A property near Wilcox, Arizona, was bought.

W. K. MEADE, outgoing U. S. Marshal of Arizona, left San Francisco last Wednesday with four California miners for Stewart river, Alaska.

W. C. HUNTON, who has been superintending mining properties in the Province of San Juan, Argentine Republic, has returned to California in ill health..

HAMILTON SMITH is now credited with intention to traverse the Klondike with powers plenipotentiary from "a British-American purchasing syndicate."

E. H. BENJAMIN of Oakland has been appointed Superintendent of Mining Exhibits at the Golden Jubilee Mining Fair, and L. W. Buckley, Manager of Special Exhibits, as assistant to General Superintendent Gilmour.

AUGUSTUS J. BOWIE of San Francisco left here July 28th, 1897, en route for the Klondike. Mr. Bowie is credited with being paid a fee of $25,000 by James R. Keene and others of New York City to expert and report on that region. Mr. Bowie writes from Dawson City, under date of October 3rd, describing the raid on the steamer Bella at Circle City on September 25th, when she was boarded and taken possession of by fifty armed men, who demanded all her stores and supplies for the starving people at Circle City, about 188 miners. There were thirty passengers on board, including Captain Ray, U. S. A., who addressed the men, but without success. They took thirty tons of provisions. Mr. Bowie says when the steamer arrived at Fort Cudahy "rumors came thick and fast about starvation in Dawson City and the terrible condition of affairs throughout the country. The ice was forming rapidly in the Yukon, and it looked as though the steamer would be unable to face the floating masses as they came down the stream. September 30th, although partially frozen in, the steamer started for Dawson City, fifty-three miles away, where she arrived at half-past 5 o'clock that evening. A more God-forsaken place you never saw. The town lies on a flat on the east side of the river, immediately back of which are hills about 500 feet high. The river is about three-eighths of a mile wide, and is, I should judge, quite deep. The elevation above sea level is approximately 1000 feet. Where the town is located must have been an old moose swamp. During the summer time it is undoubtedly a regular quagmire. There are fully 500 loafers in town, who won't work and expect to be fed, and there is no food to feed them with. The police won't arrest them, because they haven't any food with which to feed them. Everything is frozen except the whisky, and there seems to be an unlimited supply of that article at 50 cents a drink, or $10 per bottle. Champagne is $36 per bottle, and I suppose other beverages are at corresponding figures. Five-cent cigars cost 50 cents each, and flour, outside of the company's contracts, $125 for a fifty-pound sack; candles, $1 apiece. Seventy-five dollars is paid for a five-gallon can of coal oil. In fact, none is for sale. Sugar is 30 cents and tea $1 a pound; coffee, $1 a pound, and not fit for dogs. Ordinary dog meat, which means dried fish, $1 a pound. No man works for less than $15 for nine hours, and confers a very great favor upon you even at that rate. Cordwood, sawed and split, is $50 a cord in the yard. Can't say what it will be before this winter is over. Cooking stoves are not to be had for love or money. Some sheet iron ones can be obtained at a cost ranging from $75 to $100. There is one tinner in town working five men, and his orders are thirty days ahead. Sawed lumber of the poorest quality sells, when you can get it, for $160 for 1000 feet, and flooring is 20 cents a foot. The restaurants are all closed because they cannot buy supplies; bakeries closed because there is no flour to be obtained. There is no hotel and there are no lodging houses. What in the world these people are going to do before the season is over I cannot say. Every building on the main street is either a saloon with a gambling outfit or a dance house. There are only two stores, which belong to the companies, respectively, the Alaska Commercial Company and the North American Transportation and Trading Company. They close at 5 o'clock, because they have no candles or oil to burn. There is absolutely no place to go. There will be no more steamers here until next July. The people are still coming over the trail without provisions. The police here are driving every one down the river as he arrives, and the companies will assist in pushing out of town all persons who are not supplied with food. To lose our supplies at this stage of affairs in Dawson would simply mean death. Money can't buy food, and the actual staple of life, flour, is unobtainable." At the date of writing Mr. Bowie contemplated return at the earliest opportunity.

Commercial Paragraphs.

THE Paraffine Paint Co., 116 Battery street, San Francisco, has declared dividend No. 26, of 25 cents per share, payable at its office Dec. 23.

THE Gold Dredging machinery made by the Risdon Iron Works, San Francisco, suitable for the Klondike region, supplies its own propelling power, an additional element of value to miners.

C. B. BOOTHE & Co. of Los Angeles have sold a pumping plant to the State of Arizona Improvement Co., Yuma, Arizona, with a capacity of 25,000 gallons per minute, for irrigating purposes. It is being installed under the supervision of Edward B. Ives. The Kingman, Arizona, Mining and Milling Co. have placed an order with C. B. Boothe & Co. for one of their new air compressor plants and two special air drills. The California Construction Co., operating in the San Gabriel canyon, have recently purchased of the same firm one of their new style air compressors and three special air drills.

P. W. MOEN, of the Washburn & Moen Manufacturing Co., Worcester, Mass., which firm is to be a member of the new $50,000,000 wire combine, says that no scheme looking to a trust has been under consideration; that the purpose of the combine is economy in administration and cheapening of the cost of manufacture, and with that end in view a number of the larger manufacturers are proposing to form a new corporation under the auspices of J. P. Morgan & Co., to purchase and take over as going concerns a number of establishments that are engaged in mining ores and coal and in manufacturing steel and wire products. In the case of Washburn & Moen Co, J. P. Morgan & Co. will purchase the capital stock of the corporation at a price which properly represents the value of the business conducted. The combination will probably not be completed before March 1st, '98. Among the Eastern members of the combine will be: The American Electrical Works at Phillipsdale, R. I.; Ansonia Wire & Brass Co., Ansonia, Conn.; Bridgeport Brass Co., Bridgeport, Conn.; Benedict & Burnham Manufacturing Co., Waterbury, Conn.; Coe Brass Manufacturing Co., Ansonia and Torrington, Conn.; Holmes, Booth & Hayden, Waterbury, Conn.; Taunton Copper Manufacturing Co., Taunton, Mass.; Seymour Manufacturing Co., Seymour, Conn., and Washburn & Moen, Worcester, Mass.

THE factory of the Westinghouse Electric & Mfg. Co. at East Pittsburg, Penn., is at the present time very busy on a number of electric machines, all intended for Niagara Falls and other companies in the vicinity of the great electric power center. It will be remembered about six months ago the Cataract Construction Co. contracted with the Westinghouse people for an enormous addition to the power station, consisting of five 5000 H. P. generators, of the same pattern as the three already installed. In addition to these five machines, which are now under way (in fact shipment has already commenced) the factory is also building exciters representing a capacity of 675 H. P. The generators are also being made now and all of these machines will be applied to the Niagara power house as soon as required. The Niagara Falls Hydraulic Power & Mfg. Co. some time ago contracted with the Westinghouse Electric & Mfg. Co. for six 750 H. P. direct current generators, 300 volts, 250 R. P. M. These generators will be direct connected to Leffel turbines and they will be used for generating current that will be supplied to the aluminum factory of the Pittsburg Reduction Co. at Niagara. The Westinghouse Electric Co. has also constructed two 300 H. P. two-phase induction motors, contracted for by the Buffalo Niagara Falls Electric Light & Power Co. These motors will be used for driving alternating current generators, direct current generators, arc machines, etc. The Niagara Electro-Chemical Co. has contracted for a large increase in its transformer station, located above the power house of the Niagara Falls Power Co., consisting of three 235 H. P. two-phase rotary transformers and one 175 H. P. rotary transformer supplying current for the reduction of metallic sodium from caustic soda. In addition to these transformers the Westinghouse Electric & Mfg. Co. are also making for the same company 800 H. P. in air cooled oil converters, consisting of six 133 H. P. converters, 3000 alternations, which will supply current for rotaries. The Acetylene Light & Power Co. has contracted for two 1000 H. P. oil converters, water cooled, of 3000 alternations, primary 2200 volts, secondary 100 volts. These converters will supply current for arc furnaces for the manufacture of calcium carbide. The Mathieson Alkali Co. contracted with the Westinghouse Electric & Mfg. Co. some time ago for a number of rotary transformers, induction motors, and oil converters, which were recently installed and consist of eleven 165 H. P. rotary transformers, several small induction motors, twenty-two 82½ H. P. oil converters, four 33⅓ H. P. oil converters and two 13⅓ H. P. oil converters. These facts are the best evidence of the growing acivity manifesting itself in the use of electrical apparatus at Niagara Falls, all of which has been occasioned by the erection of the large power station of the Cataract Construction Co., the generators for which were installed by the Westinghouse Electric & Mfg. Co.

Facts Regarding the Klondike Region.

(*Continued from page 575.*)

not exceed in number 1881. But under the mining laws a man may locate one claim in each division of the Yukon district. There are eight divisions, and many men have claims in several of these. So it is safe to say that about 1000 men own all these claims. There are in Dawson and in the mines of these districts at the present time over four thousand five hundred persons, and probably five thousand. Besides this there are, of those who came in late by St. Michael and those who went down to Fort Yukon in order to obtain food, certainly not less than one thousand, who intend to come here as soon as navigation opens in the spring. There are coming into Dawson from up the river daily from twenty to forty men in small boats. It is said by those who have come in last that there are at least one thousand men on the road who have crossed the passes and will winter on the trails and come in early in the spring. From all indications this is a low estimate. In other words, there are here, or near here and to come as soon as roads open, seven thousand men, and there are mines in the district for one thousand. The other six thousand can only hope to work for wages or go long distances from here to prospect. Of all the mines located not more than two hundred and fifty have been proved to be of value under present conditions, and of these many will not be worked full handed until wages are still further reduced. So far as can be learned from the mine owners themselves, about one thousand men will be employed in the mines if wages are $1 an hour. Then as many more will work on lays. In addition to these not more than one thousand will work on their own claims prospecting, developing or mining them, making in all about three thousand men employed in the mines.

Yet it is probable that not so many will have supplies of provisions to last them until spring. Of the rest of the population of the district 1,500 or more will be idle, unless they move out and prospect. When the winter work is over there will be employment for far less men in summer or sluice mining, and with those coming there will be but a small proportion of the men here employed unless new mines are discovered. There have been during the last decade many thousand men in the Yukon country prospecting and mining all the way from the Hootalinqua river to the Koyu-kuk, a distance of eight hundred miles in a straight line. Hundreds have gone away poor in pocket and broken in health by the rigors of the climate, hardships and privations. Up to two years ago but one of all these men had made a respectable amount at mining, and that was only $50,000, made by John Miller, who in three years took that out of his mine on Miller creek in Forty-Mile district. Since then probably half a dozen men have made that much in the Birch Creek district. There are in the Klondike district but few mines that will do better, so far as is known now. There are not more than 250 mines in the district that have been proven to be of sufficient value to work at a profit under present conditions.

All this does not offer much encouragement to those coming here. Yet the Yukon country has been heralded to the world as one of the greatest of mining districts. It certainly is, but the bulk of its yield of bullion will come from mines that to-day and under present conditions cannot be worked at a profit. The high prices, the scarcity of the necessaries of life and the difficulties of travel and transportation make it impossible for poor men or men of small means to work any but exceedingly rich claims. The cost of working is from $5 to $20 per cubic yard. Similar deposits are worked under similar conditions and by almost the same methods in Siberia for 50 cents per cubic yard. Ground worth there $5 per cubic yard pays a high profit. Here it cannot be touched. The mine owners held a meeting two weeks ago, at which it was decided to pay only $1 an hour wages from October 1 to June 1, 1898. Wage earners have held several meetings, at which they have agreed to stand out for $1 50 an hour, and in two cases have compelled men who were working for $1 an hour to quit. A meeting was held by them yesterday, and it was determined to stand out. Neither side up to the present time could tell its strength. The mine owners are better organized, and many of them are in a position to let their mines lie idle rather than pay the higher rates. At Circle City last winter the claim owners were trying to reduce wages to 90 cents an hour, when the Klondike miners offered $1.50. After the dumps had been made or sluicing and stripping was begun for summer work, a number of claim owners on Eldorado attempted to reduce the rate to $1. An informal combine was formed for the purpose, but it happened that many of these men had purchased their claims, paying down a little cash and agreeing to pay the balance by July 1st out of the ground. The days went by and the wage earners refused to work. Soon the lockout was broken and the men went to work at $1.50 an hour. A very few of the mines, and these are nearly all on Eldorado, can pay $1.50 an hour and leave themselves any profit. While the amount of gold that has been produced by the Klondike mines is very large for the number of cubic yards of ground drifted and sluiced, it is much less than has been generally reported. It is safe to say that the total yield, so far, has been less than $3,000,000 from Bonanza and Eldorado creeks. Correct figures might show less than $2,500,000.

In making up estimates that have been published it is often that the sums taken down to San Francisco and Seattle by men who have sold their claims have been counted twice once as a part of the amount mined from the claim it came from, an again as mined by the man who received it as pay for his claim. Again, one hears here of cases where men went away with small sums and have been reported on the outside as having large fortunes. One Government official left here in the summer with $1300. He was reported as having made all the way from $90,000 to $163,000, and he writes back that his poor relations are making life a burden.

Captain Healy, manager of the North American Transportation and Mining Co., estimates that the output of gold from winter drift mining was about $2,000,000, and that from summer sluicing between $500,000 and $700,000. As to the probable yield for the coming winter and summer, the estimates depend upon the number of men that will be employed. If wages shall not exceed $1 an hour and no rich discoveries draw many men away, Edgar Mizner, the secretary of the Mine Owners' Association, says the yield should reach $11,000,000 from these sources: Eldorado, $4,000,000; Bonanza, $4,000,000; Hunker, $1,500,000; small creeks and branches of these and side hill claims, $500,000, and from other creeks in the district, $1,000,000. Captain Healy says that with wages at $15 a day the yield may not exceed $5,000,000, for in that case the richest mines would make small outputs, while the poorer mines, being worked on lays, would not be affected.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SEAL LOCK.—Arthur W. Coffin, San Francisco, Cal. No. 595,093. Dated Dec. 7, 1897. This invention relates to a seal lock which is especially adapted for the closure and sealing of freight and other similar cars or treasure chests when in transit between the forwarding and receiving stations to prevent the removal or tampering with the contents, and to afford a means of detection in case the receptacle has been opened. It consists essentially of circular disks, a central pivot uniting them whereby they are turnable with each other, a catch or latch by which they are allowed to turn in one direction only, a loop or staple formed of sections, one of which projects through each of the disks, the ends of the sections adapted to unite to form a continuous loop, hoops projecting from said sections turning outwardly, and a slotted metallic strip fitting over the ends of the hooks so as to be locked when the loop or staple is closed, it being necessary to break this connecting band whenever the lock is moved to the open receptacle, thus showing that it has been opened.

CLAMP FOR GARMENT SUPPORTER.—Charles M. Allen, San Francisco, Cal. No. 595,032. Dated Dec. 7, 1897. This invention relates to a novel clamp for garment supporters. It consists essentially of a plate having a boss or projection centrally upon one side, a fold or bend at one end serving as a resilient member adapted to receive the end of the supporting elastic or strip between itself and the body of the plate, teeth formed in the bent-over portion to engage the end of the strip when inserted, a transverse slot at the opposite end of the plate through which the strip is passed, a clasp adapted to surround the projecting head and having a tranverse loop at the upper end through which the suspending strip is passed after passing through the plate and again returned through the slot in the plate so that it serves as a hinge about which the clasp is turnable. Diverging extensions project from the clasp and a button is sildable upon these extensions so as to close and bind the fabric about the projecting head.

CENTRAL STATION COMBINED TELEGRAPH AND TELEPHONE SYSTEM.—A. C. Robbins, San Francisco, Cal.: assignor to E. C. Hughes, same place. No. 595,241. Dated Dec. 7, 1897. This invention relates to improvements in central station combined telegraph and telephone signal systems. It is especially applicable to fire and police telegraphs, and consists of a fulcrumed lever at the central station with a suspended removable receiver and contacts at opposite portions of the lever alternately made and broken by the suspension and removal of the receiver, an alarm and local battery circuit at the central station for operating the same, a relay actuated by the main line current and controlling contacts in said local circuit, and an independent contact with which the said lever engages, said last-named contact being closed when the receiver is suspended and opened when the receiver is removed. In conjunction with these devices are two batteries, one weaker than the other, and bell or alarm connections which are normally non-acting when the weaker battery is in connection with the line, but which are sounded at both central and sub-stations when the stronger battery is in action..

BICYCLE BUNDLE CARRIER.—Abram W. Duck, Oakland, Cal. No. 594,683. Dated Nov. 30, 1897. This invention relates to a carrier which is especially adapted for use upon bicycles. It consists of a wire frame so bent from a single piece of wire as to form a suitable support for bundles, and having the ends bent so that by the elasticity of the carrier these ends are caused to engage with the inclined rear posts of a bicycle frame, and, by thus interlocking with it, to hold the carrier with proper relation thereto. In connection with this elastic single-piece frame is a cord which can be carried over the bundle and attached to a portion of the framework beneath the saddle, thus holding the package firmly and conveniently for transportation.

AIR BRAKE GOVERNOR.—A. C. Rumble, Oakland, Cal., assignor to the California Air Brake Governor Co. No. 595,251. Dated Dec. 7, 1897. This invention relates to a device which is designed to control the brake mechanism of railway cars by means of an automatically operating mechanism whereby the pressure of the air and the consequent pressure of the brakes upon the wheels is regulated. It consists of a substantially closed cylindrical casing journaled with its periphery in contact with the car axle, tubular journal connections with said casing, a relief valve contained in the casing to be opened and closed by the varying speed of rotation of the car wheels and in conjunction therewith of a centrifugally acting governor by which the valve is operated.

ELECTRIC ELEVATOR CONTROLLER.—C. M. Weyman, San Francisco, Cal., assignor to the Cahill & Hall Elevator Co. of same place. No. 595,086. Dated Dec. 7, 1897. This invention relates to a means for controlling the movements of electrically actuated motors, especially when connected with elevators, and which I call "an electric elevator controller." It consists of the combination with an electric motor and an elevator mechanism moved thereby of solenoids having movable cores, mechanism actuated by the cores whereby contacts are produced and the direction of the motor first established, a controlling device by which both armature and field resistance are varied proportionately to the desired motor speed, and an automatic operating device comprising an electric clutch within the circuit which is established through the solenoids and intermediate mechanism whereby the controller is disengaged and returned to its normal position

DEVICE FOR PRESERVING PERISHABLE ARTICLES. J. S. Johnson, San Francisco, Cal. No. 595,174. Dated Dec. 7, 1897. This invention relates to a means for preserving perishable articles, such as flesh, fruits, vegetables, etc. It consists essentially in a means for exhausting air from containing vessels and thereafter sealing the same, this means consisting of a suction pipe adapted to be connected with an exhaust apparatus at one end, a means for connecting the opposite end with a conical tapering opening which leads to the can or vessel to be sealed, so that air can be exhausted therefrom, and a means for applying a plug or stopper of sealing material to hermetically close the opening after the exhaustion is complete and before the exhausting apparatus is removed.

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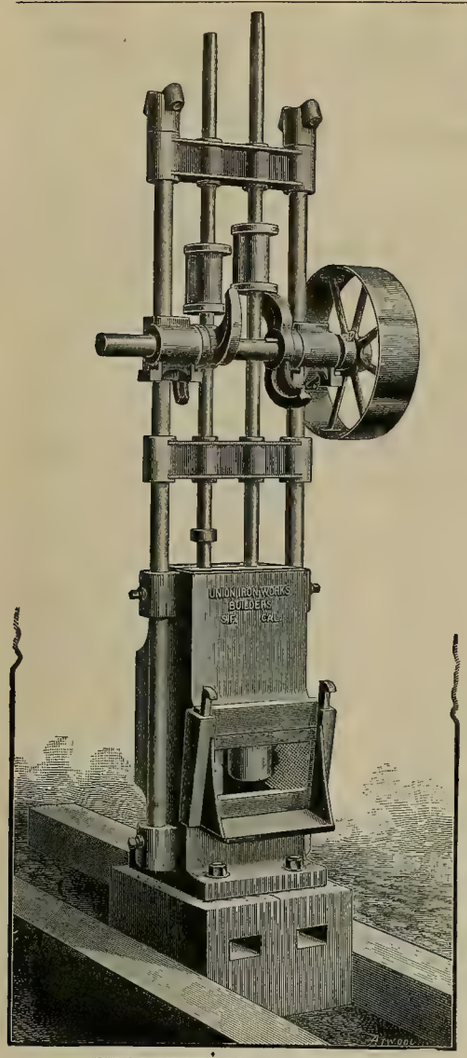

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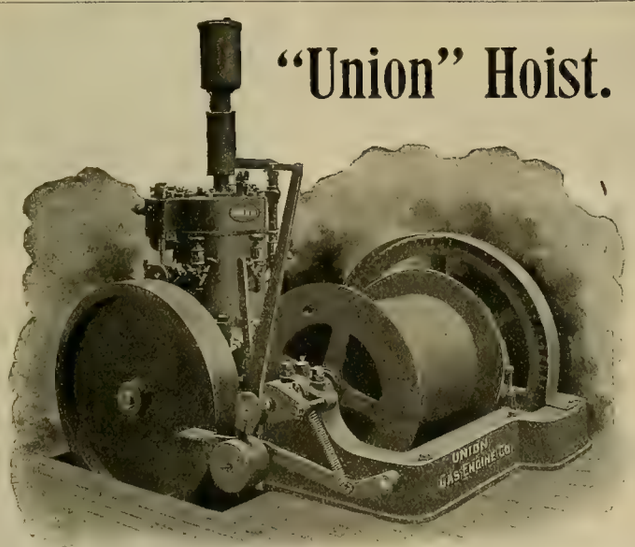

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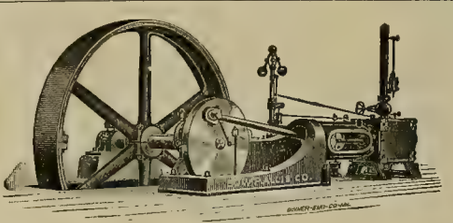

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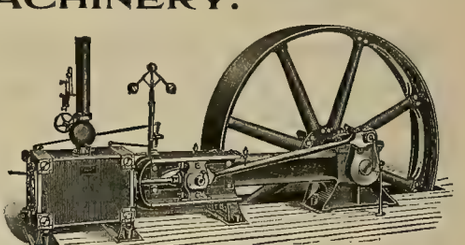

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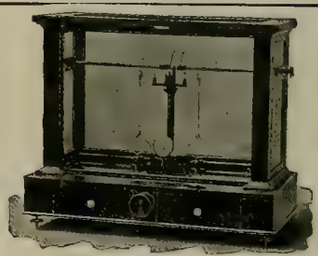

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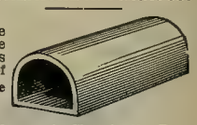
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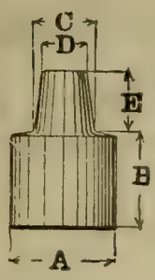

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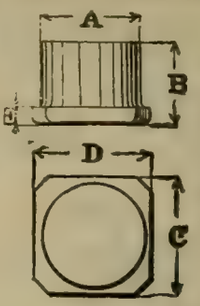

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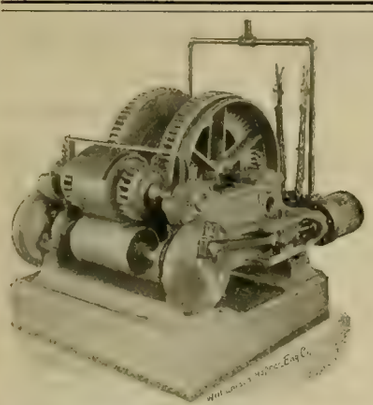

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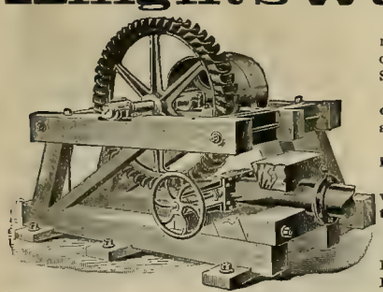

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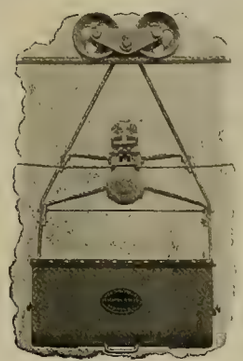
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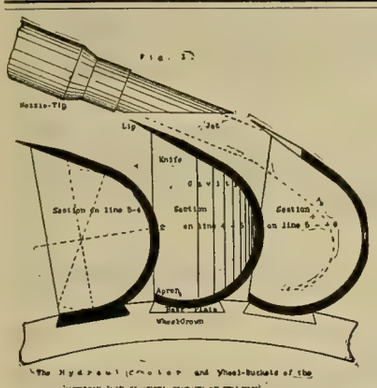

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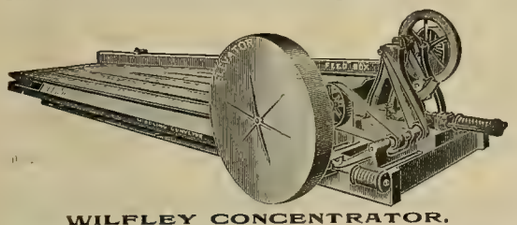

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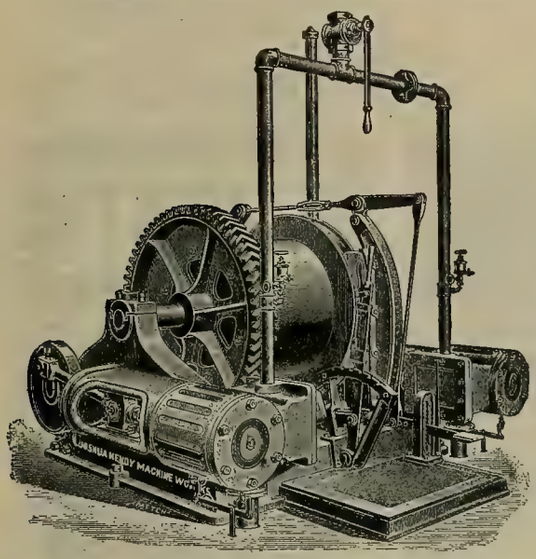

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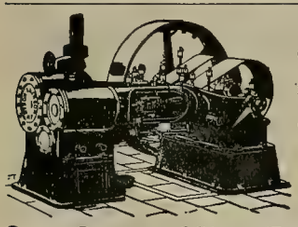

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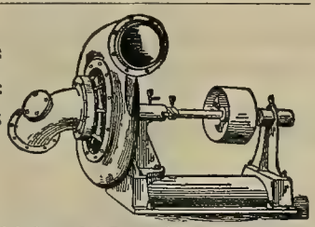

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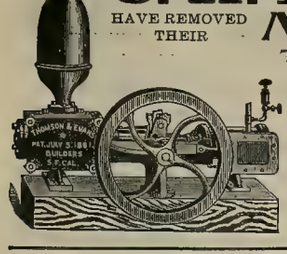

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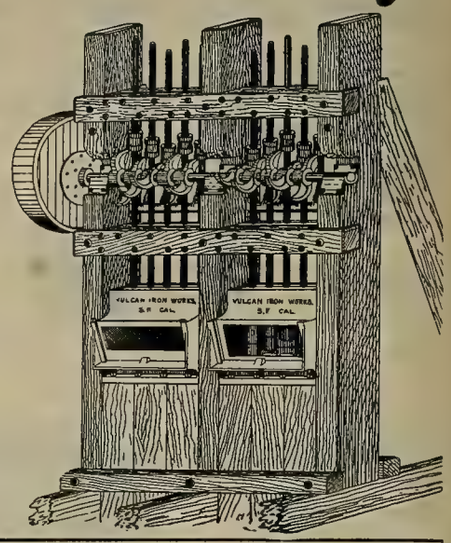

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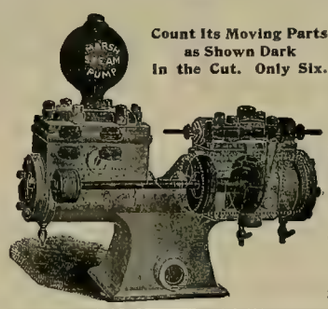

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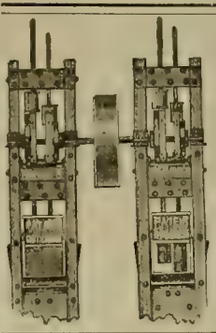

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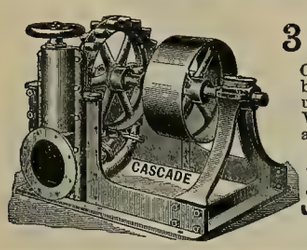

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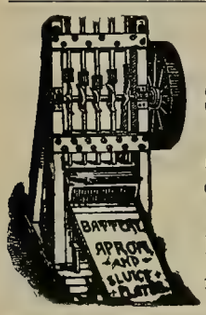

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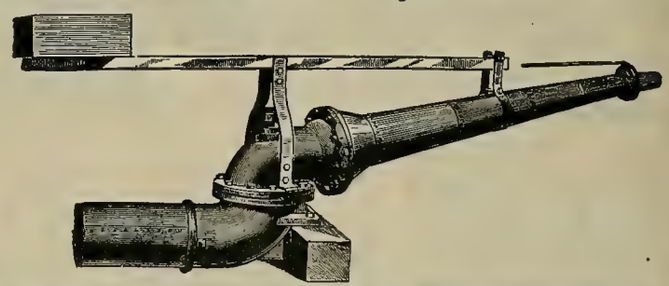

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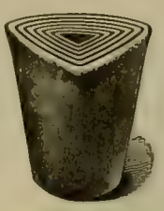

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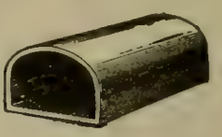

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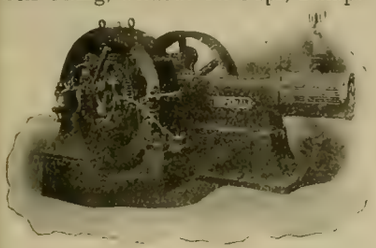

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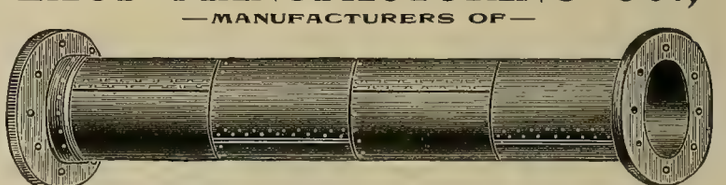

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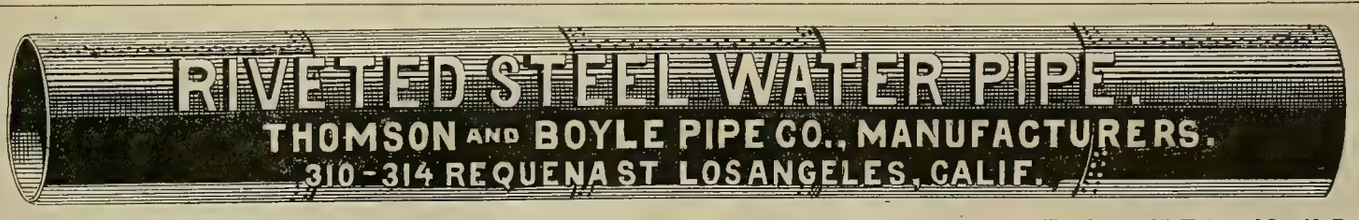

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Market Reports.

The Markets.

SAN FRANCISCO, Dec. 16, 1897.

The closing days of 1897 are marked by a fair degree of activity for the time of the year in all lines of trade. Jobbers and retailers state that stocks carried are light, which necessitates almost constant filling in. It is this that stimulates the demand for and will compel free buying in February and March of next year. The only exception to the rule of light stocks is by many jobbers carrying liberal supplies of goods that were purchased at lower prices and of goods which were expected to fetch more money at an early date. It is the consensus of opinion that next spring there will be a larger demand for goods than before known and the buying will be mainly for cash. It is conceded that all sections of the coast will increase their orders, but more particularly Alaska, owing to the expected heavy rush of people there. The export movement is also expected to increase.

The local money market is easy, with the supply of money still accumulating. Although the market is easy, yet banks and capitalists are slow to put out funds except on the best of security. This conservatism is forced by fears that Congress may do some overt act which might have an unfavorable effect on the money markets at home and abroad, and retard the growing feeling of confidence. After the present session has advanced further, and fears now entertained are proven groundless, then there will be a disposition to put out funds, which will have a stimulating effect on all industries, branches of trade and general speculation. The steamer from Australia brought nearly $2,000,000 in gold. The New York money market is practically unchanged. The supply of available funds is large, while the demand is light. The European money markets continue somewhat unsettled by reason of political complications and Russia's continued absorption of gold.

New York Silver Prices.

NEW YORK, Dec. 16. — Following are the closing prices for the week:

	—Silver in— London.	N. Y.
Friday	26⅜	58
Saturday	26⅜	58¼
Monday	26⅜	58⅜
Tuesday	26⅜	57⅞
Wednesday	26 5-16	57
Thursday	26¼	56¾

	Copper.	Lead.	Iron.	Tin.
Fri.	10 80 @10 95	3 70	10 00@12 25	13 75
Sat.	10 80 @10 95	3 70	10 00@12 25	13 75
Mon.	10 80 @11 00	3 67½	10 00@12 25	13 72½
Tue.	10 80 @11 00	3 70	10 00@12 25	13 70
Wed	10 80 @11 00	3 72½	10 00@12 25	13 70
Thur.	10 80 @11 00	3 72½	10 00@12 25	13 70

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans, gilt edged	4@4½
Call Loans, mixed securities	5@6
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	12½c Prem
New York Telegraphic Transfer	15c Prem
London Bankers' 60 days	$4.83¼
London Merchants	$4.82
London Sight Bankers	$4.86
Refined Silver, per oz. 1000 fine	57
Mexican Dollars nominal	46½

SILVER.—The market has weakened off some in sympathy with London. The decline there is said to have been brought about by the India Council having determined to resume the sale of bills. This shows how sensitive silver is for with no unfavorable influence the market stiffens but as soon as there is any adverse influence then it goes off. This indicates that the supply is not large. The demand in our market is only fair.

Silver sold in the New York market last week at 60 cents an ounce for commercial bars. This is the highest price since July last, and represents an advance of nearly nine cents an ounce since Sept. 1st. The strength exhibited by the market for silver recently is ascribed to large silver shipments from London to Russia, which country has been for some time past at work putting its currency upon a metallic basis; a revival in volume of the demand from China, a continued good demand from India and an increasing demand for use in the arts. The production of silver at the same time has not increased.

MEXICAN DOLLARS.—The market holds fairly firm at from 46½ to 47 cents for new in quantities.

COPPER.—The market is quiet but steady. The Eastern market is confined largely to small export sales. A late New York circular letter says: Manufacturers have been busy, with the brass and copper mills well employed. Interest is beginning to manifest itself regarding the price basis on which the next sales by the Calumet & Hecla will take place. Former guarantees undoubtedly checked negotiations, especially when the market slid off, but business treaties may now soon be resumed, with what results remains to be seen.

Our market is quoted as follows:

Ingot casting, jobbing	13 @—
Ingot " wholesale	12½@—
Sheet copper	— @16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½

TIN.—The market is quiet for spot but fairly active for future delivery for both pig and plate.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " " light, "	4 00@—

SHOT.—The market is steady.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 40
Drop, B and larger sizes, " "	1 65
Buck, Balls and Chilled, do, " "	1 65

POWDER.—The market is steady with the factories running to full capacity so as to meet the call from the mines.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9 to 11c, according to strength and quantity.

QUICKSILVER.—The market is quiet but steady. The last steamer for Australia took out 10 flasks for New Zealand.

Our market is quoted at $39 for domestic consumption and $35@36 for export to the west coast of Mexico.

LEAD.—The market has ruled fairly steady, but at the close it is firmer in sympathy with New York, where slightly better prices rule.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	4 75	@	5 00
Sheet	6 30	@	6 80
Pipe	5 60	@	6 10

IRON.—The local consumption is about the same. One hundred tons of pig came in the past week from England. Eastern advices state that the consumption continues free, with an increase looked for next year.

AMERICAN.	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50
ENGLISH.		
Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

NAILS.—The market is steady at quotations. The demand is slow.

We quote the following basis: 20d to 60d, inclusive—wire $2.50, cut $2.40.

COAL.—There is nothing new to report. Colder weather has increased the demand for household but the market remains steady at combination quotations.

Receipts of Coal for the week ending Tuesday were as follows in tons: Puget Sound, 6700; Nanaimo, 4422; Newcastle, N. S. W., 3527; Swansea, 2520. Total, 17,270.

We quote as follows:

SPOT FROM YARD—PER TON.	
Wellington	$8 00@— —
Greta	6 00@ 6 50
Nanaimo	6 50@— —
Gilman	5 50@— —
Seattle	5 50@— —
Coos Bay	— —@ 4 75
Cannel	9 50@— —
Egg, hard	12 00@— —
Wallsend	6 75@— —
TO ARRIVE—CARGO LOTS.	
Australian	5 75
Liverpool Steam	6 75
Scotch Splint	7 50
Cardiff	7 50
Lehigh Lump	12 00
Cumberland, bulk	10 50
Egg, hard	9 50
West Hartley	6 75

COKE.—The market is easy. Imports the past week aggregate 1294 tons from Newcastle, England.

The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	— —	@	— —
" spot, in bulk	11 00	@	— —
" in sacks	12 00	@	— —
Cumberland	10 00	@	— —

PLATINUM.—The market is steady.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

BORAX.—The market is firm, with an active shipping demand. The East reports strong markets.

The market is quoted as follows:

Refined, in carload lots, in barrels	6
Refined, in carload lots in sacks	5¾
Powdered, in car lots	6¼
Concentrated, "	5½

ZINC.—The market is firm.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

ANTIMONY.—The market is steady.

Our market is quoted at 8½c in a jobbing way. New York mail advices quote 8c for Cookson's, 7½c for Hallett's and 7c for Japanese.

Chemicals.

New York mail advices report as follows: Bromide of ammonium has advanced to 54@55c. Bromide of sodium has been advanced to 49@50c, while purchases from second hands can still be made at a shade from manufacturers' prices.

Our market is reported the same as for several weeks past, with no particular change looked for until after the turn of the year.

SULPHURIC ACID.—The demand is quiet.

We quote in a jobbing way at 1½c per lb for 66%.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported firm from store at 6½@7c per pound in carboys.

BONEASH.—There is a slow demand.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

BLUE VITRIOL.—Our market is steady, with better inquiry.

We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is firmer.

Our market is quoted in a jobbing way at $1.40 a pound.

SODA ASH, 58% (LeBlanc process).—The market is steady at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is steadier at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—The market is quiet at 2½c a pound from stores.

NITRATE OF SODA.—The market is slow and in buyers' favor for spot.

Our market is quoted from store at 4c for 95%.

PHOSPHORUS.—The market is easy.

We quote in a jobbing way at 70 to 75 cents per pound.

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delinq't and Sale.	Secretary.
Alta S M Co, Nev	58	10c	Dec 3.	Jan 7.	J E Jacobus, 309 Montgomery
Belcher S M Co, Nev	57	20c	Nov 20.	Dec 24.	Jan 14. C L Perkins, Mills Building
Best & Belcher M Co, Nev	63	25c	Nov 2.	Dec 7.	Dec 28. M Jaffe, 309 Montgomery
Challenge Con M Co, Nev	24	10c	Dec 16.	Jan 19.	Feb 9. C L McCoy, Mills Building
Con Cal & Va M Co, Nev	10	25c	Nov 3.	Dec 8.	Dec 29. A W Havens, 309 Montgomery
Crown Point G & S M Co, Nev.	72	20c	Nov 10.	Dec 15.	Jan 5. Jas Newlands, Mills Building
E Best & Belcher S M Co, Nev.	6	15c	Oct 30.	Dec 3.	Dec 18. E W Sichel, 337 Pine
Exchequer M Co, Nev	40	5c	Nov 1.	Dec 6.	Dec 30. C E Elliott, 309 Montgomery
Gold Ridge Con M & M Co, Cal.	5	4c	Aug 3.	Sept 18.	Dec 16. H Sylvester, 43 Sixth
Gould & Curry S M Co, Nev.	82	20c	Nov 2.	Dec 7.	Dec 29. A K Durbrow, 309 Montgomery
Hale & Norcross S M Co, Nev.	11	10c	Mar 20.	Dec 28.	Jan 18. R R Grayson, 331 Pine
Kentuck Con M Co, Nev	14	5c	Oct 27.	Dec 1.	Dec 22. A W Waterman, 309 Montgomery
Marguerite G M & M Co, Cal.	8	10c	Nov 4.	Dec 13.	Jan 15. F Mettmann, 237 Twelfth
N Gould & Curry G & S Co, Nev	19	10c	Nov 13.	Dec 17.	Jan 3. E W Sichel, 337 Pine
Occidental Con M Co, Nev	29	10c	Dec 7.	Jan 11.	Feb 1. A K Durbrow, 309 Montgomery
Overman S M Co, Nev	78	5c	Nov 17.	Dec 23.	Jan 12. G D Edwards, 414 California
Red Cap M Co, Cal	2	$5	Nov 29.	Jan 6.	Jan 29. H H Martin, 125 Beale
Thorpe M Co, Cal	8	2½c	Sept 28.	Dec 4.	Dec 27. A F Frey, Phelan Building
Union Con S M Co, Nev	55	15c	Dec 6.	Jan 11.	Jan 31. A P Swain, 309 Montgomery
Utah Con S M Co, Nev	26	5c	Dec 2.	Jan 6.	Jan 24. A W Havens, 309 Montgomery

Mining Share Market.

SAN FRANCISCO, Dec. 16, 1897.

The market dragged to still lower figures the past week, proving correct our assertion that lower figures would rule befor a good sized substantial rally. At this writing it looks as if still lower figures will rule for some of the higher priced shares, but there are some notable in the Gold Hill group that are about as low as they generally get, for experience has taught that at around present low prices there is big money in them before winter months pass, and the writer hazards the opinion they are good purchases now even if they should go slightly lower. Everything points to moneyed insiders being after shares, for shares they want and shares they will have. The brokers are helping them, too. Pointers are quietly putting out all kinds of bad reports, the most widely spread being that the Comstock mines have "petered out." This has been the case many times within the past thirty years, but as many times have they proven the assertion false, and will again. The truth is it is impossible to know when a mine is exhausted, which mining in this State proves for many abandoned mines are large dividend payers now. Few thought in 1870 that there was any ore in Crown Point or Belcher on the Comstock, below the depth they were then working, but the largest value of metal from those mines was subsequently discovered and removed and dividends paid. This caused more persistent work elsewhere which led to the large ore deposit in Con. Virginia and California, from which large dividends were paid and sent the shares of twenty-three leading mines from about $5,000,000 to over $270,000,000. Two years after the highest prices the same mines sold down to $30,000,000 only to recover to $114,500,000 in the Sierra Nevada deal, which sold up to over $280 a share. Preceding the Con. Virginia deal in 1886, the shares of the twenty-three mines sold on the basis of about $1,500,000. When the deal was at its height they sold at over $40,000,000. These are only given to show that the Comstock mines have as many lives as the proverbial cat, and least looked for, the shares go from absurdly low prices up to big figures. There is very active work going on in the Comstock mines and it is quite safe to affirm that such shrewd and successful financial men as D. O. Mills, John W. Mackay and Col. Alvinza Hayward, and others, would dispose of their milling and other interests on the lode if they did not believe that history will repeat itself again. But what worries outsiders is as to when the "repeating" will be done. Some say next year, others say after international bimetallism is an accomplished fact, but the writer says no person, unless it be the moneyed inside, knows, for if they develop a lode of gold bearing ore, which old miners say they will, then a big deal will result irrespective of any other consideration.

News from the Comstock mines is practically unchanged so far as official letters are concerned, but private advices from seemingly reliable sources are quite encouraging, yet they point to time. It is stated that soon after the turn of the year more work will be started in two or more of the mines. The official letter from Utah reports continued work in a northwesterly direction with fairly favorable formation. In Sierra Nevada on the 900-foot level west crossdrift No. 5 has been started, but work is continued in the north lateral drift. The new tunnel is being pushed. No change in the work on the Layton tunnel level. The only work reported in Union is the west crossdrift on the 900-foot level. They are still running east from the 1000-foot level of Mexican. In Ophir work is confined to the 1000-foot and Central tunnel levels. There is no change reported in the official letter. Active and energetic work is continued in Con. Virginia on the 1550-foot, 1650-foot and 1750-foot levels. From the general tenor of the official letter it looks as if it will not be the superintendent's fault if a development is not made. A few tons of ore were raised assaying over $30 to the ton. Nothing new from Best & Belcher. They continue to extract low grade ore from the 400-foot Bonner shaft level. A new process of working Comstock ore is reported, which, if correctly stated, will revolutionize that entire district and set many hundreds of miners to work. Work reported in Savage is practically unchanged. Hale & Norcross is still idle, but contestants down here are not. It looks as if active exploiting work will be started soon in Chollar as the repairs which they have been making are about finished. If the work is properly run good results will follow. They are drifting south in Potosi on the tunnel level and driving west from the sixth floor above this level. In Alpha the northwest drift was, at last advices, in low grade ore on the 500-foot level. They are still going west in Con. Imperial on the surface tunnel. Fair progress is being made in the joint Challenge, Confidence and Con. Imperial west crossdrift. They are in nearly 1700 feet. They continue to kill time in Yellow Jacket. The strike of ore has not been reported officially to the public. This will be done when the shares have been bought up. In Crown Point they are doing dead work so as to get the mines into better shape for exploiting. In Belcher they are running west on the 1200-foot level and west on the 850-foot level. They are extracting a few tons of ore. From Overman and Seg. Belcher nothing new has come to hand. In Justice they are running for the ore found above while doing other work of a development character.

The work on the Brunswick is practically unchanged, although it is being done energetically by the different companies. The joint Con. Virginia, Best & Belcher and Gould & Curry work is confined to the 300-foot and 600-foot levels. In Savage active exploiting work is being done. In Chollar and Potosi there is no change reported. In the former they are taking out a few tons of ore and continue to send bullion to the mint. The joint work by Chollar and Potosi is watched with interest. The official letter from Occidental reports that on the 750-foot level they are in fair grade ore. No change is reported in the other levels.

The following illustrates the changes of the week:

Mines.	Dec. 9.	Dec. 16.
Alpha	$ 07	.....
Alta Consolidated	.....	$ 03
Andes	17	.....
Belcher	.....	51
Best & Belcher	51	48
Bodie	.....	.....
Bullion	09	06
Challenge	.....	.....
Chollar	41	37
Confidence	.....	.....
Consolidated California and Virginia	1 35	1 25
Consolidated New York	.....	.....
Crown Point	11	.....
Exchequer	.....	.....
Gould & Curry	44	.....
Hale & Norcross	1 30	1 25
Justice	46	.....
Mexican	.....	.....
Ophir	.....	.....
Overman	.....	05
Potosi	45	40
Savage	23	.....
Sierra Nevada	50	51
Union	.....	23
Utah	07	.....
Yellow Jacket	.....	.....

San Francisco Stock Board Sales.

SAN FRANCISCO, Dec. 16, 1897.

9:30 A. M. SESSION.

50 Best & Belcher	48	200 Potosi	40
400 Chollar	35	200 Sierra Nevada	45
100 Overman	05		

SECOND SESSION—2:30 P. M.

200 Ophir	52	400 Sierra Nevada	51
800 Con Cal & Va	1 25	200 Bullion	06
100 Chollar	37	200 Union	23
100 H. & N	1 25	200 Alta	03
500 Belcher	51		

WILL NEGOTIATE with owners or their duly authorized agents only.

WILL INVESTIGATE only thoroughly bona-fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

E. N. BREITUNG,
Marquette, Mich., U. S. A.
Operator and Dealer in
Mines, Mining Properties and Mineral Lands,
Mining Stocks, Bonds, Options, Leases, Contracts and Securities.
MONEY LOANED ON BONA-FIDE MINES

WILL EXAMINE on reasonable terms all kinds of Mines, Mining Properties and Mineral Lands as to their value, method of working and the condition of their titles.

WILL GIVE Options, Leases, Bonds and Contracts on all kinds of Mines, Mining Properties and Mineral Lands.

Assay and Chemical Work Done on Reasonable Terms.

Have best of bank and other references. Use McNeill's or A B C Telegraphic Codes.

DO ALL OUR OWN EXPERT AND CHEMICAL WORK.

Working Capital for Mines.

PACIFIC EXPLORATION COMPANY

Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

Tunnel Contract.

Bids Wanted for Running about 300 Feet of Tunnel
AT SUNNY HILL, SHASTA CO., CAL.

Machinery now on the ground. For particulars, apply to MARINA MARSICANO GOLD MINING CO., 217 Sacramento Street, San Francisco.

Rainfall and Temperature.

The following data for the week ending 5 A. M., December 15, 1897, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

CALIFORNIA STATIONS.	Total Rainfall for the Week.	Total Seasonal Rainfall to Date.	Total Seasonal Rainfall Last Year to Same Date.	Average Seasonal Rainfall to Date.	Minimum Temperature for the Week.	Maximum Temperature for the Week.
Eureka	2.52	15 06	16 89	12 27	42	62
Red Bluff	62	6 06	9.61	7 63	36	62
Sacramento						
San Francisco	.20	4 07	8 78	6 48	45	59
Fresno	17	1.95	3 60	2 64	34	64
San Luis Obispo	.16	1 57	5 99	*	34	78
Los Angeles	.02	2 50	3.84	4 12	42	84
San Diego	.08	1.23	2.75	2.18	46	80
Yuma	00	.81	1.20	1 44	34	74

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING DECEMBER 7, 1897.

595,032.—GARMENT SUPPORTER CLAMP—C. M. Allen, S. F.
594,936.—STIRRUP—H. Anderson, Sumner, Wash.
594,842.—GRAIN BINDER—J. F. Appleby, Santa Cruz, Cal.
595,012.—SCRUBBING BRUSH—P. F. Barrett, S. F.
595,236.—LOAD DUMPER—T. Carroll, Anaheim, Cal.
595,118.—STOVE PIPE HOLDER—Chase & Griswold, Salem, Or.
595,093.—SEAL-LOCK—A. W. Coffin, S. F.
595,149.—TREE PROTECTOR—C. C. Coulson, Riverside, Cal.
594,936.—POTATO PARER—A. G. Dehlin, Seattle, Wash.
595,095.—CAR FENDER—Dickerson & Towne, Oakland, Cal.
595,121.—FOWL ROOST—F. D. Dimock, National City, Cal.
595,015.—HAMMER—J. H. Driller, Los Angeles, Cal.
594,992.—TIRE TIGHTENER—W. P. Goodman, Los Angeles, Cal.
596,174.—PRESERVING FRUIT, ETC—J. S. Johnson, S. F.
595,956.—WATER HEATER—W. B. Livermore, Fresno, Cal.
595,023.—GAS LIGHTER—C. T. Lynd, S. F.
595,068.—DENTAL APPLIANCE—W. T. Lyon, Portland, Or.
595,188.—SHOW WINDOW—S. E. Maxon, Portland, Or.
595,129.—INDEX—M. C. Neuner, Los Angeles, Cal.
595,194.—INDEX—M. C. Neuner, Los Angeles, Cal.
595,113.—RUG MAKING MACHINE—O. Rice, Oakland, Cal.
591,241.—TELEPHONE SYSTEM—A. C. Robbins, S. F.
595,251.—AIR BRAKE GOVERNOR—A. C. Rumble, Oakland, Cal.
595,222.—FAUCET—N. S. Wakefield, Pomona, Cal.
595,006.—PUMP VALVE—W. Wascher, Portland, Or.
595,086.—ELEVATOR CONTROLLER—C. M Weyman, S. F.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

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POSITION AS SUPERINTENDENT OF GOLD Mining property, quartz or gravel, or would travel as expert for good company. Address, "EXPERT," MINING AND SCIENTIFIC PRESS, San Francisco.

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LOW PLACER GROUND

IN CALIFORNIA, FOR DREDGING PURPOSES.

Must Exceed 50 Cents per Cubic Yard.

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FOR SALE, AT A BARGAIN.

A complete Champion Prospecting Diamond Drill Outfit. Good as new. Used very little. Does successful work. For price apply to GOLD HILL MINING CO., Angels Camp, Cal.

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MINE BELL SIGNALS.

Adopted, Used and in Force in Accordance with State Law.

For the convenience of our readers in the mining counties we print in legal size, 12x36 inches, the Mine Bell Signals and Rules provided for in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS, 330 Market St., San Francisco.

Assessment Notices.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 29th day of November, 1897, an assessment (No. 2) of Five Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, No. 125 Beale street, city and county of San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of January, 1898, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 29th day of January, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

H. H. MARTIN, Secretary.

Office—125 Beale street, city and county of San Francisco, California.

ALTA SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Gold Hill, Gold Hill Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3d day of December, 1897, an assessment (No. 58) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of January, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 28th day of January, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. E. JACOBUS, Secretary.

Office—Room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 7th day of December, 1897, an assessment (No. 29) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 11th day of January, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 1st day of February, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

DELINQUENT SALE NOTICE.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 8) levied on the 28th day of September, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
A. F. Frey, Trustee	178	4,200	
Balance due.			43 10
A. F. Frey, Trustee	211	100	2 50
R. Z. Johnson	385	1,525	38 13
Emma Rosenbaum	325	1,000	25 00
Emma Rosenbaum	326	300	7 50
Emma Rosenbaum	327	200	5 00
Fr. H. Rosenbaum	343	417	10 43

And in accordance with law, and an order from the Board of Directors, made on the 28th day of September, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, room 44, Phelan building, San Francisco, California, on MONDAY, the 27th day of December, 1897, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

ANNUAL MEETING.

The Regular Annual Meeting of the Stockholders of the Gould & Curry Silver Mining Company will be held at the office of the Company, Room 69, Nevada Block, No. 309 Montgomery Street, San Francisco, California, on MONDAY, the 20th day of December, 1897, at the hour of 1 o'clock P. M., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting.

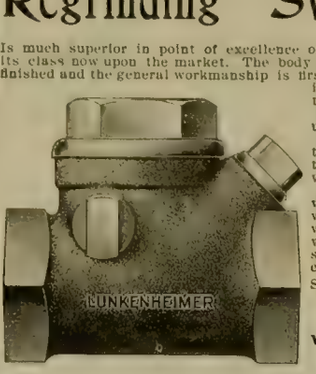
Transfer books will close on Friday, December 17th, at 3 o'clock P. M.

ALFRED K. DURBROW, Secretary.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from George Rieber, in the Badger Hill Mine, near Placerville, El Dorado Co., to deposit tailings in Iowa Canyon; from F. W. Cook, in the Try Again Mine near Placerville, El Dorado Co., to deposit tailings in a ravine; from Matt Yoner, in the Hoosier Mine near Georgetown, El Dorado Co., to deposit tailings in Bear Creek; from Otto Reichel, in the Mountain Ranch Mine near Mountain Ranch, Calaveras Co., to deposit tailings in a ravine; from J. F. Gurney et als., in the Johnston Placer Mine near San Andreas, Calaveras Co., to deposit tailings in a ravine; and from J. G. Underwood and W. N. Lamb, in the Chris Limpher Mine near Plymouth, Amador Co., to deposit tailings in Indian Creek, gives notice that a meeting will be held at Room 69, Flood Building, San Francisco, Cal., December 27, 1897, at 1:30 P. M.

LUNKENHEIMER'S
Regrinding Swing Check Valve

Is much superior in point of excellence of material, design and workmanship to any other valve of its class now upon the market. The body is heavy and well proportioned, the seat is carefully finished and the general workmanship is first-class. This valve is so designed that when the disc is raised the passage through the body is fully equal to the diameter of the connecting pipes.



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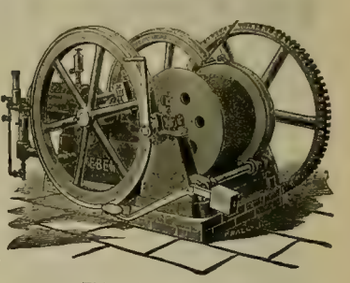

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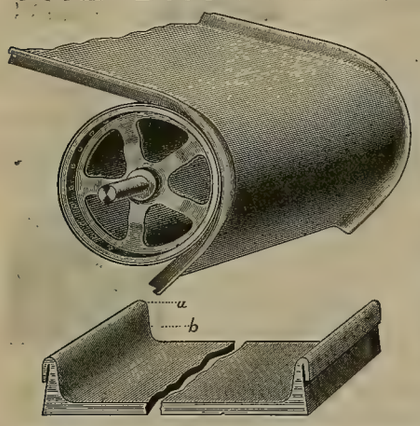

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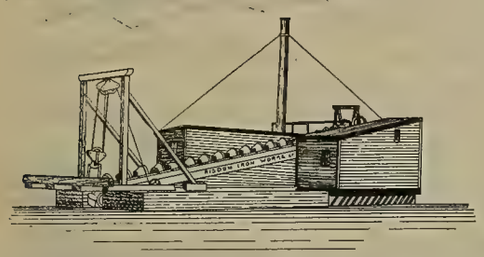

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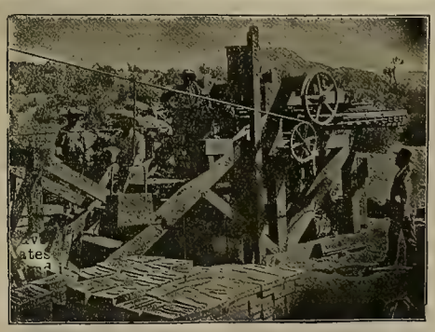

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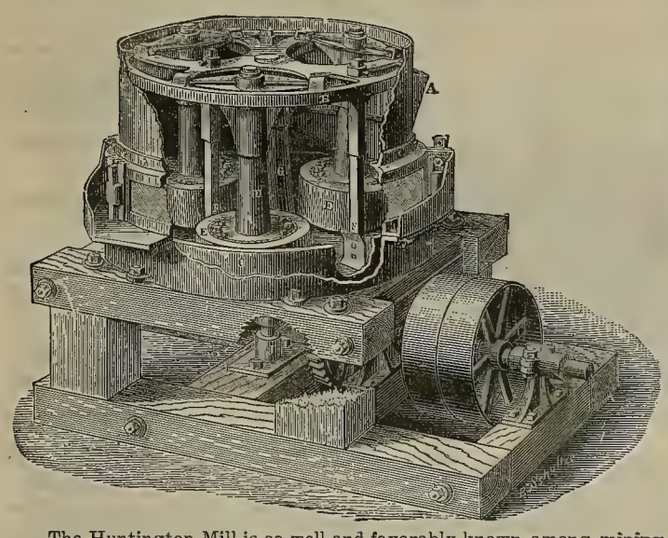

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No. 1955.—VOLUME LXXV. Number 26. SAN FRANCISCO, SATURDAY, DECEMBER 25, 1897. THREE DOLLARS PER ANNUM Single Copies, Ten Cents.

Vein Structure Nevada and Amador Co.'s.

Illustrated notice of vein structure in Nevada Co., Cal., compiled from the 17th report of the U. S. Geological Survey, appeared in the issues of Nov. 6 and Dec. 11, referring more particularly to pay shoots. The subject which is a very interesting one to gold miners the world over is again referred to and illustrated herewith.

Fig. 1 is engraved from a flashlight photograph of half a dozen miners at work on several small quartz developments between the foot and hanging wall near the 1800-foot level of the Ophir Hill vein, Empire mine, Nevada Co., Cal., such seams often, as in this case, yielding extraordinarily in net return of gold. Of course, it is understood that in those veins the development of gold is not confined to the ore shoots. The vein preserves its general character over considerable area, but only in part of that area does the quartz contain enough gold to be profitably extracted as ore. In another and smaller class of veins all quartz occurring in the vein is good ore, and outside of the ore shoots the vein closes down to a seam. The question what grade of quartz is regarded as "good ore," determines the practical extent of such pay shoot. In early days it had to be very good ore that would pay; now, anything over $5 per ton—the average cost of deep mining and milling—is considered worth working.

It is a general characteristic of those ore shoots that they have an elongated shape, forming an angle with the horizontal plane, which generally differs slightly from the dip of the vein, that is, the shoot pitching at a steep angle on the plane of the vein, the following law appearing to govern the general direction: The shoot will, as a rule, pitch to the left of an observer standing on the apex of the vein and looking down in the direction of the dip. While this is by no means an infallible rule, yet it holds good in so many instances that it may be considered as a general result of some yet unknown cause, and is deemed worthy of mention herein and of note on the part of the California miner.

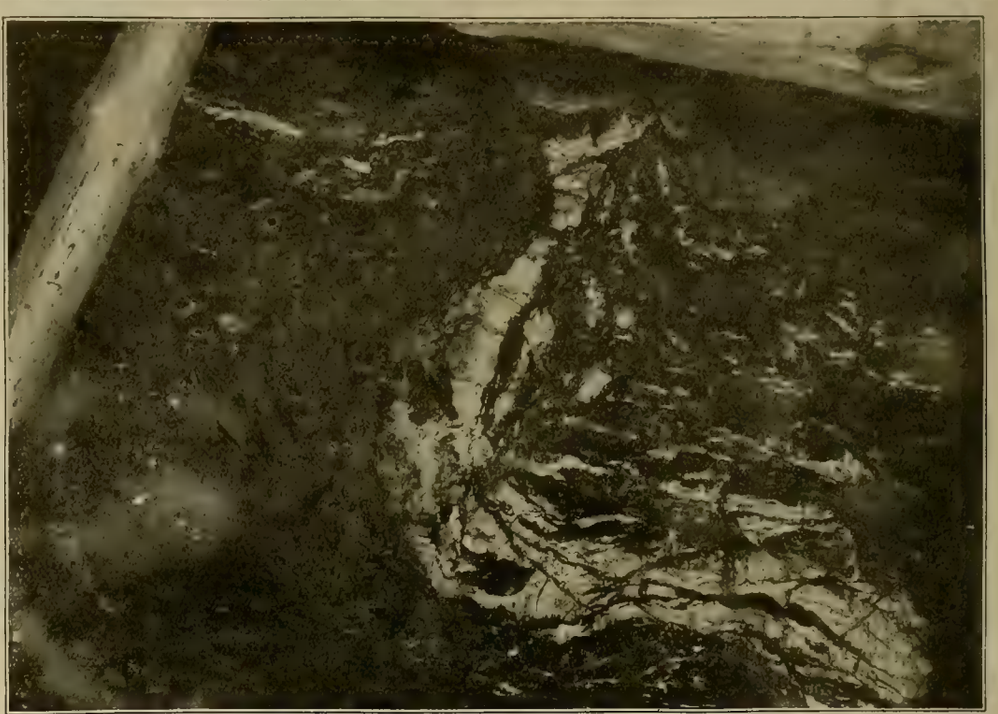

FIG. 2.—BUNKER HILL VEIN, AMADOR CO., CAL.—STOPES ABOVE 300-FOOT LEVEL, SHOWING VEIN SPLIT UP INTO SEAMS IN BLACK, CRUSHED CLAY-SLATE.

FIG. 1.—OPHIR HILL VEIN, EMPIRE MINE, NEAR 1800-FOOT LEVEL, SHOWING SEVERAL SMALLER VEINS BETWEEN FOOT AND HANGING WALLS.

Fig. 2 affords an interesting view of another vein structure which frequently appears in the soft, black slates of the Mariposa formation along the mother lode, lying along the contact of black slate and diabase, separated by a distinct hanging wall of the latter. Rarely is there a continuous, well-defined vein, the black slate being sometimes crushed over a width of 20 feet in the manner shown in the engraving from a flashlight photo taken in a stope above the 300-foot level in the Bunker Hill mine, Amador Co., Cal. While the pay ore is in the quartz, yet, it is found necessary to mine the whole mass, which thus constitutes low-grade ore. The cut also shows a curious curve of the principal mass of quartz, due possibly to movement subsequent to deposition.

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J. F. HALLORAN.....General Manager

San Francisco, December 25, 1897.

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Map of the Klondike Region.

With the compliments of the MINING AND SCIENTIFIC PRESS is sent in this issue to our readers a corrected map of Alaska, the Northwest Territory, the Klondike, etc., up-to-date and believed to be reliable. It was lithographed specially for this paper. This brief reference is made to it to direct the attention of our subscribers to the fact that, folded in each copy of the paper of this date, is the map, and, also, to comply with the requirements of the Postoffice officials in such matters.

SINCE Oct. 1, '97, this paper has refused several pages of proffered advertising, chiefly from concerns who have nothing of value to sell and seek only to delude and get something for nothing. An advertisement in this paper has long been justly regarded as good evidence of the advertiser's standing and the value of what is offered intending purchasers.

SOME interesting points were brought out recently in a case in the Superior Court of Yuba county, Cal., where suit was brought against Charles Stepp and others in San Francisco to recover judgment for supplies to a mine, which, it was claimed, defendants owned. The plaintiffs proved that Mr. Walrath, the Superintendent of the mine, had bought the supplies, and claimed that they had sold these supplies, believing defendants were owners. Defendants denied that they had employed Mr. Walrath and that there was any such company in existence as the Faust Mining Company, under which name the suit was brought. Mr. Stepp, as witness, explained that the mine had been bonded by Mr. Walrath and two others and that they (the defendants) had advanced $7000 to the bonders for the Dalton mine, intending to purchase that if it turned out well; but that there had been no profits and a great deal of loss. Mr. Stepp said that in case of profits, they would have divided them; but, as a matter of fact, they were out of pocket and at a great expense. He incidentally stated that he was interested in several mines and had recently staked four men $1000 apiece to go to the Klondike. Plaintiffs argued that, although they had not proved a partnership, they had at least proved a liability; that defendants would have been responsible had the mine turned out profitable, and would have shared the profits. Defendants contended that three other parties had bonded the mine and had wanted to sell it to the defendants, they (the defendants) paying $7000; but they had no present property interest therein. The Judge this week decreed that plaintiffs recover from three of the defendants the amount sued for, with costs, exempting Stepp and Walrath from the judgment, which, in effect, was that the latter, as superintendent, was authorized to act as purchasing agent, and his contracts and agreements must be kept by the incorporation he represented.

The Modern Alchemists.

From the number of letters received at this office it is evident that some credence has been given to the recent claims of sundry "manufacturers of gold." The matter is deserving of further attention to that already given it in these columns.

It is assumed at the outset that those of present prominence in the matter are honest in their convictions and have no desire to defraud the public. They have said what they say so many times that they have come to believe it themselves. No matter how extravagant a statement, if one will continue to state it he will ultimately come to individual personal belief therein.

The whole subject belongs more properly to the middle ages than to these sunset years of the nineteenth century, and is a singular illustration of the survival of the unfittest. There is, doubtless, a strain of superstition running through the centuries—the superstition in this case being intensified ignorance. Tennyson says that he "doubts not through the ages one increasing purpose runs." This record of folly and failure from the days of Aristotle to those of Emmens, Brice and Marshall shows no increasing purpose, but rather sounds the fainter echoes of a former widespread faith.

Through the centuries has existed a belief in the possibility of prolonging life by an artificial elixir, and of turning baser metals into gold. This belief was largely fostered by learned impostors on the same principle that the ridiculous claims of the Keeley motor have been rewarded by financial assistance during the last quarter of a century—it being as characteristic of charlatans of the ninth as of the nineteenth century to play on the credulity and avarice of the masses.

It has been said that such men as Brice, Emmens and Marshall are doubtless sincere and are not to be classed among dishonest impostors. Their sincerity must be unquestioned. Other men learned in science, and men that have done great things for their age, were as sincerely mistaken. It must not be forgotten that Paracelsus, Kepler, Tycho Brahe, Isaac Newton, Leibnitz and others equally eminent were, at least for a time, firm believers in the principle that baser metals could be turned into gold; hence, there is no desire to characterize or condemn any one mentioned in this or any other century as being otherwise than thoroughly sincere.

The physicist considers nothing theoretically impossible, for that which is the object of derision today may be the sober, accepted, scientific fact and the valuable invention of to-morrow. The true scientist constantly holds himself in readiness to abandon his most cherished convictions and accept the latest discovery or demonstration of facts opposed to his education, experience or cherished beliefs.

It is but a few weeks ago that a professor of chemistry at the California State University at Berkeley publicly expressed his belief in the possibility of such a thing as the transmutation of baser metals into gold; and whether it be our local professor, Sir Humphrey Davy, or Hermes; whether it be Norman Lockyer experimenting on the specific heat of gaseous bodies in a high temperature, Sir William Crookes discussing "meta-elements," Cary Lea on the allotropic forms of silver, or Berthelot boldly affirming his belief in the unity of matter, it can only be said that many prominent chemists have considerable faith in the mutual convertibility of elements possessing chemical properties in common. One of the profoundest thinkers has declared his belief that: "The transmutation of an element is nothing more than the transformation of the motions which determine the existence of said element, and which gives it special properties, into the specific motions peculiar to the existence of another element."

It is neither our province nor our purpose to enter into a metaphysical discussion of the occult or esoteric. Those who look into crystal spheres, read magic mirrors, affirm telepathy, and discourse on subliminal self, are close to the slender line which divides the most of us into two classes—those that are inside and those that are outside the insane asylum. The Brothers of the Rosy Cross and the disciples of Zoroaster have always interpreted their doctrines, their head center being at present in Paris, where exists an Alchemical Association, of which S. H. Emmens, late of California, is an honorary member. They have a journal, "L'Hyperchymie," and independent groups of students. One of their oldest workers is the Grand Master, Theodore Tifferau, who in 1854 claimed to have discovered a method of transmuting silver into gold. In October, 1896, in a voluminous memoir, he claimed to have proved that the metal is an aluminum compound. This society claims that Darwin's school of evolution is but a part of the great doctrines which they teach, and which should be applied to the chemical elements as well as to human beings. Their starting point is that ether forms chemical atoms by agglomeration; that this ether is condensed energy, and that hence all matter is dissolvable into energy; that energy, matter and motion form a trinity, one in substance three in appearance; that matter is one in kind, and the diversity of chemical bodies results from differences in grouping, and in motions of the constituent particles; that ether is the father of hydrogen, which evolves oxygen, nitrogen and carbon; that this combination is due to etheric vortices; and that an alchemist who expects to succeed must possess psychic power over the atoms, so that by the action of his will the elements shall group themselves to form the metal desired.

They juggle with chemistry, and take considerable comfort in producing alleged gold at will. The following is one of their favorite recipes: "Put into a crucible layers of sheet iron and of powdered vitriol; place over it another crucible pierced with a hole for respiration. Heat in an intense fire. But a flux must be added to the crucible to prevent melting, viz: One kilo litharge, one kilo clean white sand, mix and add to the crucible at a red heat. Remove with an iron spoon the yellow oil and put it aside. The two compounds have not lost weight. This oil is dry water, a fire, a salamander. * * * You obtain a metal of a golden yellow, having a density of 24, not capable of being minted. This is changed into ordinary gold." How the final transformation is to be effected is not vouchsafed.

A candidate for entrance into this society has no easy task. He must first place himself in a properly receptive attitude by throwing out of his soul all pride, anger, jealousy, hypocrisy and idleness. This portion of the process is certainly worthy of emulation. Having reached this high plane of mental sublimity, he must practice crystal gazing, reading in magic mirrors, and be able to hypnotize himself at will. He must live in an atmosphere of perfumes and music, and finally succeed in separating his astral body from his corporeal frame. He must then learn to be discreet and silent and reveal no result; and must be possessed of sufficient money to bear all expenses of his life work. He must be up in chemistry and a little ahead of those who ordinarily practice that science by being the possessor of a magic wand, a magic mirror and a brazier; these, with an alchemist's robe embroidered in silver and gold, being among the necessary adjuncts of an adept.

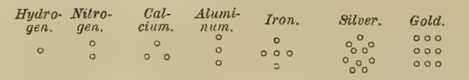
We now come to the stated results of sundry gentlemen in this country, whose works, if commensurate with their statements, will occasion serious financial revolution, and will at least render unnecessary any protracted efforts toward securing gold by the ordinary processes now known. These gentlemen claim to be able to manufacture gold. Considerable has been said and sung relative to the alleged results of Mr. Emmens' work. Mr. E. C. Brice of Chicago has also a way alleged to be satisfactory to himself of making gold; though in his odd moments he is able at will to produce silver. Of course at the present quoted rates he can put his time in to better advantage in manufacturing the former material. Mr. Brice is credited with giving out his secret as follows:

He works on antimony ore, 50 per cent antimony, 50 per cent iron, sulphur, carbon, etc. He refines the antimony, which is placed in a furnace and subjected to "destructive distillation," whatever that may be. The fumes arising from this process are driven by air blasts into a shaft six feet in diameter and 105 feet long. At the end of this shaft the fumes

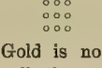
are run into wool bags, to the sides of which the antimony collects in the form of a gray colored sand, the fumes arising from the coal being allowed to escape through the meshes of the cloth. This sand is mixed with water to the consistency of modeler's clay and cut into small blocks, which are placed in a furnace and subjected to a heat approximating 5000 degrees. This is to secure as nearly as possible volcanic action. Oxygen, so Mr. Brice explains, is the medium of change. For forty-eight hours the blocks are allowed to remain in the furnace, which is patented and which Brice claims is the secret of his success, inasmuch as he has in it devised a means of securing great heat in large amounts. An ore crusher of the dry-pan kind then grinds the blocks into a gritty sand, and this is put into another furnace and covered with two portions of lead to one of the sand, which Brice calls his artificial ore. As its specific gravity is greater than that of the so-called ore the lead is precipitated to the bottom of the furnace. The intense heat causes the lead to form "litharge," which acts as a caustic on the ore and eats up nearly all its constituent elements except the gold and silver alleged to be thus produced. The lead, as mixed with the gold and silver, is base bullion. To refine the base bullion it is molded into small pigs, which are placed in bone-ash cups. Then these cups are put in a furnace and fused. Forty minutes is all the time necessary to cause the bone-ash to absorb all the impurities in the bullion, leaving a mixture of pure gold and silver. This jumble of an ordinary fire test will be amusing to any one who ever made an assay of ore.

Another gentleman, Mr. Marshall of Nebraska, disdains to fritter time away on the production of the present depreciated white metal, and devotes his time exclusively to the production of gold. Mr. Marshall has not only succeeded in producing gold, but has reasoned it all out. He thinks that the others in the same business have not caught on to the most economical process; and in a communication of some length, addressed to the editor of this paper, he gives his views in detail. Among other things Mr. Marshall says:

"For some ten years in experimenting with and perfecting my method of extraction I have all along, sometimes, that is, in some earths and ores, gotten phenomenal results, such as I detail. For instance in New York sands I got $7.50, $12, $25, $30 and $50 from the same sands just according to how they were treated. It was the same sand, and none of it would run more than a trace to $4 by ordinary fire assay. I never knew chemical analysis to get over $6 and generally a few cents. I was a trained chemist before I became a lawyer but never made any professional use of my chemical training. I studied chemistry and became quite proficient therein because I liked it. So you see I approach this matter from the view of a trained chemical expert. For a long time I entertained the chemical views, traditions and prejudices of a trained chemical expert. Had I not been bound by them I would have made more rapid progress. I refused to accept facts until forced to do so. I kept getting the gold—the extraordinary yields in some materials—not in all, not revealed by assay or even analysis. Now I find it possible to apply the principle to all ores—that is all 'dry' ores. It seems only a question of application. About three years ago I was refining or rather separating a bar of bullion from an experimental run. It contained silver, gold, copper and iridium. I separated some four ounces of gold and some sixteen ounces of silver. I had my ideas of a flux for 'saving' the gold. When I got my silver bar I tried it for gold again and found considerable gold in it. I parted again and fluxed and smelted the silver again. Still it seemed to contain just as much gold. Seven times consecutively I parted the bar and still the gold nowise disappeared. Afterward I kept on parting until I had dissipated the silver in manipulation and kept getting gold about the same yield. Then I put a silver (standard) dollar in a crucible, fluxed and melted and parted as before and got ten cents' worth of gold therefrom. Then I took C. P. silver and found the gold was 'produced.' I succeeded in applying the same principle and 'producing' gold by a similar combination from not only silver but iron, copper, aluminum and iridium as well. The latter is easily changed as there is no necessary change of gravity. It is most readily produced from alloys. Putting a little iridium into much silver will increase the yield of gold immensely and the other metals as well. These I accidentally got tangled up with a sulphide of silver in my manipulations and I got $3 worth of gold all in a bunch. So I deduced the fact that sulphur was a proper constituent. I finally succeeded in taking sulphide of silver or iron and nitrate of silver and producing a nice leaf of gold with the blowpipe. Finally I found by taking artificial sulphide of iron (this, as you may be aware, being nothing but iron filings and sulphur fused) and treating the same as a natural ore I extracted about $15 gold per ton. This can doubtless be increased to $40 or $50 per ton, as my work was defective in pulverizing, etc., when I got the $15. Here, you see, is the way by which one thing suggested another until it explains the extravagant yields of the process; so what appeared a phenomenon becomes a law, a necessity. Here is where it is most valuable. Now, a word as to the alchemists, Dr. Emmens and Mr. Brice. I know Dr. E. and have a high regard for him, and think what he claims as to production is true. As to the financial success of its production, it remains unproven as yet. I have doubts as to the profit, he only claiming 25 per cent profit; and there is expensive material and expensive work. As to Brice, I have very little confidence; he depends upon an alloy. His principle is correct, but it produces only a little gold. I have mentioned these alchemists and something of their methods. We have Dr. E. producing gold by 'force and impact' and low temperature and Brice producing by 'alloy.' I have a friend who also produces by 'alloy.' I have his formula. Another has produced a little chemically. My reaction, as you see, is strictly and only chemical. I might cite other instances of lesser note, but at least we have three different methods attaining the same end. This proves gold is not a compound, but is a condition of matter. This deduces a little hint of what an 'element' may be. There is some molecular or atomical law of crystallization or combination of which we know nothing, but which exists. It seems very evident to me, and I will illustrate what I mean. Suppose each little '°' below an atom or molecule:



"Of course, this arrangement is fanciful. We absolutely know nothing about it, but any force, gravity, electricity or chemical reaction which will cause these atoms in the different substances to rearrange and make the combination



will produce gold. Gold is not the only element I have produced. In all these reactions with metal other than silver some silver is produced. By changing the chemical combination it is very easy to produce silver from iron or aluminum. And I have in my experiments produced iron from silver, and came very near producing platinum from silver—that is, it looked like platinum, resisted acids, but somehow was lacking. I did not pursue it to conclusion. Again, I asked Dr. E. what caused him to take this course, and he answered that it was finding by working in nickel and cobalt that they seemed at a certain stage interchangeable. This was discovered from trying to produce pure cobalt and pure nickel. Here, therefore, you see, is more than a prima facie argument showing an 'element' is a certain condition of matter. Moreover, I have met several other phenomena in my experimentation. For instance, working in N. Y. sands I found by changing the electric current I had as a result no gold or silver, but from 2 to 5 lbs. of chemically pure mercury per ton. Now I never knew any analysis of N. Y. sand to show mercury. I have tried, myself, carefully and repeatedly to get the sensitive reaction of KI., making the red iodide of mercury, but could never get it. Still I have found 'traces' of metallic mercury, but nowhere near what I have produced. I washed out 14 ozs. chemically pure mercury from 500 lbs. of sand thus treated once. I found this also a convenient way to reduce low-grade mercurial ores, and of course very cheap. In the same way, by variations, I separated silver, aluminum and sulphur at will in considerable quantities. As to commercial profit I am uncertain, never having had the opportunity to pursue to a conclusion. So you see the principle of my method is entirely new, and belongs not only to gold but other metals as well.

"I have told you, taking an artificial iron sulphide containing no gold beyond, perhaps, a mere 'trace,' I produced about $15 per ton gold, with an almost certain probability of quadrupling that yield. Where do we find, so far as we can ascertain, the primary and largest source of gold? Is it not in the iron sulphide veins? True, we find gold in everything. I get it from lava, but the great and best sources are sulphides. Then am I not in exact concordance with nature? If gold can be produced from a sulphide, is it any wonder that with the chemical reactions of nature and the necessary 'force and impact' and perhaps the principle of 'alloy,' that we find gold primarily in the sulphides? Again, we frequently find veins, North Carolina being an example, where the oxydized portion will be rich, running up to $100 or more per ton, while the 'live ore,' when struck, yields only $5 to $6 per ton. Whence came this difference? I am aware miners generally have the impression that the deeper the mine the richer the ore. This is, I think, a hallucination, but in any event where it occurs it arises from fixed mineral principally and not the necessary rule of increase of value. In other words, exposure to the atmosphere, I would demonstrate to you under proper conditions, increases the yield of gold. I found a ledge in New Mexico where the outside for a few inches ran $20 to $30, while inside it decreased to a 'trace.' Upon somewhat the same principle depends both my success and Dr. Emmens'. As to Brice I know not. Just to-day comes a great story of Brice's success. It may be so. I understand the principle to a degree, but its financial success I cannot conceive of. Thus you have the whole principle. In the printed statement you have the results. I have now briefly recounted how I was led up to these results."

Mr. Marshall's article may, if nothing else, add something to the gayety of the mining world. He kindly points out toward the close the illusion which he believes miners labor under, of thinking that the deeper the mine the richer the ore. Upon reading Mr. Marshall's remarks those miners who harbor that belief will see how badly mistaken they have been all along; and likewise will note the valuable addition to the general information on mining subjects that Mr. Marshall vouchsafes, wherein a ledge in New Mexico of "outside" ore ran $20 to $30, while "inside" it petered out. It is probable that Mr. Marshall ran up against a ledge where the surface was free milling ore, sulphurets developing as depth was attained—which is not an uncommon phenomenon the world over. His alleged ability to produce fourteen ounces chemically pure mercury from 500 pounds N. Y. sands is also of lessened value when it is taken into account that it is not probable such extraordinary attribute is shared by the sands of this coast, though probably were Mr. M. to experiment with Carson river sands below the old Comstock dumps he might find even more than the same proportionate amount of mercury therein. The letter is published merely to illustrate the mode of thought, the absurd and fanciful claims of the writer and the evident fact that he himself believes in the truth of all he says, which is a characteristic in all ages of devotees at any shrine. Of course, it is difficult to imagine how any one outside of the incurable ward of an insane asylum could expect to get $15 in gold per ton out of "iron filings and sulphur fused," but such things are essential articles of faith in the creed of orthodox modern alchemists.

MANUFACTURERS of mining machinery who contemplate increasing their business anywhere in this west half of America would do well to remember that the time to advertise in the MINING AND SCIENTIFIC PRESS is when you want more business. In this regard it is in order to state that it is not the amount of money you spend in advertising, but it is the amount of advertising you buy for your money that tells. You need to be a judge of advertising, its qualities and values, and be able to buy it right, just the same as any other line of goods you buy. It pays advertisers to make announcement in our advertising columns. That is the reason we bring it to advertisers' attention. It pays you. If it didn't pay you, it wouldn't pay us to have you use it. But it does pay. A good advertisement in a good paper is worth more than a poor advertisement in forty poor papers. There are other mining journals, but it is generally conceded that the MINING AND SCIENTIFIC PRESS is the best and gives advertisers the greatest value for the money expended with it.

Hydraulic Mining.*

NUMBER II.

While, for the reasons stated, the flume should, as a rule, be avoided, conditions are sometimes such as to render recourse to the structure expedient, and that independent of topographical reasons, as for instance, where there is much rock to be excavated; where the ground is broken and porous, or water is so scarce that evaporation and absorption should be reduced to a minimum. Where a large amount of lumber is required for flume building, including supporting trestles, it may be economical for the company to manufacture this material instead of buying it, to which end a cheap sawmill should be put up at or near the head of the ditch, and, as the latter is finished and filled with water, float the lumber down to points where wanted. Almost always there is in California, at the head of these ditches, and generally for a long way farther down, timber suitable for making good lumber. A sawmill erected, lumber could be made not only for the flumes and trestles, but for all other purposes connected with the mining, the cutting of sluice boxes included.

In general terms, it may be said that as much grade should be given the flume as practicable, since the greater the fall the smaller the structure required to carry a certain amount of water. The material used in the construction of a flume must be proportioned to the size and duty required of it, much being left to be determined by the judgment of the builder. Usually posts, sills and caps, made from 3x4-inch scantling with 4x6-inch stringers, will suffice for a flume 2½ feet square—timbers, larger or smaller, being employed in proportion to the dimensions of the flume, the posts, sills and caps being set 2½ to 3 feet apart. For lining, well-seasoned, first-class 1½-inch boards should be used, the seams being covered with pine battens 3½ inches wide and ½ inch thick. An open space of a few inches is usually left between the upper edge of the planking and the cap. The posts should be let into the ends of the sills and caps to the depth of an inch and a half, but not mortised or tenoned. If thought necessary to strengthen the flume, the sill may be extended a foot or two beyond the post and side braces be nailed thereto. On the cap pieces a plank is placed to facilitate foot travel along the flume.

Where the latter rests on a trestle or scaffolding, the supporting posts and sleepers of these structures should be well charred to prevent their decay. High trestles should be anchored with strong wires or wire rope as a protection against the force of the wind. It is well to keep always some water flowing through the flume, as the swelling of the planks incidental to the change from a moist to a dry condition tends to induce leakage and draws the nails. As with ditches, waste gates ought to be placed at suitable intervals along the flume, that it may readily be emptied should occasion require. Where exposed to snow-slides, it is customary to make an open cut in the mountain side, and, having placed the flume in the excavation, cover it with a shed composed of heavy timbers roofed over with planks or logging.

When, as often happens in excessively cold weather, there is danger of the water flow in the flume or ditch becoming obstructed by the formation of anchor ice—that is, ice forming on the bottom—the water should at once be turned out or the ice may accumulate to such an extent as to fill the channel solidly and so remain till thawed out by the return of warm weather.

When in building a flume a curve becomes necessary, the outer side of the structure must be raised to an extent corresponding with the abruptness of the deflection. This arrangement, by throwing the accumulated water to the opposite side, tends to equalize the flow over all parts of the flume. When this occurs, the boxes or sections of the flume, usually 12 feet long, have to be shortened, the posts, sills and caps at the same time being set closer together. For the more readily effecting this curve, the side planks are on their face cut with a saw, the bending of the plank closing these cuts tightly.

For the construction of a box or 12-foot section of a flume 2½ feet square, 261 feet of lumber, board measure, are required, being at the rate of 106,100 feet per mile. For a flume 4 feet wide, 3 feet deep and one mile long 241,560 feet of lumber are required, while for one of these structures 7 feet wide and 4 feet deep of equal length 303,160 feet of lumber would be called for.

Iron Pipes.—Among the obstacles encountered in the conveyance of water to points where required for consumption or use are elevations above and again depressions below the common ditch level. For surmounting the former, recourse to iron pipes may be had if sufficient head to force the water over the obstruction can be obtained without going up the ditch too far, thereby necessitating the employment of an objectionable length of pipe. So, too, the elevation may be pierced with a tunnel if here again the cost of the adit is not so great as to make its construction impracticable. There being no other alternative, resort to one or the other of these expedients must be bad, if either be feasible—a point to be determined by the preliminary survey—or else the projected enterprise must be abandoned.

Where the trouble to be overcome consists of a depression of the surface so deep as to preclude recourse to fluming, then the iron pipe in the form of an inverted siphon must be employed, where the conditions make this practicable.

A remarkable feat of this kind was achieved by the Spring Valley Canal Company, who, for the purpose of conveying 1500 inches of water carried by their ditch across a deep canyon in Butte county, laid down a 30-inch iron pipe extending from one side of the gorge to the other, a distance of 14,000 feet, the point where the water enters this pipe being 980 feet above the bottom of the canyon and 150 feet above the point where it makes its escape. The water here entering the pipe, therefore, had a "head" or hydraulic pressure of 150 feet, yet at this end of the pipe it never attained a height of more than 50 feet above the point of discharge, at the opposite end, a fact denoting that a much smaller pipe than that laid down by this company would have sufficed for the above service. This pipe under the pressure mentioned discharged 53 cubic feet of water per second.

Another notable enterprise of this kind has just been completed this month (Dec., '97) at Junction City, Trinity Co., where a French company put in 5700 feet of siphon passing over a 280-foot canyon. Of this, 2200 feet is No. 10 iron 30 inches in diameter and 3400 feet is 36-inch pipe. The laying of this huge pipe required considerable engineering skill. The whole thing is illustrated and described in the issue of Nov. 27, '97.

Where leakages occur in the slip joints of iron pipes, these, if slight, can be stopped by throwing in a bag of sawdust, or, if somewhat large, by driving in soft, well-seasoned wedges of pine, which, swelling, make a very close joint. If the leak be extensive, recourse must be had to iron grip-bands, clamped on and drawn together with screws or wedges.

(To be Continued.)

*Begun in issue of Dec. 18th, '97.

MINERS BOATING DOWN THE YUKON.

On the Yukon River and at Fort Yukon.

Accompanying the party which left San Francisco July 28th. '97, on the Portland, en route for Dawson City, N. W. T., was Max Newberry, special artist for the N. Y. *Herald*. Herewith are reproduced two of his sketches, one of two miners journeying down the Yukon. The two portrayed went in by way of Skaguay over the Chilcoot pass, thence to the chain of lakes and across by boat to the Hootalinqua, thence down the river 400 miles to the Klondike.

The other picture portrays an overland scene, a party of Klondikers arriving at Fort Yukon. The dogs are preceded by a man on snowshoes, who makes a trail in which the animals walk. Dogs will not pull a sled unless they have a trail. They are kept in line by another man in front of the sled, who steers by means of a geestick. This man also does a good part of the pulling.

KLONDIKERS ARRIVING AT FORT YUKON.

Notes on Present Western Practice of Metallurgy Economically Considered.

NUMBER II.

By W. B. DEVEREUX.*

In both custom and mine smelting works the first requisite is a sampling works of sufficient capacity. In order to accomplish good work it is absolutely necessary to know not only the value in precious metals of the ore which is to be treated, but also to have a complete analysis of its earthy or non-valuable constituents. Of course, in a private smelting works the only object in running the ore through the sampler is to determine its value and slag constituents. It is of the utmost importance that accurate and full details in regard to the ore be kept in books arranged for that purpose. In no other way can the metallurgist check the work that he is doing in his smelters, and in no other way can he so make up his ore mixtures as to obtain uniform slags. The ordinary form of book will show the ounces of silver and gold; the percentages of lead and copper, and, in additional columns, the silica, iron, lime, magnesia, baryta, alumina and zinc. The works should be charged with a total of the valuable constituents, even though the quantities are so small in some ores that they are not paid for, as is the case sometimes with small percentages of lead, copper, silver and gold. They are also credited with the amounts of valuable metals obtained, and, at convenient times, a balance is struck and the percentage of values saved is determined, proper allowances being made for values in by-products, fine dust and in furnaces.

Lead and silver smelting less than twenty years ago was a very simple process as compared with the same process at the present time. Smelting was then carried on chiefly with surface ores already oxidized by natural causes and containing no deleterious ingredients. The furnaces were small, slags were easily made, and the smoke and dust were allowed to escape into the air. Very little matte was made, and large percentages of lead were used in the charge. At the present time the easily smelted surface deposits have been exhausted to a large extent; the ores have become complex and carry sulphur; lead ores have become scarce and in great demand, and the percentage of lead used to collect the precious metals has steadily decreased. The presence of sulphide ores also necessitates roasting furnaces. Large quantities of matte are made, and the treatment of this matte has itself become complex, because nearly all of the custom ores carry small quantities of copper which ultimately finds its way into the matte. This has brought about the introduction of copper-metallurgy into lead-silver plants, and there are scarcely any custom works of this character in the West which do not have appliances devoted to the metallurgy of copper. The great impetus to lead-silver smelting came with the discovery of the carbonate ores in Leadville. The first smelters used there were small round water-jackets. With the need for a greater capacity came the introduction of the rectangular furnace, the width being kept about the same and the greater capacity being obtained by increasing the length. There has been a constant effort to get more capacity, and at the present time metallurgists are still striving to build a furnace which will give a greater capacity than those at present in use. It has been found, however, that there are limits to the breadth of the furnace, which is the distance between the tuyeres, and also to the blast pressure. Furnaces have been constructed which exceed the present types in both these conditions, but the results have been such as to fix the breadth for the present at about 42 inches and the blast at 32 ounces maximum. The general type of furnace now constructed has an inside dimension at the tuyeres of 42 by 120 inches. Furnaces 42 by 140 inches are running satisfactorily, and others are being constructed of the same dimensions. The ordinary practice is to make the height 16 to 17 feet from tuyeres, to top of charge. This is an advance of about 4 feet over the height of charge, which is still in use at many of the works, and is necessitated by the increase of blast pressure now used. Some new furnaces are now being made with a height of 20 feet. Sixteen ounces is almost a minimum blast pressure now, and from 26 to 32 ounces is common. Three types of rotary blowers are in use, and these are constructed so that pressure even higher than 32 ounces can be maintained, if desired. Fan blowers are not used by Western smelters.

The increase in dimensions has, however, necessitated more massive construction, owing to the larger amount of material the furnace is to contain. The foundations are of the best. The wrought-iron plate which forms the bottom of the iron enclosure for the crucible must be absolutely tight and rest solidly upon the foundation, preferably upon a layer of cement. Let me caution you here against using cast iron plates for the under part of the furnace, as a slight crack will admit of the passage of melted bullion down into the foundation. I have known cases where tons of bullion have found their way into the foundation of the furnace through a hole not larger than a nail hole, and when the furnace was taken down it necessitated the excavation through the foundation and down into the clay below for 8 or 9 feet, before the last of the bullion was recovered. Crucibles should be made of good firebrick, well luted together, so as to prevent as little absorption of bullion as possible. Generally the jackets rise to the height of the bosh only. Above this the furnace is constructed of brick. Some metallurgists have advocated the construction of the whole furnace of water-jackets. The only real advantage in this is the fact that zinc and other accretions forming on the sides of the furnaces can be much more easily barred off from iron than from brick walls. On the other hand is the liability of injuring the jackets in barring down, the necessity for increased water supply, and the regulation and care of the additional jackets.

Water-jackets are used exclusively for the lower part of the furnace. These are made both of wrought iron and of cast iron. Wrought iron jackets are generally made so that a single jacket forms one side of the furnace, while cast iron jackets are made in sections. Both constructions have advantages. In case of a leak a single cast iron jacket can be taken out and a new one put in very quickly, without blowing out the furnace. The disadvantage of cast iron is its liability to crack. This objection, however, has been overcome to a large extent by making the castings very carefully, so that the thickness of metal is uniform throughout, and changing the form of lugs by which the castings are bolted together, so that the strains will not break these off; consequently the use of cast iron jackets has been increasing in the last few years. In some works cast iron jackets have always been used to the exclusion of wrought iron. The advantages of wrought iron jackets are that there is no possibility of cracking, that the whole side of the furnace can be formed of one jacket, and the life of the jacket, if properly cared for, is much longer than that of the cast iron. If the water becomes low in the jacket and the iron becomes overheated, the sudden introduction of cold water will not cause a crack, and damages to the jacket can be repaired to a very considerable extent by patching on the inside. Very long jackets, however, become very much warped through the difference in the expansion of the inside sheet and the outside sheet, and a very decided bow in the center is established, thus disarranging the interior shape of the lower part of the furnace. Of course, if the furnaces are built in inaccessible places, where it is difficult to replace jackets, one would naturally chose wrought iron in place of cast iron; but where foundries are available cast iron is generally preferable, as a few extra jackets on hand will obviate the trouble which might come from a single jacket breaking down. The old style of jacket, and one which is still in use to a large extent, has for the admission of air a hole cast in the side of the jacket in which is inserted a galvanized iron tuyere pipe. At best the nozzles do not make a very close fit, and when they have been knocked around by the furnace men a few times it is impossible to make them air-tight. Melted slag also damages them to a greater or less extent. When it is desirable to lessen the pressure of blast or cut it off altogether on a particular tuyere, in order to allow the other tuyeres to melt away the slag obstructions, it can only be done by tying the sack so as to close it partly, or by taking out the pipe and blocking the tuyere opening. Of course, in well regulated furnaces running under proper conditions, these things are very seldom required, but at the same time it adds very much to the convenience of the furnace to be able to do them without trouble when they are necessary. If it is easy for a workman to make any such temporary changes he will be more apt to do them promptly. This had led to the introduction of a number of tuyere connections which supply such conditions to a greater or less degree. The general form of these is a cast iron box or pipe which is flanged and bolted by lug bolts to the side of the furnace, so that by loosening two bolts it can be lifted off.

The tuyere box is attached to the main air pipe by a canvas pipe or by a rigid iron connection. Personally I prefer the latter. The tuyere box is also provided with a valve either in front of the tuyere opening or in the upper part. Some forms have valves similar to a clack valve with two openings, one of which opens into outer atmosphere and is closed by the pressure of the air holding the valve up against the opening. In case the pressure is stopped suddenly the valve drops and closes the opening into the air pipe and falls away from the opening into the air. This is for the purpose of allowing the gas which always comes back into the air pipes when the blast is stopped to pass into the outer air, and thus prevent the possibility of explosions, which are sometimes very serious unless proper precautions are taken. Another form of tuyere consists of one box carried around the furnace either in front of the tuyeres or above them and connected to the tuyere openings by close-fitting connections. In many works to-day the whistle of escaping gas can be heard in many places, and I have no doubt that the leakage from these sources, if measured, would astonish many metallurgists who consider their works are running very satisfactorily. It certainly needs but little argument to show that constant leaks, through which air is blowing at about two pounds pressure, must use up in the aggregate a very considerable amount of power. Power costs money, and its loss through mechanical defects in construction is inexcusable.

Furnaces of the type I have described will smelt from 60 to 100 tons a day, according to the character of the charge, together with the addition of a certain quantity of rich slags. These are added to recover their valuable contents, and also to make coarse material in the furnace, which helps to keep the fine ore from packing and scaffolding, and forms interstices for the passage of the blast. It also performs another function which is not so well understood. By this I mean that another slag cannot be melted without a considerable amount of fuel by itself, yet it is universally found that given a charge of ore, running with the least possible fuel, a very considerable amount of slag can be added to the charge without necessitating any increase of fuel. The probability is that the slag, being already proportioned and having been liquid, melts first and acts as a carrier for the unfused slag-forming material in the charge. In other words, it becomes first, let us say, more siliceous, in which form it is very corrosive as regards the bases in the ore, and combines with them when it again has a great attraction for silica. With a furnace of this class running under ordinary conditions, a number of products will be obtained, the disposal of which is a matter for careful consideration. By far the largest product is, of course, the slag. In the earlier smelting practice in this country the slag was tapped directly from the furnace into slag pots, which iron were wheeled to the edge of the dump and the slag immediately emptied out. It was found, however, that in tapping directly from the furnace a certain amount of metal was carried out in the current of the slag, and, in addition, when ores were smelted which contained sulphides, a certain amount of matte was formed which was also tapped out with the slag. When no matte was present, the metal tapped out with the slag could generally be saved, to a large extent, by pouring out the liquid slag and saving the partially cooled shell adhering to the sides of the pot. As soon as the matte became a factor in smelting, it was necessary to allow the slag to cool in the pots, and afterward the button of matte found at the bottom of the cone of slag was broken off and saved for subsequent treatment. This, however, rendered it impossible to save the shells, which were found to be of considerable richness, as the partially cooled slag on the sides of the pot prevented the small globules of matte and metal from settling. The next step consisted of having pots with a hole bored in the side above the height to which the matte ordinarily extended, and, after the slag had sufficiently settled, it was tapped out through this hole, leaving the rich shell on the sides of the pot and the matte in the bottom. This process is used in many works to-day, but it has the disadvantage of making more shells ordinarily than are required as flux for the ore charge. Besides, it entails considerable labor in separating the matte, which is more or less mixed with the slag, and not in as good condition for retreatment. The most feasible way to separate the matte and make clean slugs is by using a forehearth, and this device is now coming into extensive use in lead smelting. With the small furnaces formerly in use, the forehearth was hard to manage, as it gradually crusted up, owing to the lack of sufficient hot slag to keep it heated up to the melting point. With the introduction of larger furnaces, especially those of 80 to 100 tons capacity, it has been found practicable to use forehearths, which collect the matte and from which the settled slag overflows into pots.

(To be Continued.)

* Condensed from School of Mines Quarterly.

A PAPER on experiments in boiler bracing, by Mr. Francis J. Cole, read before the American Society of Mechanical Engineers, showed that the average holding power of stay bolts, when screwed through three-eighths plate and riveted over, when cold, is 16,350 pounds for the worst, and 24,000 pounds for the best, and, when hot, 3470 pounds for the worst and 4613 pounds for the best. This indicates that the best riveted head which can be formed cold, made in the usual conical shape, has a holding power, hot and cold, very much less than the worst form of bolt and solid head, even when nicked or grooved deeply under the head, or bolt-screwed through with a nut on under side of sheet. It does not appear that the solid bottom head-bolts are deficient in holding power when used in this manner, but the principal objection to their use is their liability to injury when screwed into a firebox where the holes are not tapped at right angles to the sheet and where the surface of the sheet is curved.

THE projected tunnel under the Irish Channel to connect Great Britain with the north of Ireland, will be about thirteen miles in length. It will reach from the Mull of Cantire to Tor Point, in county Antrim. The estimated cost is $35,000,000. The Hungarian government has just completed the necessary arrangements for the construction of a tunnel under the Danube at Budapest. There is to be a foot path for passengers and an electric railway, also an upper way, which will be reserved exclusively for vehicles. It will be ventilated by electric machinery.

Mining Summary.

CALIFORNIA.

Amador.

The lowest workings in the Keystone, at Amador City, are 1600 feet on the incline. The vein can be worked to the depth of 3000 feet, and the mine is not half worked out. The mill is running on ore from the upper levels.

Leader: The Jackson M. & M. Co. has bought from J. A. Greenwood the Townsite mine No. 2.

The shaft in the Amador Queen No. 1 has passed the 800 foot mark and Gen. Mgr. Dye is making every effort to get to 1000 feet.

The new shaft of the Wildman at Sutter Creek was started two weeks ago. Mr. Ross hopes to get the shaft down 100 feet per month. It is to be three-compartment.

At the South Paloma, Supt. M. B. Kerr is having the ground between the 700 and 1200 levels prospected.

The Amelia shaft is down 345 feet and progressing favorably.

At the Greek mine, near Esperanza, a rich strike is reported. The mine is bonded to San Francisco people, who have put up a small mill. The shaft is down 130 feet, and the vein is from 2 to 3 feet wide.

Ten tons from the Hirschle Ranch mine netted $22 per ton in free gold. The vein is from 30 to 38 inches.

Butte.

The Butte County M. & P. Co. at Nimshew is locally reported to be in financial troubles and its mine closed in consequence of attachments.

Calaveras.

(Special Correspondence).—The Paragon, Mountain View, Palomacita, Princess, Tip Top, Bullion and Empress quartz mines have been consolidated under the name Paragon Con. G. Mines. They are located near West Point. There are seven parallel ledges, from 2 to 10 feet in width, and worked through tunnels at depths varying from 250 to 400 feet, with a 10-stamp mill, electric lighting plant, and water power under a pressure of 410 feet. This property is under the management of Percy L. Shuman, one of the owners.

The Amador *Dispatch* says that a mining deal has taken place covering properties near Mokelumne Hill. Mr. Shuman, who owned the North Star mine, has associated with him a Chicago man and secured ground covering a distance of 2¼ miles in length and from half a mile to 1½ miles wide. The new company is known as the North Star Con. The channel is 200 feet wide the entire length of the property, with pay gravel 13 feet in depth, estimated at $1 50 to the ton. The motive power will be electricity, taking water from the Mokelumne and Campo Seco ditch.

At the Amador Queen No. 1 Supt. J. E. Dye has arranged to put in power drills, and will begin operations on an enlarged scale.

A good showing has been encountered in the Paragon group near West Point, owned by Mr. Shuman of Mokelumne Hill.

The Spanish Bar on the Mokelumne river will be worked on the hydraulic-lift plan. The mine has been bonded by W. F. Robinson to a German company in San Francisco.

El Dorado.

W. D. and M. English of Oakland are doing assessment work on the Van mine, near Georgetown.

Fowler and Benson purchased a one-quarter interest in the Marshall quartz claim, below Grizzly Flat. In running a 500-foot tunnel they struck a ledge 7 feet wide of promising ore. It is free milling, and from six tons they realized $58.

Gazette: J. A. Elder, at Pilot Hill, is making preparations to erect a 20-stamp mill on his quartz mine.

Democrat: J. Mott has begun work on the Gardner mine, near Fairplay.

The mines in operation near Fairplay are the Old Confederate, the Petaluma and the Uncle Sam—all gravel mines.

The shaft on the Gamblin is down 50 feet and the rock looks well.

The mills of the Union, Pocahontas and Buena Vista mines, near El Dorado, are all in operation, and the Starlight will begin crushing Jan. 1st.

The new mill at the Esperanza, near Garden Valley, is running full blast. About forty men are employed.

Inyo.

The shaft on the Molus, near Bishop, is in 200 feet, and drift 130 feet. The ore averages $30.

Kern.

The opening of the new 10-stamp mill at Johannesburg and the opening of the railroad to that place liven matters.

Miner: On the Pinmore, at Randsburg, twenty men are working, the production amounting to a ton per day to the man. The total development to date on this property is 750 feet of tunnels and drifts.

A ledge of rock running from $60 to $75 per ton was uncovered on the Tip Top last week. The ledge is 2½ feet and two men took out twelve sacks.

Mariposa.

(Special Correspondence).—The event of the past week in mining circles has been the cutting of the Crown Lead ledge in the tunnels of the Red Banks property. The Crown Lead mines are on the mother lode about six miles southeast from Coulterville and with the Red Banks properties occupy the north side of the Merced river, opposite and adjoining the Mariposa Grant. Both properties are under bond to the London Exploration Co. for a price said to be $225,000 and the crosscut tunnels of the Red Banks have been extended to cut the Crown Lead vein, which lies parallel with the former and to the northeast. At a distance of something over 900 feet from the mouth of the tunnel this vein has been cut, showing over 30 feet of pay ore, all of which is reported to assay over $10 per ton and much of it will go many times that amount. The tunnel is about 100 feet above the Merced river and cuts the vein at a vertical depth of about 1000 feet below the outcrop. So far as known this is the most extensive strike made on the southern part of the mother lode in several years and is thought to insure the opening up of these properties, and incidentally of course the Mariposa Grant, which, however, is now become of secondary importance in the transaction.

At the Merced properties about fifteen men have been laid off on account of the completion of the air compressor plant at the Mary Harrison, and power drills will now be used in the stopes. The two men recently arrested at Coulterville for stealing ore from this mine were bound over for trial in the Superior Court. The rock found in their possession was positively identified by the officers of the company, who testified that they had mined quartz in California for twelve months and knew that there was no similar rock within miles of their property. The manager testified that the streak of rock alleged to have been stolen was worth $10,000 per ton. This is partly corroborated by the fact that the monthly cleanup just made is the largest in the history of the mine and shows a handsome profit. Well-informed people claim to see in the recent announcement that "inside friends" would advance this company the sum of $60,000 for further development, the first step towards wiping out the present excessive capitalization of Merced. They point out that another of the Bigelows was recently reorganized through the same process of loans from friends, foreclosure and receivership, and that its new $10 shares are selling at $25. That while the only one of the Merced properties remaining in operation—the Mary Harrison—is a good mine, improving with depth and turning out a constantly increasing margin over its cost of operation, yet it can never hope to pay a satisfactory return on the present investment, which amounts to $1,200,000 over and above the entire output of the mill to date, and the only prospect of getting the property on a dividend-paying basis is through a reorganization for a reasonable sum.

At the Virginia the storage dam is completed and the frame of the new mill is in place, and most of the machinery is on the ground.

A local pool has been formed in Coulterville to explore the Black Bart mine at Curry's Flat, from which large pockets have been taken in the past.

Representation work is about completed here and compliance with the law has been more general this year than usual, owing in part to the increased confidence now felt in Mariposa mines and also in part to the requirement in the new location law of $50 work immediately on location of the claim.

Bear Valley, Cal., Dec. 20th, '97.

Nevada.

The tunnel on the Benton & Murchie gravel mine is 210 feet, and a contract has been let for 200 additional feet.

The Phœnix M. Co. paid the final installment on the Sneath & Clay, on Gold Flat. Mgr. Shockley is making headway in completing improvements.

The Red Dog M. Co., in trying for a permit to build a dam in Greenhorn creek for restraining debris, met with opposition at the meeting of the commissioners, W. T. Phipps appearing for the Anti-Debris Association.

Telegraph: Rich ore has been coming from the 900 drift of the Brunswick. The ledge at that point is about 18 inches and is said to be as rich as the ore that came from the Delbi.

The Grass Valley district reports 40 stamps dropping at the North Star, 40 at the Empire, 25 at the Maryland (Idaho), 28 at the Omaha, 20 at the W. Y. O. D. (Work Your Own Diggings), Brunswick 10, Crown Point 10, Pittsburgh 10, Penna 5, Orleans 5, Gold Flat 5, Custom Mill 15. In the Nevada City district are reported 70 stamps at work at the Champion, 40 at the Providence, Nevada City 20, Murchie 20, Mountaineer 20, Mayflower 10, East Harmony 5, Delaware 5, Stanford 5, Old Home 5, Reward 1, Custom Mill 10.

The shaft at the Live Oak is 100 feet, and drifting has begun.

Development work continues at the Ormonde, Washington.

Herald: A rich strike was made in the Brunswick, Grass Valley, last Saturday.

add calavras

Echo: Work in the Ghost mines, located on the mother lode, is progressing.

A shaft is being sunk on the Calaveras Con at Robinson's Ferry.

Citizen: J. S. Lloyd, at Sheepranch, has discovered an iron mine on his property.

Transcript: Prospecting at the Stanford under the superintendency of Joseph Thomas is satisfactory. The ledge is improving in both drifts. The shaft will be run another 100 feet.

A new pay chute has been struck in the Chapman Ranch mine.

Placer.

Boston—The statement of the Pioneer M. Co. for November compares as follows with previous months:

	Nov.	*Oct.*	*Sept.*
Tons rock crushed	530	508	610
Value of gold bars	$8 367	$9,337	$11,858
Payroll	4,421	4,636	4,441
Bi ls	1,717	1,642	1,271
Total expenses	6,138	6,378	5,712
Net earnings	2,228	3 158	6,146
Average value of rock	15.79	18 38	19.44
Men employed	56	57	56

Sentinel: The Schultz mine near Westville has a tunnel on the ledge 250 feet, and a 2-stamp mill.

At Sunny South twenty-five men are at work.

J. Q. Ackerman is the new Supt. at the Sailor Consolidated, fourteen miles above Westville.

At the Bald Mountain Gravel mine above Westville, the channel is worked through a shaft of 100 feet. Operations will be continued during the winter.

The ledge at the Drummond has been encountered in the new tunnel at a distance of 1213 feet, 750 feet from the surface. A crosscut shows the ledge to be 14 feet between the walls. The Drummond is eight miles northwest of Forest Hill. C. L. Lang is Supt.

Five men are engaged at the African Gravel mine on the American river, three miles from Applegate. M Merrithew is Supt. A shaft has been sunk 54 feet and drifting commenced.

In Placer county Schultz & Warner are operating a property on which they have a 2-stamp mill. The men take out the ore and Mrs. Warner runs the mill.

One hundred ounces of bull on, estimated at $12 an ounce, were shipped from the Boulder, near Ophir, last week.

The new tunnel on the Drummond cut a 14-foot ledge 750 feet below the surface.

A few years ago W. C. Ralston and associates located several thousand acres of ground on the Ralston Divide. The claims were worked as one property, covering eight miles of the channel. A French company, through Mr. Ralston's efforts, took hold of the property, and in April, 1895, they began preliminary work, expending about $1000 per month. Work was partly suspended on Aug. 1st, '97, and resumed Dec. 1st, '97, and will be continued until the property is thoroughly developed.

The Bear River Hydraulic M. Co., near Colfax, has been operating three weeks. The object is to prospect only, and for this purpose 400 inches of water are used, by which it is estimated to move from 1500 to 2000 cubic yards per day.

Remembering the prodigal waste in early hydraulic mining, when 50 per cent from the mines of Dutch Flat, You Bet, Little York, Gold Run, etc., were dumped into the basin of Bear river, anything but a good and uniform prospect in this vast gravel bed would be a disappointment. The Erie M. Co. own the lower half-mile of this gravel bed, with ground below and right-of-way from the South Yuba Water Co., whereby the entire deposit of gravel in Bear river may be readily converted into a big sluicing proposition, which, in fact, it is.

W. Nicholson, Supt. of the Hobart mine, says the ledge in the Hobart compares favorably with the mother lode.

The tunnel on the Haub mine is 1200 feet in bedrock under the channel, and, by a little upraising, shoots the gravel to the main entry. It is said they are taking out an ounce a day to each man.

The tunnel on the Cedar Creek mine is 1300 feet on bedrock, and delivers the gravel by upraising chutes. A. Rogers is Supt.

Plumas.

The Claybank tunnel is being pushed rapidly.

Bulletin: A. G. Cameron is retimbering his drift mine on the North Fork. The pay streak ranges from 40 to 90 feet in width and is from 5 to 7 deep.

H. Kelley is running a tunnel in the San Jose. After 50 feet he will make an upraise to the channel.

Dunn Bros. are erecting a quartz mill near the Wentworth claim.

D. White and son are working their river bar claim.

Sacramento.

Mining locations have been filed this week on the American river channel.

San Diego.

In the Julian and Banner districts several good strikes are reported and there are more men at work there now than for years. The Helvetia mine, near Julian, is being drained of water, that it may be examined. Enough ore is being taken out to pay expenses.

Receiver Pauly of the Free Gold mines at Hedges states that the reported rich discovery by Peter Burke, on the desert between Hedges and Ogilby, is not true. There is no find of dirt running 50 cents to the pan, or any other amount, according to Mr. Pauly. Receiver Pauly warns people that they will find nothing to repay them for their trip to the desert.

San Francisco.

The State Supreme Court in the case of Ball, respondent, G. R. Tolman et al., appellants, has affirmed the judgment of the lower court, that the act of April 23, 1880, "amendatory of an act for the better protection of the stockholders in corporations formed under the laws of the State of California for the purpose of carrying on and conducting the business of mining, approved March 30, 1874," applies to all corporations formed for the purpose of carrying on and conducting the business of mining. It applies not only to corporations which extract gold and silver from ores, but equally to those which extract it by the methods of placer or hydraulic mining. Under possible circumstances the directors of a corporation, when they have failed to comply strictly with the law, may be held excused; but if so, the facts must be within the knowledge of the directors who are sued and should be set forth and proved. Where there has been an entire failure to comply with the law mere ignorance of the law constitutes no exculpation.

Shasta.

An employe of the Iron Mountain Co. writes they have enough metal in sight to last 20 years, and that about 1100 men are employed around the mine, quarry and smelters. Miners' wages at the mine are $2 60 per day—board 50 cents. The foreman says that there are at least 125 men per week applying for work and refused, which sounds somewhat exaggerated.

Free Press: McLeod & Johnson have a crosscut tunnel 120 feet. The ore body is 60 feet in width and averages $5 per ton.

E. P. Connor and son have done considerable development work on several locations. The Jumbo yielded $6000 in one season. A drift has been run on the ledge 40 feet.

Extensive work has been done on the Corinne. The ledge is 2 feet and the ore averages $15 per ton. A crosscut tunnel is in 150 feet.

A shaft on the Phœnix shows the ledge to be 2½ feet. The ore mills $10 per ton.

On the Bonanza the shaft is down 35 feet on a 4-foot ledge. A stratum on the foot wall of the vein gave a return of $3600 per ton. A drift 70 feet showed a small vein of sulphuretic ore and a drift 50 feet shows a ledge of the same kind of ore 2 feet in width.

Hussey, Fisher & Co., on the Alice, near Keswick, have one tunnel 150 feet and another 100 feet, exposing a ledge which runs from $15 to $125 per ton.

The Union, near Redding, is sinking on a gravel channel. They recently put down a 50-foot shaft.

The Afterthought smelter was started last week, after an idleness of a year. The plant has a capacity of thirty tons per day. They have about 1200 tons of roasted ore on hand.

Siskiyou.

Sovey & Clute are working the Kelley diggings on Cherry creek.

W. W. Walters and others are opening a new mining region near Gottville.

Spengler Bros., at the mouth of Humbug, will commence sluicing about Jan. 1st.

The miners near the junction of Shasta and Klamath rivers begin operations Jan. 15th.

The yield of the Blue Gravel mine at Greenhorn last month amounted to $7000. This blue gravel bed extends from Yreka creek up the Greenhorn creek channel 100 feet in depth.

The slab to be used as an invitation to the President for the Golden Jubilee in San Francisco was taken from Major Meyers' quartz ledge in Quartz valley.

Eastlick and Kradle are opening the old Carson mine near Fort Jones.

D. Manning's crosscut tunnel at Oro Fino has reached 140 feet.

Some high-grade ore is being taken from the Quinne mine in Cherry Creek district. The tunnel is being run on the vein 500 feet below the surface.

The Boggs hydraulic mine on Elliott creek was sold last week to Portland people.

Jas. Ironsides has taken $1200 from a seam less than 2 inches wide from the Little Chief.

Journal: H H. Hunter of Yreka is sinking a shaft on the Queen mine at Cherry creek. The ledge is 16 inches wide.

The Garrett, opposite Hamburgh Bar, is still in operation on good pay ground.

The Distlehorst-Barton dredger is at the lower end of Collin's field, in the Klamath, and taking out good pay.

Trinity.

Mining is reported active along the Trinity river. The La Grange started last week. The Red Hill is also working.

Journal: The Lappin Co. near Deadwood has 700 feet of tunnels, levels and shafts. The rock is of uniform grade. As soon as the mine is opened, a stamp mill will be erected. There are nine claims. The owners are M. A. Brady, R. E. Cochran and J. Tourtellotte of Weaverville.

R. H. Clifton of San Francisco made four cinnabar locations in the Hyampom section. The ledge outcrops 4000 feet. He will open the ledge.

Tuolumne.

(Special Correspondence).—On the Philadelphia mine, owned by the Goldwin M. Co., an Eastern organization, a rich ore body was encountered last week at a depth of 400 feet. The tunnel is 496 feet, encountering a 3-foot ledge at 476 feet. This property was idle 30 years. Present operations began 18 months ago. The company has free water. They will put in electric power and a 10-stamp mill. W. H. McClintock at Sonora is Supt.

Sonora, Cal., Dec. 21st '97.

At the Santa Ysabel, No. 3 shaft, No. 2 level, west crosscut, advanced 5 feet, face in hard quartz with a little greenstone; No. 5 level, south drift, advanced four feet with face still in quartz showing some gold. During the month of November the mill ran ten stamps on about one-third time; 227 tons of ore from the Mascot, Central and Knox & Boyle ore chutes was milled, which gave a clean-up of $14.50 per ton. Ten stamps are now running on 15-hour time, and expect very shortly to start the other ten stamps.

Add Butte

Democrat: The Arbona started the ten stamps of its new mill last week. It is operated by water power, a supply of which has been assured the year around. The vein at all points carries an average width of 7 feet that will mill $7 per ton. The rock contains some free gold and a large percentage of high-grade sulphurets. J. R. Sears is Supt.

At the Marble Point the vein is free milling and high-grade. The workings consist of two tunnels, one 20 feet and the other 90, and two shafts 15 and 20 feet. J. Joseph is Supt.

At the Lady Washington a rich chute has been encountered on the 700-level and the owners have instructed Supt. Fisher to draw plans and specifications for the necessary machinery and power drills to run their lower tunnel with all possible speed to tap the ore chutes at the 1400-level.

The Little Pine and Bull Horn placer claims in American Camp are about to start.

Operations have been resumed at the Star, which was shut down on account of scarcity of water.

Supt. O'Connell of the Major McKinley is still sinking a shaft.

It is reported that the Longfellow, near Big Oak Flat, is about to pass to a Chicago Co.

The Gray Eagle, at American Camp, under the management of M. Page, is running.

The Consolidated Eureka is getting out the water that accumulated. Capt. Thomas reports that the stamps will be running soon.

At the Longfellow a 5-stamp mill is being put up. This will be used for testing purposes, soon to give way to a crushing plant of large capacity.

The Ready has its shaft to the 300-level to a tunnel run several years ago. The ledge

at this point is 5½ feet and prospects beyond the hopes of the operators.

Sinking continues at the Grizzly. The last level shows a fine ore body.

At the Dreisam the new steam hoist is in operation. The shaft on the vein has attained 60 feet. Good ore is found.

The Fisher G. D. Co are putting up an additional mill and expect to have it running this week.

Dorsey & Fraser struck a pocket in Jackass Hill. They took out $300 and continued to take out gold every day since.

The Clark Ranch, situated on Deer Flat, has been bonded to Dr. Gould and others.

At the Providence the company are getting their machinery.

Independent: G. W. Plummer and L. A. Engelke have sold the Grey Eagle near American Camp to Koble Bros. of San Francisco.

The Rawhide is running tunnels from the 1300-level.

The shaft at the Ready at the 200-level shows 5½ feet of an average prospect.

Prospects are good at the Skinner and Old Sonora, situated on the Tuolumne river between Jacksonville and Steven's Bar, operated by the Harriman G. M. Co. A prospect shaft has been sunk 85 feet and ore uncovered assaying $60 per ton. A two-compartment shaft will be sunk 500 feet.

W. Sharwood, Supt. of the Soulsby, bonded the Potato Ranch mine, near Phœnix Lake for $50,000. Mr. Sharwood represents San Francisco investors.

Banner: Work began on the Spring Gulch mine, at American Camp, this week.

The California Powder Co. has bonded the McKinley mine at American Camp and are preparing to develop it.

San Francisco people have bonded the Pirate mine, and commenced operations.

The Golden Dawn has been bonded to San Francisco people, and preparations are under way for active operations.

Yuba.

The new mill at the Good Title mine is running on good ore. The new hoisting works will be completed by Christmas and sinking will be resumed. The shaft is 160 feet.

Work is stopped at the Dannebroge and Pennsylvania mines of Brown's Valley.

NEVADA.

The secretary of the Richmond Con. mine at Eureka says during '97 work at the mine has been carried on only by tributers, and that during the year 1022 tons of ore have been raised, containing 834 ounces of gold, 17,955 ounces of silver, and 161 tons of lead. These were sold at Salt Lake City for about $25,000. The Richmond establishment for smelting and refining has cost the company nearly $300,000.

Dec. 10th was the date set for the first payment to be made by the Pecks on the Logan & Hully mine in Como. The Pecks have informed Messrs. Logan and Hully that they could not take the property. The purchase price of the mine was $62,000; the purchase of the Douglass ditch and mill at this place, which was one of the contingents of the deal, would take $40,000 or $50,000 more; a complete reduction works at that point would add at least another $30,000, and a mode of transporting the ore from Como to the reduction works—either a narrow-gauge railway or a tramway—would have brought the amount necessary to carry out the deal successfully close to $200,000, possibly more. When the mine was bonded some three months ago the Pecks agreed to do certain development work on it. This has been done. It is locally asserted that there is now a body of ore in sight close to 250,000 tons, and this ore will average about $15 per ton, from 60 to 70 per cent of this value being gold. Logan & Hully have put men to work to run another tunnel lower down and further develop the property.

Miners have been put at work on the Rabbit Hole sulphur mines in Humboldt county. The sulphur is pronounced by stockmen and metallurgists to be superior to Japanese or Mexican. The mines comprise 480 acres of sulphur bearing territory.

Mgr. Popkiss of the State Line Co. has secured a bond on the Ophir claim. He has opened a body of fair ore, and the company contemplates the erection of a steam hoist.

The Austin *Reveille* is informed that an ore body is struck in the Keystone mine; that the mill will be started up soon, and that a smelter will take the place of the concentrator.

For the week ending Dec. 17th ore shipments were made from Eureka as follows: Eureka Sampling Works, 44,000 pounds; Excelsior, 93,460 pounds; Eureka Con., 66,040 pounds; Jackson, 63,720 pounds; Richmond, 32,700 pounds.

W. J. Nelson, Mgr. of the Boston-Nevada Copper M. Co. of Yerington, says the mill will start the first of the year, and that the company will enlarge the plant to double its present capacity.

OREGON.

The Sanger mine, Baker county, is running full blast.

The Eagle River Placer mine, near Baker City, is doing extensive development work.

W. P. Keady at Sanger is retimbering his mines and putting them in shape for extensive operations.

The Ashland mine was sold last week to Bennett & Reynolds of Minneapolis. The consideration was $20,000. A tramway will be constructed from the Ashland mine to the mill.

Wimer Bros. & Co. are running three monitors at Ashland.

The Victory, at Glendale, is running four giants night and day.

Stein & Bowers are putting in mills with a capacity of thirty tons per day on their Woodville purchase, and driving a tunnel.

C. E. Brown bonded three quartz properties on Williams creek for $10,000.

Ingalls & Friday's last clean-up, six miles below Merlin, averaged $8 per ton. The dyke of porphyry is 60 feet wide.

J. C. Taylor of the Lost Flat mine, near Jacksonville, has a 70-foot tunnel in good ore.

Rowley & Co. have their quartz mill in Uniontown in operation.

Brown Bros. have made a strike in the Canfield property near Jacksonville.

Ten tons of rock from the Free Silver mine, ten miles southeast of Ashland, yielded $45 per ton. The concentrates show $150 gold and 996 ounces silver to the ton.

The Neil Bros. have bonded three claims near Ashland for $10,000 to C. E. Brown.

The Lawrence M. Co. is doing development work on the Matt Johnson property, on Reuben creek, near Ashland.

BRITISH COLUMBIA.

The Dundee M. Co. shipped 540 pounds of ore from its mine near Ymir to London. The ore is principally galena.

The Golconda group, six miles from Greenwood, has been bonded by P. C. Stoess, M. E., of Spokane, acting, it is understood, for the British Columbia D. Co. of London. The amount of the bond is $35,000.

The Evening Star at Rossland shipped 100 tons of ore during the past week.

The Silver Cup, near Trout Lake, employs forty-six men and ships twenty tons per day.

The matte shipments from Kootenay last week were 179¼ tons; total value, $137,860.08 Total value of ore and matte exported for the week, $236,900 03.

The big strikes in the War Eagle and the Deer Park have improved during the past seven days and the showing is better than ever.

The final payment of $47,500 was made for the Porto Rico and Lizzie B. at Rossland last week by the Canadian Pacific Expl. Co.

Smelting returns from a recent shipment from the the Little Joe, at Rossland, are $45 per ton, in gold.

The New Gold Fields of British Columbia, Ltd., has abandoned the Exchange mine near Slocan City. Twenty men have been employed for the past six months, but they have been paid off and the work has been closed down. The abandonment is due to unsatisfactory results, the statement being made that the lead has pinched out. There is a 100-foot shaft on the property and about 150 feet in drifts.

ALASKA.

Improvements on the Thingvalla at Funter Bay progress rapidly. The tunnel is on the vein and will be continued 200 feet.

The Keystone G. M. Co.'s shaft at Funter Bay is 40 feet. The hoisting machinery lately purchased in San Francisco works well. Mr. Cleary is the Supt.

The Hunter Bros. at Funter Bay have driven 65 feet of their tunnel. The rock improves and carries free gold. This is known as the Geyser.

The mild weather permits late work at Silver Bow Basin. The tunnel on the Perseverance has been driven 60 feet. No wall has been reached, though driving across the ledge has proceeded 60 feet.

THE KLONDIKE.

A Tacoma, Wash., Klondike company telegraphed a man of wealth in the East as follows: "We have incorporated for $100,000; profits will be $125,000 monthly. How much stock do you want?" The answer came back promptly: "Will take it all; pay for me out of first month's profits and send me check for $25,000."

IDAHO.

The Cœur d'Alene D. Co. has secured a bond on the Amy group, six miles below Wardner Junction. They have let a contract for extending the lower tunnel 200 feet.

C. S. Jennings of Spokane has bonded the Ainslie group of five gold claims in the Neal district for W. J. Harris, Mgr. of the Le Roi mine. The district is eighteen miles from Boise.

The ores of the Magpie, at Pine Grove, yield $15 per ton in gold. A new mill will be placed in the spring.

UTAH.

Seventy-four cars of ore, bullion and concentrates were billed out of Tintic district last week.

The recent strike in the Mollie Gibson at Tintic assays thirty-five ounces silver and a small amount of gold.

The Old Jordan and Galena shipped 1100 tons during the first fifteen days of December.

This week a 50-ton shipment from the Phœnix was completed.

An average of six cars of ore are leaving Bingham daily.

MONTANA.

Review: Last year the total output of the Butte Reduction works was 3,000,000 pounds of copper; this year the output will total over 8,000,000 pounds.

Nearly all of the W. A. Clark properties in Butte have been merged into the Colusa Parrot M. Co., and incorporated under the laws of the State of Washington. Capital stock $1,000,000.

Miner: The Alice G. & S. M. Co. of Walkerville made a shipment of nineteen bars of gold-silver bullion this week to the refinery at San Francisco. These shipments are made every two weeks and the output the same as usual. The 60-stamp mill of the company is kept busy treating the ore from the Alice. Blue Wing, Magna Charta and other mines are being operated under the management of T. W. Buzzo, and the company is one of the few silver corporations so advantageously managed that dividends can be paid right along, even though silver is not in great demand at the present time. From the Alice, which is one of the oldest and deepest mines in the camp, ore is being hoisted from the 1000-foot level. The ore from the Alice is almost entirely silver, while the ore taken from the Blue Wing carries a great deal of gold. Some very rich ground was recently opened up in the Blue Wing mine, which is less than 700 feet deep. One remarkably rich piece of ore from the Blue Wing has been sent to Omaha as a part of the Montana mineral exhibit at the International Exposition, which opens in that city next year.

The Alice mine is one of the most effective and economical plants in the West, and, it is said, can handle ore that only carries twelve ounces of silver and $1 50 in gold at a profit to the company. It is expected that, even at the present price of silver, the dividends of the Alice Company in the year 1898 will be larger than they have been in the past year. To show something of the development of the Alice Company mines, there are thirty-two miles of open work in the different properties of the company and large bodies of ore blocked out. At the present time the management is doing a good deal of development work, preparatory to increasing the capacity largely as soon as the price of silver goes up to a reasonable figure. In all about 300 men are employed by the company at the mines and mill.

Since operations began at the Ruby mine, Aug. 16th, '97, the mine has produced over $125,000 in gold and silver ore and is now producing at the rate of $2000 a day. In November $70,000 worth of ore was milled and shipped, one carload alone giving returns of $12,000. In October the shipments amounted to about $45,000. It is estimated that there is $1,000,000 worth of ore in sight. The property is developed by a tunnel, although there is a shaft 270 feet in depth on the claim.

The biggest hoisting engine in the West is now being manufactured at San Francisco for the Anaconda Copper M. Co., and, when completed, will be placed at the Diamond shaft, one of the richest of the Anaconda properties.

SOUTH DAKOTA.

At Horn Blende, the new mining camp southwest of Rochford, development work is being done. L. M. Kerney is sinking a shaft. Omaha people are putting down two shafts. Major Simmons is sinking a shaft.

Developments are progressing on the Union Hill Co's. ground at Galena. Ore found in the Eureka shaft goes from $12 to $20.

A body of 4-foot ore was broken into on the Thompson, near Terry, last week, assaying from $8 to $26.

COLORADO.

The Cleopatra M. Co., in Pitkin, has been a dividend payer for six years. The ore is high-grade silver, running over 200 ounces. A. Plewis is Supt.

The Gold Cup, in Gunnison county, is being developed after lying idle a number of years. The ore carries some gold, but the principal values are silver and lead.

The Silver Star M. & M. Co., Silverton, has incorporated to operate on the Letter G. vein, which is a mass of concentrating ore. Work has begun and will be prosecuted during the winter.

A strike has been made in the Newton mine at Idaho Springs by W. E Renshaw. The streak is 10 inches wide and the first-class mineral runs from 10 to 17 ounces gold per ton, besides 100 ounces of silver.

The Windsor Company, operating between Idaho Springs and Dumont, has encountered about 5 feet of solid lead and copper ore in the extension of adit levels.

Work has been resumed on the U. S. tunnel near Idaho Springs. The company has bought the Turner water rights along Clear creek, and will install a very complete plant of machinery and supply the tunnel with electric power for compressors and drills.

The Strong, Cripple Creek, is shipping 100 tons a day to the smelters. The ore ranges at $40.

The Dillon is being developed with a crosscut at 300 feet, but as yet is not a steady shipper.

The Granite has an output of about 500 tons a month.

The Dead Pine is getting up new ore bins and preparing for a much heavier production than the present 500 tons monthly, which averages about $35.

Production from the Hallett and Hamburg goes at the rate of about 100 tons a month, the ore averaging $40.

The Dexter mine at Cripple Creek was sold last week to the Eldorado M. & L. Co. for $25,000. It was a cash transaction.

At the Wautauga, Central City, the main shaft has reached 400 feet. A. P. Kimball is Mgr.

The output from the Isabella, Cripple Creek, the present month will aggregate 2,300 tons, an increase of 50 per cent over last month. Net earnings of the company for November were $8,000.

The Moon-Anchor, Cripple Creek, December production will run 350 tons of 5-ounce average.

Forch Bros. & Heck, Cripple Creek, on the Crown Point, have started active work. An adequate plant of machinery will be erected and work crowded.

Baker & Co., at Victor, are making regular shipments from the Pauper. A shipment was made the 20th, of 18 tons of 5-ounce ore, and 30 tons of the low-grade product.

The Mab shaft, at Leadville, began sinking, all difficulties with the big pump having been removed.

Considerable work is being done on the old Iron mine. While the shipments are not heavy, yet those engaged at work make more than day's pay.

The Crescentia shaft on the property of the Emmett Mining Co., Leadville, has been closed and the machinery removed.

The output from the Royal Tiger, at Silverton, is a carload a day.

At Boulder, a strike in the April Fool opened a vein of sulphides yielding $116 per ton.

The Vindicator at Cripple Creek shipped 300 tons the past week, ranging from $30 to $40 per ton.

The Orphan Boy in Boulder county, owned by a German company, since 1893 has produced $250,000. An offer of $750,000 for the mine is said to have been refused recently. The development consists of a shaft 45 feet deep and two tunnels, 215 and 1145 feet. B. Wise of Denver is Supt.

The Anchoria-Leland M. &. M. Co. will begin within 60 days the erection of a mill, of a daily 60-ton capacity, at a cost of $50,000, at Colorado Springs.

E. De Witt sent out an initial shipment on the Rocky Mountain, Cripple Creek, last week. Specimens were taken out showing crystallized quartz stained with fluorine, showing some gold and abundant sylvanite.

McCormick & Co. of the Tombigbee, on Lawrence townsite, have opened a stringer at a depth of 65 feet assaying from $22 to $400 per ton.

The *Telegraph* estimates the gold production of Cripple Creek for '97 at $13,150,000 This estimate is based upon the fact that for the first eleven months of the year the production amounted to $12,000,000.

The daily output from the Fluorine, at Cripple Creek, is twenty-five tons.

Woods, Townsend & Co of the Christmas, Cripple Creek, output eighty-five tons the past week, consisting of screenings worth $75 and low grade ore worth $30 per ton.

NEW MEXICO.

Development work on the Pinos Altos G. M. Co's. properties is progressing. Surface openings along the vein demonstrate that the ore body is continuous nearly a mile.

The Copper Queen mill, Silver City, will start Jan. 1st.

Jackson & Blatz have purchased one-half interest in the Minnie B, cleaned the shaft and are sinking on the vein, which is 2 feet, carrying copper ore

Crawford & Derbyshire, concentrating the old tailing pile at the Pacific during November, produced 483 tons of concentrates.

A strike was made in the Hidden Treasure, near Elizabethtown, Colfax county, of a 3-foot vein giving values of $80 to $400. The company proposes to add a milling plant.

The Baldy district about Elizabethtown is furnishing evidence of activity. Various operators propose to erect milling and chlorination plants and treat the product at home, shipping concentrates only.

Rubio & Co., Hillsboro, shipped a car of five-ounce gold ore last week.

The last carload of ore shipped from the Brush Heap, Kingston, gave returns of 600 ounces silver and 4 ounces gold per ton.

In the Iron King, at Bland, a large body of ore has been struck.

G. Smith began work at Bland, on the Emerald, Point Breeze and Dolly Varden.

Work on the Albuquerque, near Bland, is progressing steadily.

The New York, largely owned by J. C. Flournoy of Albuquerque, is being developed.

On the Fraction a 3-foot lead of highly mineralized quartz was opened. H. D. Cartwright and T. B. Ward of Santa Fe are the owners.

Bland *Herald*: Deeds transferring the Albemarle group to the party headed by Mr. Posey have been placed in escrow in a Denver bank. The extent of option is nine months, during which time $75,000 is to be expended in the development of the property. The bond call for the purchase price of $150,000.

ARIZONA.

A shipment of a 50-pound bar of bullion was made last week from the Gold Cliff at Pearce.

W. G. Blakely is Supt. for an Eastern Co., which is operating in the Cedar district, in Mohave county. A 5-stamp prospecting mill is in operation.

Major Hampton is shipping twenty-four tons of six ounce gold ore from the Hampton & Leffler lease on the Oro Plata, in Mohave county.

The Temple Bar M. Co. is constructing the works to extract the gold from its gravel bars on the Colorado.

Work on the Grant group at Guijas is progressing. A. B. Sampson is the Supt.

At the Old Dominion, it is said, little work will be done until the railroad reaches Globe.

A new bond on the Continental mines was recorded Dec. 1st between W. Sidow, J. H. Morley and N. L. Amster. The original bond called for the payment of $40,000. The new bond expires June 1st, '98, and the price is $30,000.

LOWER CALIFORNIA.

News from Calmalli is to the effect of a general strike among the miners in the employ of the Ibarra G. M. Co. Work in the various shafts has been suspended, and the cyanide plant only is in operation. It is not learned that the miners have any particular grievance, and the only reason seems to be that they are tired and want rest or a change. Work will probably be resumed in a few weeks with a new force, according to the *Lower Californian*.

MEXICO.

Ground for the Juarez smelting plant of the Corralitos Mining Company has been laid out near the north end of the yards of the Corralitos railway, and a spur track is being now built to the location.

The steamer Orizaba, which reached Guaymas from San Francisco last week, brought 200 tons of copper from Santa Rosalia, the third shipment by the Boleo Co.

A City of Mexico dispatch says the sale of the Inguaran copper mines to Rothschild & Mirrabeaud of Paris, for several million dollars, is the result of prolonged investigation. Messrs. Rothschild & Mirrabeaud will build two lines of railway, one to connect with the western branch of the Mexican National Railway and the other with the west coast, so as to have connection with the Pacific ocean.

ONTARIO.

The Golden Star M. & D. Co. are down 111 feet and have a level at 75 feet. The north drift is 107 feet, and the south is 54 feet. The next level will be started at 175 feet. After developing the mine the company will erect a stamp mill. A. C. Hubbell of Duluth, Minn., is Pres.

Mechanical Progress.

Water Power and Momentous Changes.

The purposes for which water power is being utilized are greatly varied. It is used directly as electrical energy for lighting purposes and for chemical and metallurgical operations. Transformed again into mechanical energy by means of the electrical motor, it is used for working tramway systems, for producing wood pulp for paper making, and for driving machinery of all kinds at the mines or in engineering and other workshops. The significance of this new step forward in the application of water power to industrial purposes is startling. On the one hand, it signifies that man has at last learned how to effectually master and utilize one of the mightiest natural forces of the earth.

Coal is an exhaustible possession, and the day must come when the coal fields of the earth will be worked out. Our rivers and falls offer, on the other hand, an inexhaustible supply of energy; for so long as the heat of the sun evaporates the water of the sea, and causes it to fall again as rain upon the hills or as snow upon the mountains, this source will be available for the supply of man's wants, and the arrival of the time when the earth's coal fields will be exhausted need no longer be awaited with misgivings. But there is another aspect of this development which is less cheerful for contemplation by three of the nations of Europe. The position which England, Germany and Belgium occupy to-day as the leading manufacturing countries of Europe has resulted chiefly from their possession of extensive coal fields capable of cheap development, coal having been in the past the chief factor in determining the industrial progress of any country. The progress of electrical science has, however, apparently changed the conditions of industrial supremacy, and it appears as though the possession, not of coal fields, but of water power, will be the determining factor in the future.

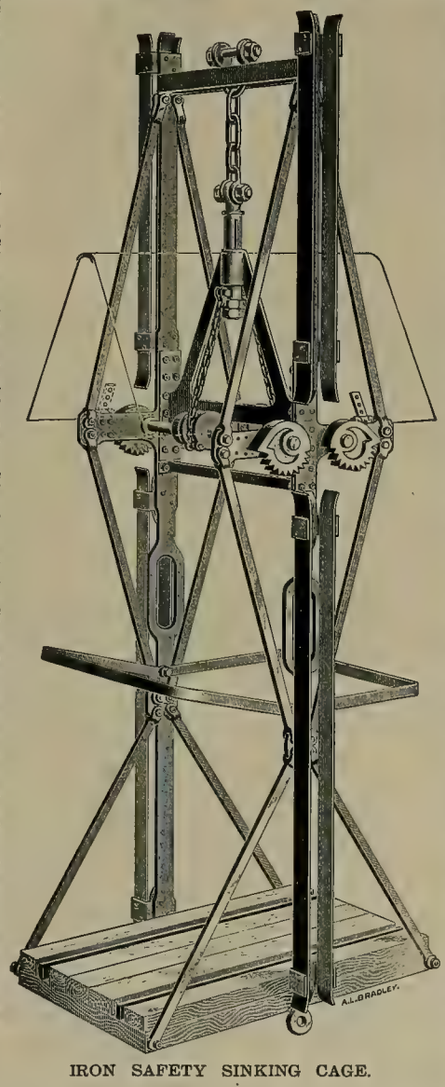
Whether the check of the natural growth and expansion of industry in the older manufacturing countries of Europe, that may already be observed as one result of the increased use of water power in countries hitherto of little or no account in the industrial struggle, will be followed by the gradual migration of the staple industries to the cheaper centers of power remains for the future to disclose, but it is a question of tremendous significance for the prosperity of the countries concerned.

Advantages of Hydraulic Riveting.

The first important point to be attended to when riveting is to be done is to see that the holes are properly punched or drilled, and the rivets of a size to fit the holes. In boiler work the drift pin is too frequently used to bring the holes fair with each other, to the discouragement of all good work. The next thing is to see that the rivets are long enough. Good work cannot be done if the rivets are not of sufficient length to allow a proper head to be turned up. Also the rivets must fit the holes. With a rivet too small to properly fit the rivet hole good work is an impossibility. The plates must further be held closely and firmly together when driving the rivets. It is one of the strong points of hydraulic riveting that the plates are forced together and held there while the riveting is being done; and in hydraulic and other power riveting it is of vital importance that the rivets be of sufficient length. If a trifle too short when hand riveting is done, the rivets can be coaxed into shape after a fashion; but with the machine riveter there is no chance of doing even a half decent job unless there is stock enough in the rivet to fill the machine set. The test of sufficient rivet length is to have a slight fin or rim of metal crowd out the ball around the heading tool. The fin need not be very wide—it should not even require removing but it should be there and of even width all around the outside of the heading tool. In hand riveting the best work is done when a rivet is driven here and there, bolts being used in the other holes to clamp the plates together while the intermediate holes are being riveted.

Safety Sinking Cage.

The engraving shows a new iron safety sinking cage in which the details are so clearly portrayed as to make no explanation necessary. It is manufactured to order by the E. P. Allis Co., 9 Fremont St., San Francisco, to suit the size of shaft, with track of the required gauge.



IRON SAFETY SINKING CAGE.

In the operation of the plant of the New Jersey & Pennsylvania Concentrating Works the dust was for a long time a great nuisance in the bearings of the elevators and conveyors. At last Mr. Edison came to the conclusion that as it could not be got rid of he would turn the bane into an antodote. He now has a form of oil feed and bearing in which, after the oil is fed, the bearing is dusted over so as to prevent the oil running away. Dust from the surrounding air soon cakes on additionally, but as soon as the film grows too thick and heavy it is automatically flicked off, when the oil feeds again. The dust skin or shell reforms and the same cycle is repeated indefinitely. The bearings are thoroughly protected and once a month is often enough for refilling the oil cups.

Probably the largest penstock ever used in connection with the development of water powers in Canada is being built at the works of the Laurentide Pulp Co., Grande Mere, Que., on the St. Maurice river. The main penstock is 14 feet in diameter, made from $\frac{7}{16}$ inch steel plate, 550 feet long, and with its branches has used in the neighborhood of 300 tons of plate.

Our New Mexico and Arizona traveling correspondents write that there is a growing demand throughout that entire region for gas engines, wherever wood for fuel and water for steam or electrical purposes are scarce. There is a big future in the trade of gas engines; the innumerable uses to which they are applied are a recommendation and sure to create a demand. A gas engine expert says there are to-day American gas engines being extensively used in Europe. In Paris there are engines of 600 H. P. that were made in this country some time ago. Any town where ordinary gas is manufactured can be made a field for the sale of gas engines, and the use of crude oil and gasoline enables country residents to utilize the power. Gas engines are made from ½ to 600 H. P., and the many uses to which they may be put are extraordinary. Central and South America are beginning to buy these machines, and it is expected that as their many uses are shown the demand will increase.

The plan of winding steam pipes over 8 inches in diameter with $\frac{3}{16}$ inch copper wire, thus nearly doubling the bursting pressure, is an important change in engineering practice. That the thickness of sheet copper forming the pipe may be reduced to the minimum, and at the same time insuring the full advantage of wire winding, an improved system of manufacturing steam pipes has been devised, described as consisting in simply using copper of the thinnest possible gauge to form the interior or core of the pipe, while the body proper is composed of steel wire wound closely around the core, the interstices being filled in solid with copper by electrodeposition. Increased strength comes from wire winding.

The chainless bicycle is the latest. It will not prevail. Bicycle makers have taught a good deal on the general subject of locomotion, and it is not impossible that locomotive makers may take radical lessons from them about building locomotives. There is much that might be learned and adopted about the use of tubing, and why not also about the use of the chain? All have more respect for the chain as a power transmitter than they had ten or twenty years ago. It is believed to be entirely practicable to-day to build a locomotive with high speed, perfectly balanced, smooth running and economical engines and chain transmission to all the axles. With electrical manufacturers intent upon swallowing everything in sight, it can scarcely be pretended that the time-honored old locomotive is as safe as it once was, and there was never a time when revolutionary suggestions were more permissible than now. With electricity substituted as a motive power for steam, and chain transmission to all the car axles, that would be, indeed, a revolution in locomotion to wake Stevenson from the dead.

In reply to an inquiry as to what method can be adopted in the construction of a connecting rod, to allow for the adjustment of the brasses and still keep the rod of a uniform length, it may be said that this can be done by constructing the cross-head end with a tapered key and gib, as ordinarily used on stationary engines, and the crank-pin end of the marine type, with two through bolts, bolting the brasses to the butt end of the rod. In this way the adjustment of the cross-head end brasses for wear lengthens the rod, and the adjustment of the crank pin brasses for wear, shortens the rod. A change in length of the rod, if any, will then be caused by the unequal amount of wear of the brasses at either end.

Electrical Progress.

How To Become an Electrical Engineer.

Written by George B. Lauder for the *Electrical Review*.

If the young man asking advice is able, from a financial point of view, to study electrical engineering in some of the reputable schools or colleges in this or other countries, he should do so as the quickest and best means of getting much of the required knowledge. At the same time he should make it a point to become as familiar as possible with the practical applications of electricity previous to commencing the study and during the vacations, as, by so doing, one is able, from the practical experience so gained, to more easily understand the theory. Practical training may be gained by working with some electrical construction firm or in some electric light or power station. Any further advice in a general way would seem unnecessary, for there would be but the one sensible course to be pursued by such a young man.

Presupposing that the seeker for advice is 18 years old, has had a common school education, but is unable, from the lack of the necessary money, to prepare for and take a course in electrical engineering, the writer, acting both on practical experience and from observation, would submit the following advice:

Starting with the above conditions, it will be possible for a determined young man to become an electrical engineer at the age of 30, though not much, if any, before, for the twelve years are none too many in which to prepare. To be sure, as many have done, one might, after two or three years' experience as a wireman, hang out his shingle: "Mr. So-and-so, Electrical Engineer;" but the ability of such a one would exist solely in his own imagination or through the ignorance of those with whom he came in contact. Our young man must not only work hard during the day, and do it every day, but, together with that, he must devote most of his evenings and other spare time to studying books, and in that way get the benefit of the work and knowledge of those who were before him. There is no other way, and unless that is done faithfully and continually, success as an electrical engineer is impossible.

The first step is to go to work for some concern which does wiring for electric lighting, and learn how to wire houses, etc., not with the idea of becoming an expert wireman, but because, by so doing, one can obtain, probably as quickly as possible, some conception of one or two of the first principles of electrical science. Two years should be enough in the wiring business, and it would be well to drop it at the end of that time. During these two years some conception of "volts," "amperes" and "Ohm's law" should be forming in the young man's mind, and he would be learning his needs in regard to reading matter. It would early be advisable to send to the *Electrical Review* for a catalogue of their publications on electrical and kindred subjects, to select a few of the simplest works on electricity and to try and read them understandingly. A thing should not always be taken for granted simply because some book states that it is so; one should satisfy oneself that it is so and why it is so, for then one is reading intelligently and to one's great profit. It is very probable that our reader will find himself floundering before progressing very far in his study, certainly a little later. When he does he has, even thus early, arrived at one of the critical points in his undertaking, and, as he then does or does not, so will he meet success or failure in the future. If he would be successful he must, when he finds he is not reading understandingly, learn the reason why and at once begin another line of reading and study which will

lead up to and make clear the misunderstood matter; and, if he will do so faithfully and in every instance, he will be successfully fighting for the honest name of electrical engineer.

Now, having spent two years as a wireman, and in starting his line of book study, our young man is 20 years old and ready for the next step, which should be to get in with some electric lighting or power company in some small city of from 15,000 to 20,000 inhabitants, and go to work in the station (a station using steam power would be necessary now or later), and in that way open an acquaintance with other principles of the science. A wise young man will not hesitate to keep himself in the best standing with his fellow-workmen, to act the part of a man willing to work, and at all times to bear in mind that he can learn something from others. Here he will have opportunity to become familiar with dynamos and other apparatus, to trace out connections on switchboards and elsewhere, to learn how to repair arc lamps, meters, etc., and will unconsciously become familiar with certain principles, and be constantly opening up new fields for thought and study. Steam engines and boilers should be considered, and our young man should begin to read the very simplest works on steam engineering, and to advance in such reading as fast as it may be done understandingly, but no faster. It will early become evident that a systematic and thorough study of mathematics is absolutely a necessity, and, as time goes on, the study of mathematics must continue.

The question of saving money must be constantly kept in mind, and at the very start a method of saving—as much as may be done without bodily discomfort or loss of health for want of proper care—should be adopted and adhered to during all of the twelve years, for, if the lines herein suggested are followed, the money will be needed by and by.

The writer would advise the young man to stay with the electric company, either with the same or different ones as opportunities present themselves, until he is 24 years old, and during that time to continue his work, study and money saving on the same general lines as have been already laid down. At the age of 24 he should be ready, and it would be advisable for him, to take a special course in some one of the best scientific colleges in this country, covering two years in time, and in so doing to make it a point to get a knowledge of the fundamental principles of chemistry, an insight into the higher mathematics, some training in mechanical drawing and some knowledge of mechanical engineering, and as much knowledge of theoretical electricity as can be obtained in that time. Of course three years would be better than two, but more than three would not seem best at this age. Advice regarding the individual studies to be taken up would be out of place here, for our young man at 24 would know himself about what he needed.

The question of money with which to pay tuition and the expenses of a special course is liable to be a serious one, as quite likely it will have been impossible to have saved enough for the purpose. There are, however, a number of things which may be done. Perhaps a friend or relative may be found who will advance the amount necessary; it is practicable to take out a policy in some life insurance company and borrow the money with the policy as security; one might be fortunate enough to obtain a free scholarship and thus save the bulk of the expense. There will be found, as a rule, some way of getting the money needed, but, if not, the course must be taken at a later time. After completing the special course the young man could do himself much benefit by spending a year or two in some modern machine shop, to learn the construction and operation of machinery in general, to look into designing, if possible, and at all times to continue reading up in mechanics, steam and electricity. The remainder of the time could be well spent in one of the larger electrical manufacturing companies in the country. The writer knows two young men, neither of whom is 30, who have lived much after the ideas set forth in this communication, and who are rapidly approaching the time when they can truthfully style themselves electrical engineers.

THE use of power electrically transmitted from waterfalls, already very large, is increasing. At the present time the total of the larger installations in the United States is 80,000 H. P., which will be increased to about 150,000 when the Niagara scheme is completed. This does not include the numerous small water-driven plants in the mining districts of the western half of the nation. Switzerland comes second, with 32,000 H. P. This figure will be increased to 48,000 when the second water-power plant on the Rhone near Geneva is completed. France follows with 18,000 H. P., which will be increased to 30,000 by the completion of the power plant near Lyons. Germany has only one water power of any magnitude—that at Rheinfelden. This will yield 16,000 H. P. when completed. Italy has 18,000 H. P.; Sweden and Norway, between 10,000 and 20,000 H. P. each, with almost limitless possibilities of further development. England and Scotland bring up the rear with only 4000 H. P., which is due to the circumstance that the surface formation of those countries does not permit of a very frequent application of water as a motive power.

Scientific Progress.

Long-Distance Telephony and the Railroads.

It does not seem within the scope of the ordinary human understanding that the immense passenger traffic of a railroad of the marvelous extent of the Pennsylvania Company, or any similar line, could be visibly affected by the long-distance telephone. Such a statement ordinarily would be received with ridicule and laughter by the common railroad officials, and treated with contempt by the higher authorities. Yet, no lesser personage than James McCrea, the head of the Western branches of the Pennsylvania system, told President M. E. Ingalls of the Big Four and Chesapeake & Ohio railroads that the business of the famous limited train of their company had been practically ruined by this instrument. These two gentlemen met in consultation in reference to commercial relations between the two lines, and during their negotiations the subject of the falling off of the passenger traffic of the country was brought up. Various reasons were given, when Mr. McCrea made his decidedly sensational statement. It is well known that the Pennsylvania Limited was originated and run in a measure for the benefit of the brokers and business men of Chicago and the Northwest, who needed quick action in the matter of travel. The trips to New York were taken upon occasions of utmost importance, when time meant thousands of dollars. By means of the Limited the broker or business man was taken to New York in the quickest possible way. There was no delay in getting there; it meant rapid business talk, and equally as quick a return to Chicago. The business man was willing to pay the price assessed for the development in rapid transit displayed by the Limited.

Then came the introduction of the long-distance telephone. People were slow in realizing its benefit. Slowly but surely they have, however, acquired its significance. A broker in Chicago or a grain dealer in that city has an idea for a big deal; he telegraphs to New York asking for certain information: "Call me up by long-distance telephone and give me your answer." The result is that for $15, perhaps $20, a talk is held with the New York man. He has had an opportunity to concentrate his expressions to the shortest possible statement; he has even jotted it down, and at the proper time calls up his man and transacts business. So it is done every day. Mr. McCrea gave as an evidence that in the past he found it necessary to spend twenty days in the month on the road, leaving but ten days of his time at home. By the aid of the long-distance telephone now he has reversed matters; it requires but ten days of his time upon the road, giving him twenty days at home. In Cincinnati, O., grain men, who have been in the habit of making two and three trips a week to Chicago, say: "Oh, yes, that has been the case with me; I have, for $3 or $4, been able to transact business which otherwise meant a trip to Chicago or St. Louis." The same way with commission dealers and brokers. They indorse the statements of the grain men, and state that the telephone has saved them numerous trips. The financial brokers and bankers use the telephone continually now; in fact, it is quite the feature of several of the more prominent brokers since they have their long-distance telephones, but it has never become so prominent a factor in railway circles as has been stamped by Mr. McCrea's utterances. If it practically interferes with a great train like the Limited, a revolution is certainly taking place in railroad affairs.

A Railroad That Lifts Itself.

In Halford's patent railway the immediate motive power is the force of gravity, and the cars are, as it were, always running down hill. This result is achieved by making the permanent way in sections, whose length is to be determined by engineering considerations, hinged together and supported at each end on hydraulic rams. As the train reaches the junction of two sections it puts the hydraulic machinery in action, so that the ram rises, lifting the end of the section, together with the cars that are upon it. The train thus has a decline, down which it runs by its own weight, and as the same process is repeated with each section, it is practically always running down a falling gradiant, continuous though of varying steepness. The necessary hydraulic power is conveyed through a pipe laid beneath the rails, and the admission of water to the cylinders of the rams is controlled either by electrical means from the cars, or by the weight of the train depressing the section it is about to leave, and thus actuating the supply valve. In the model built by the inventor the rails are raised on columns and the cars suspended on either side below the track, but the system is claimed to be equally applicable to trains running above the rails in the ordinary way, though in that case it is considered that the limit of speed consistent with safety would be much reduced. With a full-sized railway the stroke of the rams necessary to produce a high speed would, it is claimed, not be very long, and the passenger would experience little, if any, of the switchback motion which might at first sight appear inevitable. As a model the invention works prettily.

An Arizona Pickling Plant.

The Arizona Timber & Lumber Co., at Bellmont, is under contract to the Santa Fe Pacific to supply hewn ties for six years. The life of a tie is only four years. The Wellhouse patent, which has run out, will remedy this, extending the life of a tie to thirteen years. In the main building are two cylinders, each 110 feet in length, the pump and six compressors. To the north are two large tanks, set on a score of pillars of cement. East are two buildings for storage of chemicals and general supplies. Adjoining is a vat house with a tank in which is made concentrated zinc chloride solution. This tank is lined with lead three and one-half tons weight. The materials necessary to the solution are transferred by the trolley from the storage building. Steam is used in the cylinders and for motive power. On a platform 22 feet wide by 500 feet in length ride the cars loaded with ties, held to the iron trucks by chains. Thirteen of these cars will run into each cylinder, each cylinder having a capacity of 400 8-foot ties, when the cylinders are hermetically sealed. A "nigger" is operated at each end of the platform, the means of drawing the thirteen cars or trucks to and from the cylinders.

The treatment begins with sealing the ties in the iron cylinders or retorts. After the vacuum in the cylinders or retorts is pumped, steam is turned on for five hours. A vacuum is again created and then the chloride solution is forced into the cylinders, this solution being the antiseptic that enters into the wood and prevents decay. This pressure of 100 pounds to the square inch is kept up two hours. The entire treatment runs from twelve to fifteen hours. The two tanks outside of the pump room contain 95,000 gallons, one carrying the zinc chloride solution and the other the tannin solution, both necessary to the complete execution of the method of treatment, after the wood has received a steam bath. A tank lined with five tons of lead stands beside the two larger ones, this containing concentrated zinc chloride, which is fed from the tank previously mentioned. The whole process of handling ties from the loading on the trucks and taking a course of treatment to that of piling up again in the yard ready for delivery costs the railroad 15 cents per tie.

There are now 120,000 safed ties on the grounds. The capacity of the plant is 1000 ties per day. Ninety men are employed.

SPOKANE and Tacoma, Wash., Portland, Or., San Francisco, Los Angeles and San Diego, Cal., are to be connected by the longest telephone system in the world. The circuit will be 1800 miles in length between Spokane and the Mexican boundary. The Sunset Telephone Company's northwest division is preparing to build across the Cascade mountains in '98, connecting by a direct line Tacoma and Spokane, which now talk to each other via Portland and The Dalles. At present the Sunset telephone line runs southward to Eugene, Or., then to Redding, Cal., a distance of 300 miles, through the Siskiyou mountains. This gap is to be closed next year. A series of circuits which can be connected in a continuous line is now in operation between Boston and Omaha. This line is about 1700 miles long, 129 miles shorter than the Spokane-San Diego line. An extension to Helena, Mont., is not improbable from Spokane. This would make the line 2211 miles in length, and make a long-distance record not likely to be equaled until the company gets its proposed line to the Klondike in operation.

THOUGH the ramie plant is susceptible of cultivation in southern California, Arizona and New Mexico, one difficulty in the way of its use has been to find some cheap method of preparing the fiber so as to get rid of the gum it contains. It is reported that a London firm has solved the problem by the discovery of an infusion that extracts all the gum from the fiber. If so, this will lead to the use of ramie on a large scale, as when thoroughly cleansed it can be woven into fabrics almost equal to silk.

Manganese Ores.

Ores of manganese were produced in seven States in the year 1896, the total mined being 10,088 gross tons, valued at $90,727, or $8.99 per ton. This total, which embraces only the ores extracted from the earth and marketed as manganese ores, represents a slight increase over the previous year's output of 9457 gross tons, a gain of 541 gross tons, or 5.67 per cent. The amount and value of the manganese ores produced in the United States in 1895 and 1896 are shown below:

	1895		1896	
States.	Production. Gross tons.	Value.	Production. Gross tons.	Value.
Alabama	2 991	$20,937	3,421	$36,686
California	525	5,400	284	3,415
Georgia	3,886	27,416	4,085	27,032
North Carolina	....	....	2	17
Pennsylvania	460	2,300	265	1,988
Virginia	1,715	15,656	2,018	21,485
West Virginia	....	....	13	104
Total	9,547	$71,769	10,088	$90,727

Amending Federal Mining Laws.

To the Editor:—I find in your issue of the 11th inst. an article by Mr. E. H. Moore of Nevada City, Cal., in opposition to my proposed amendments to the mining code. I infer that Mr. Moore is an engineer. He has expressed his opinions honestly, no doubt, and therefore I can take no exception. Every man is entitled to his opinions as to the mining laws as much as to those of his religion or politics. This matter is entirely impersonal. The fact that I have taken part in twenty-three vigorously contested mining lawsuits is my apology for desiring to keep my mining friends free from such costly amusements. Of these twenty-three suits, the least expensive was the Mt. Diablo-Callison case, which cost the former company $35,000, and was characterized by my friend Judge John Garber as pleaded *in forma pauperis*. The Eureka vs. Richmond, the Eureka Hill vs. Bullion-Beck and Champion, the Iron Silver vs. Williams, the Raymond-Ely vs. Hermes, in all of which I was chief expert, cost the litigants not less than $150,000 each—all of which was money unnecessarily thrown away and filched from the owners of the mines.

All this expense was due to the absurd provision of the "extra lateral" right. Mr. Moore is of the opinion that I am "radically wrong." It is hardly sufficient so to say, and I ask Mr. Moore to give some reasons why I am radically wrong.

Will he kindly answer the question, "Is or is not the extra lateral right the chief cause of our ceaseless litigation?" I would ask him to study the Report of the Public Lands Commission, Ex. Doc. 46, Washington, 1880, and see how few of the mining men, surveyors-general, deputies, registers and receivers disagree with me. I have the best interest of the legitimate miner at heart. I have no sympathy with monopolists, rich or poor. I have sent Mr. Moore a copy of my address before the Miners' Convention and also of the provisional code as formulated by the committee at Denver.

I would ask for his criticism, as well as that of any other well-wisher of the mining industry, and trust he will send it to you for publication. I am in favor of 1500x1500 feet for a lode location. This, by Mr. Moore's own calculation, will give a depth, on the dip of 45°, of more than 2000 feet. The law as proposed by the committee allows ninety days before definite fixing of the boundaries of the claim; and if the locator shall be sufficiently far-seeing, he can take a second claim on the side of the dip, which will assure him a potentiality of over 4000 feet on the line of the dip, even at 45°.

I call Mr. Moore's attention to the map made by Mr. F. J. Wrinkle, mining surveyor, Virginia City, Nev., to illustrate his testimony before the Commission. We all of us know or knew Messrs. James and Wrinkle. The former was all too early called away from us. No better surveyors have ever officiated in our country. Mr. Wrinkle, I am free to confess, favors the "extra lateral right," but his own statement of facts and his own map emphatically enforce my own conclusion. Look at the map! A series of two parallel locations of a width of 1500 feet each—in all 3000 feet—will cover every bonanza found in the Comstock in nearly forty years, extending from the Maryland below Gold Hill to the Utah on Cedar Hill, north of Virginia City, with the single exception of the bonanza found in the Union Con. and Scorpion. Two such locations would have in no way prevented excavations in depth on the principal claims on the Comstock and would have saved to the stockholders, the mine owners, the $10,000,000 spent in useless litigation from 1860 to 1865.

I am pleased to see that Mr. Moore agrees with me that the "local rules and regulations" should go. Some years ago such an acknowledgement would have been combatted as an unjust interference with the god-given right of an American citizen to do as he —— pleases.

He is also good enough to agree to accept my proposition to make the acquisition of a patent less costly to the miner. This is expressly provided for in the proposed code, viz, that honest work, to the value of $500 for five consecutive years shall suffice in order to apply for patent.

As to the sixth resolution I propose that the locator shall be permitted to locate 3000 feet of the channel, dead river or deep placer, as soon as he reaches it. Let him take the whole of it together with a reasonable amount of ground on each side.

If 3000 feet of the channel be insufficient, would Mr. Moore kindly write to any member of the committee and make such suggestions as to him may seem good?

My seventh resolution, "faulty" as it may be, is now the rule of the Commissioner and is the law of the land. The last decision of the Land Office at Washington allows a patenting of any mineral substance occurring in sufficient quantity and quality to make the "land more valuable, by reason thereof, than for agricultural purposes."

My eighth proposition is not a "confiscation of the property of a miner or prospector without capital" for the reason that work for five years at $100 per year renders the claim immune or free from any further expenditure other than the payment for the ground at $5 or $2.50 per acre, as the case may be.

I fail to see how these or any of these resolutions "ties up the prospector's pick."

Security of title is the aim and object of all of them and a prospector can more easily sell a definite quantity of land having within it mineral than if it be sold subject to the proof that he has the apex of the lode which he offers for sale.

Mr. Moore says that our own laws are the "most free on earth."

If he had said that we have no laws at all he would, almost exactly, have expressed it. When a shotgun argument or a heavy purse can be invoked against a poor man, where can we find any law? When the Government allots a claim, the authority granting it should see that it be respected and neither brute force nor money should be potent enough to dispossess the rightful owner (the locator).

Mr. Moore is absolutely in error as to the necessity of asking a concession for a mine in Mexico. I am to-day applying for certain claims "pertenencias," in Mexico, and I have not asked nor I have been obliged to ask any concession from anyone. A "permit to prospect" on private land must be asked from the owner, which generally is freely given because the ranch owners are very desirous of having work done within their limits so as to sell the products of their ranches. Such permits cannot be demanded in the United States. Further, the taxes are not nearly as heavy as in our country in view of the cheaper labor and materials required in Mexico.

Mr. Moore says our only requirement is citizenship actual or intended. That is true, but it is, in my judgment, a most illiberal one. All the Spanish American countries allow an "inhabitant" to take up mining ground.

If Canada were as illiberal as we of the United States, the hegira to the Yukon region would be greatly curtailed. I do not defend the reported heavy taxation of the miners; in fact there is no certainty whatever that it will be enforced. I have spoken with a number of miners who have worked both placers and lode mines under the British flag and have not found a single dissenting opinion as to the fairness and security of title under that system.

W. S. Keyes.
Member of Committee.
San Francisco, Dec. 14th, '97.

To color iron blue, 140 grams of hyposulphite of soda are dissolved in a liter of water (four and two-third ounces to one quart); thirty-five grams of acetate of lead are dissolved in another liter (one and one-sixth ounces to one quart); the two solutions are mixed, made to boil, and the iron is immersed therein. The metal takes a blue color, such as is obtained by heating it.

Proposals Invited for Electrical Apparatus.

In accordance with the act of Congress, approved July 19, 1897, the U. S. Navy Department is inviting sealed proposals until January 29, 1898, for the construction by contract of a Government armor factory, as a whole, in accordance with the plans and specifications. Proposals will also be received at the same time for furnishing separately the whole or any part of the machinery embraced in such a plant. The following is the electrical equipment required: One electric charging machine; two 160-ton and 75-ton electric overhead traveling cranes, with special hydraulic lifts; one 160-ton, one 100-ton, five 75-ton, one 50-ton, one 20-ton and one 5-ton electric overhead traveling cranes; three electric portable grinders; three sets of electric multipolar generators of 400 K.W. capacity each, and each with engine complete; about twenty-five electric motors for operating tools of varying sizes; arc and incandescent lamps, and wiring for entire plant.

All bids must be accompanied by specifications and drawings, showing in detail the machinery proposed to be furnished. The Department presumes that, should an appropriation be made by Congress for the erection of this plant, successful bidders will be required to enter into contract and give satisfactory bond in a penal sum for the performance thereof within the time specified in their proposals. The bidders will distinctly understand that no such appropriation has yet been made, and that not only is the usual right reserved by the Department to reject any or all bids, but that under the statute authorizing proposals the Department will report to Congress the receipt of all bids made, and await its further action. The time in which the work can be delivered or completed must be stated in the bid, and in considering the bids weight will be given to this statement, and also to any statement which bidders make as to the security which they will furnish for the faithful performance of any contract awarded to them.

Prospective bidders should apply in person to the recorder of the Armor Factory Board for information as to details, specifications and plans of such a plant, and for opportunity to examine and use the same in preparing their proposals. Proposals must be addressed to the Secretary of the Navy, Washington, D. C.

Recent California Mining Incorporations.

Eskimo M. & T. Co., San Francisco; capital stock, $250,000; subscribed, $5000; C. P. Yore, G. O. Perry, T. M. Scribner, M. W. McIntosh, D. J. Wren.

Klondike G. M. & E. Co., San Diego; capital stock, $25,000; subscribed, $2005; F. J. Land, T. G. Farmer, N. M. Goodwin, P. F. Ropell, C. A. Ryan.

West Australian P. G. O. R. Co., San Francisco; capital stock, $50,000; subscribed, $10,000; J. Gruss, W. J. Gruss, E. Gustreto, G. Gruss, H. L. Schemmell.

Genevieve M. Co., San Francisco; capital stock, $250,000; subscribed, $250; W. P. Scott, A. J. McGovern, M. B. Woodworth, T. M. Carroll, W. Royal, A. H. Warren, E. Carroll.

Jane Morgan M. & M. Co., Stockton; capital stock, $500,000; all subscribed; J. E. Kidd, R. B. Telfy, B. Kidd, T. H. Ganeard, A. R. McDonald.

Recently Declared Mining Dividends.

Gold Coin M. L. Co., Colo., 1 per cent, $10,000; Dec. 25.

Dutch M. & M. Co., Tuolumne Co., Cal., 5 cents per share; Dec. 22.

The Utah, Utah, $1000; payable Dec. 25.

Mount Morgan G. M. Co., Australia, £25,000; 6d a share for the month of November.

Ontario S. M. Co., 75 cents per share; payable Dec. 31.

Homestake M. Co., S. D., regular monthly dividend, 25 cents per share, and extra dividend, same amount; payable Dec. 27.

Napa Con. Q M. Co. a quarterly dividend of 10 cents and 10 cents extra, payable Jan. 1 to stock of record Dec. 18; 70 cents paid during year. The company is earning at the rate of $1 to $1.25 per share. For the last six months net earnings amounted to $57,000, and $40,000 in dividends were paid, leaving surplus of $17,000.

Coast Industrial Notes.

—California built more miles of railroad (210) in '97 than any other State in the Union.

—Moran Bros. of Seattle, Wash., have a contract from an Eastern "Yukon Co." to build ten steamers and twenty-four barges for $1,000,000.

—The Robertson Raft Company has a contract for 1,000,000 feet of piling, to be made into a raft at Stella, Wash., on the Columbia river and towed to San Francisco.

—The United States increased its export business to Mexico over 12 per cent during the last fiscal year, showing that American goods are satisfying the Mexican trade. American exporters now supply over 50 per cent of all that Mexico imports, and '98 will see this percentage increased.

—Secy. of War Alger, has ordered 600 reindeer and their drivers from Norway, to take food to Dawson. Better use American and Canadian horses. The sooner the better food is got in there, and now is no time to begin making fanciful experiments with reindeer. They will cost $80 each landed at the foot of the Dalton trail.

—The new ferry-boat between San Francisco and Oakland will be built by the Union Iron Works. It will cost $200,000 and will be completed May 1st, '98. When the new boat is put on the line there will be a twenty-minute service between Oakland and San Francisco during the hours of heavy travel, instead of the half-hourly service now given.

—This week there were shipped from Pleasanton, Cal., eighteen carloads, 1306 bales of hops, the last shipment of this season's crop from the hop yards of that place. The total harvest there was 2400 bales, or 475,000 pounds, of cured hops. This entire crop has been sold to a single customer in London. This crop has averaged 1900 pounds to the acre. It has brought within a fraction of 20 cents a pound. The gross figure was $90,000. The harvesting caused the distribution of $20,000 to 2000 pickers.

—The Mexican government appears to be reaching for the control of its Pacific coastwise traffic, which at present is wholly in the hands of the owners of the several American steamship lines that ply between San Francisco and Panama. The object embraces the construction of a port at San Jorge, at the head of the Gulf of California, and the building thence of a railroad ninety-six miles in length to Yuma, Arizona, here making connection with the Southern Pacific. Only eighteen miles of the road would be within the United States.

—There are at present in San Francisco 15,000 bales of cotton awaiting shipment to Japan. During the season of 1896-'97, closing October 31, 1897, the S. P. Co. brought out here and shipped to the Orient 37,000 bales of cotton. From November 1 to the present time they have brought from the Southern States, chiefly from Texas, to San Francisco 30,550 bales, part of which is still to be shipped. There is also an equal increase in the volume of cotton shipments by way of Portland and Seattle. At those places, too, there are large quantities of cotton waiting to be transported to Japan.

—The output of California salmon fisheries this year is 17,695,000 salmon. In the State hatcheries are 24,000,000 salmon eggs that will be hatched and liberated in 1898. The effect of the salmon laws is clearly marked by the collection of salmon eggs at the egg collecting stations on tha headwaters of the Sacramento river. At the Baird station 9,000,000 eggs were collected. At the Battle Creek station 48,000,000 have been collected. Last year the total collection of salmon eggs at all the stations on the coast produced 37,000,000. Under wise legislation—approved by fishermen and canners alike—and propagation, the output of salmon taken from the Sacramento river is rapidly increasing—the only river on the coast that shows an increase year after year for the past six years.

—Bids for supplies for the Mare Island navy yard were opened at the Navy Department last Tuesday. The following were among the lowest bidders: Baker & Hamilton, San Francisco, hardware, $1088; Dunham, Carrigan & Hayden Co., San Francisco, brass wire, $366; Holbrook, Merrill & Stetson, San Francisco, copper wire, $417; Milton H. Cook, San Francisco, rigging, pump and bellows, $1325; A. A. Watkins, San Francisco, Russian iron sheets, $195; Holbrook, Merrill & Stetson, San Francisco, babbitt metal and solder, $387; Selby Smelting and Lead Co., San Francisco, pig iron, $3637; same company, 50,000 pounds of ingot copper, $5825; Williams, Dimond & Co., San Francisco, anti corrosive composition, $5000; W. P. Fuller & Co., 10,000 gallons lard oil, $3887; same company, lubricant and beef tallow, $221, and lamp black, $190; C. M. Gates, San Francisco, 50,000 pounds red lead, $2880; W. P. Fuller & Co., San Francisco, polishing paste, $335; same company, 5000 gallons sperm oil, $2072; Dunham, Carrigan & Hayden Co., San Francisco, water-gauge glasses, $135; Holbrook, Merrill & Stetson, San Francisco, angle, check and globe valves, $4469; Dunham, Carrigan & Hayden Co., San Francisco, files, $2238; Baker & Hamilton, San Francisco, 25,000 pounds cotton waste $1675; Remmer Aden, Vallejo, Oregon pine deck planks, $9847; Libby, McNeal & Libby, Chicago, 10,000 pounds tinned roast beef, $812; Armour Packing Co., Kansas City, 5000 pounds tinned ham, $462; J. Levi Jr., San Francisco, 5000 pounds rice, $250; S. W. Ehrman, San Francisco, 50,000 pounds sugar, $2775.

Personal.

LOUIS JANIN is in Santa Barbara, Cal.

E. KENEDY of Rossland, B. C., has gone to London.

GEO. W. GRAYSON of Oakland, Cal., is in Arizona.

W. O FROST of Placerville, Cal., is in San Francisco.

T. P. GOWER of Madera, Cal., is in San Francisco.

JAS MAIN is Supt. of the Boggs mine, Yreka, Cal.

C. W. SMITH is Supt. of the Mohawk mine, Tucson, Ariz.

W. LAWRENCE is Mgr. of the North Star, Tintic, Utah.

A. T. LAWRENCE is Mgr. of the North Star, at Tintic, Utah.

J. E. JACKSON has returned from Denver to Salt Lake City.

R. C CHAMBERS is Supt. of the Ontario at Park City, Utah.

E. J. DE SABLA JR. of Nevada City, Cal., is in San Francisco.

J. W. PAYNE, Gen. Mgr. Grand Reef mine, is in Tucson, Ariz.

W. D. ROBB is Supt. of the Wellington, near Whitewater, B. C.

C. W. TOZER of Arizona reached San Francisco last Tuesday.

R. L. DOUTHITT is Supt. of the Washington mine at Bland, N. M.

EDW. LECKIE is Mgr. of the New Goldfields mine, Rossland, B. C.

T. R. GEARHARD of El Dorado, Cal., was in San Francisco this week.

A. WILSON is Supt. of the Gage-Wilson Co., Cherokee, Butte Co., Cal.

J. M. BUFFINGTON is Supt. of La Suerte mine at Nevada City, Cal.

SUPT GIBSON of the Black Diamond, Ainsworth, B. C., has resigned.

B. E STAHL is Supt. of the Bent & Alexander mine, Ashland, Oregon.

C BIESEL is Mgr. of the Cœur d'Alene Co., at Wardner Junction, Idaho.

F. ZEITLER, Supt. Champion mine, Nevada City, Cal , is in San Francisco.

STEPHEN C. WILLIAMS, Supt. of the Star, Sonora, Cal., is in San Francisco.

J. H. O'CONNELL, Supt. of the McKinley, Sonora, Cal., is in San Francisco.

RD. PLEWMAN has been appointed Receiver of the O. K. mine, Rossland, B. C.

SUPT. PARNALL of the Old Dom. Copper Co., Globe, Ariz., has gone to Michigan.

H. M. BENNETT is Mgr. of the Dives and Shenandoah mines at Silverton, Colo.

CAPT. JAS. BLACK of Salt Lake is in California examining mother lode properties.

W. H. WESTFALL has charge of the Steger mine at West Point, Calaveras Co., Cal.

L. DAVIS, of the North Star M. & D. Co., left London last week for Rossland, B. C.

L. D. GRAETER of Montana is in San Francisco on his return from Weaverville, Cal.

CHAS. O'CONNELL, Supt. of the Boulder, Shingle Springs, Cal., is in San Francisco.

F. W. WILMANS, Pres. Boulder M. Co., has returned to San Francisco from Rescue, Cal.

CAPT W. H. MCCLINTOCK, Supt. of the Goldwin M. Co., Sonora, Cal., is in San Francisco.

G. S. MILLER, Supt. of the Portland-Alaska M Co., Seward City, Alaska, is in Portland, Oregon.

SAM W. CHENEY has returned to San Francisco from the Mammoth-Garfield, in Shasta Co., Cal.

O. S BUCKBEE, Supt. of the Confidence mine, Confidence, Cal., reached San Francisco yesterday.

A. T. CALDWELL of Portland is superintending the construction of a cyanide plant at Ashland, Oregon.

T. A. CARSON succeeds J. E. Poingdestre as Mgr. of the Good Title mine, Dobbins P. O., Yuba Co., Cal.

GEO. BLAKE, Supt. of the Bell mine, Tuttletown, Cal., is at the Waldeck Sanitarium, San Francisco.

J. B. TREADWELL, Supt. Keystone at Amador City, Cal., has returned to the mine from his trip to Oakland.

G. W. STORCK is the Mgr. of a new M. & D. Co., organized by Sioux City, Iowa, men to operate at Sonora, Mexico.

J. F. PLAGEMAN has returned to San Francisco from the Weiland mine, in Amador Co., Cal., in which he is interested.

TOM T. LANE reached San Francisco last Sunday from the City of Mexico and departed for the Utica mine, in Calaveras Co., Cal.

E C. PLATT of New York, associated with J. W. Mackay, is said to be the purchaser of the Grand Reef mine, fifty miles north of Wilcox, Ariz.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from George Reber in the Badger Hill Mine, near Placerville, El Dorado Co., to deposit tailings in Iowa Canyon; from F.W. Cook, in the Try Again Mine near Placerville, El Dorado Co., to deposit tailings in a ravine; from Matt Yoner, in the Hoosier Mine near Georgetown, El Dorado Co., to deposit tailings in Bear Creek; from Otto Reichel, in the Mountain Ranch Mine near Mountain Ranch, Calaveras Co., to deposit tailings in a ravine; from J. F. Gurney et als., in the Johnston Placer Mine near San Andreas, Calaveras Co., to deposit tailings in a ravine; and from J. G. Underwood and W. N. Lamb, in the Chris Limpher Mine near Plymouth, Amador Co., to deposit tailings in Indian Creek, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., December 27, 1897, at 1:30 P. M

FOR SALE, AT A BARGAIN.

A complete Champion Prospecting Diamond Drill Outfit. Good as new. Used very little. Does succe sful work. For price apply to GOLD HILL MINING CO., Angels Camp, Cal.

Mining Share Market.

SAN FRANCISCO, Dec. 23, 1897.

The same sick and heavy market, which has been a characterizing feature for some time past, held to Monday when Sierra Nevada showed more life and made quite an upmove on reports of an ore strike. This imparted a better tone to shares at that end Tuesday there was another slight strengthening, causing Sierra Nevada to sell up to over 80 cents, when the Gold Hill shares under the lead of Yellow Jacket stiffened slightly, which was sustained yesterday by Belcher moving up slightly. While the market shows considerable strength, yet experienced operators are suspicious that it has no further foundation than a natural rally from the extreme low prices. There can be no doubt of brokers' boxes being well cleaned out of margin shares, for holders had to let go or else take up the little left at the lower prices which have ruled for a few weeks past. Assessments coming due also helped the selling. From all we can learn, there is from two to three weeks more of work to be done in Sierra Nevada before they expect to reach the ore found above, and while the management are hopeful of a decided improvement in it, yet neither they nor any one else can see so far ahead It is a gamble. It is expected that the report of Prof. Ogden on the Brunswick lode will be submitted to-day to the different companies interested on that lode. It is a very long report and goes into the subject in all its minutiæ, from both a scientific and practical mining standpoint. They are quite confident that paying ore in quantity will be uncovered, but the work will have to be changed to the west —heretofore they have been crossdrifting to the east for the ore body. Conforming to this information, work in the Gould & Curry and Best & Belcher grounds has been started to the west. They confirm the opinion expressed in this department that in Potosi the work will eventually develop into something quite important, as it will in Occidental; more depth will be required in Savage. Taking the report as a whole—and it is by far the most important that has been made on any lode in the Comstock district for many years —if future work confirms deductions made by the two experts, we can look forward with confidence to that lode having in store for the management of two or more mines bonanzas of some importance; but it will take time and large expenditure of money before it can be demonstrated to the satisfaction of large moneyed interests—those who back their opinions by $20 pieces.

From the Comstock lode the general tenor of advices is that the work in several mines is reaching points that deserve close watching; yet it may take several weeks before the desired points are reached. In several of the mines it looks as if they are fairly well through with the foundation work for more active exploiting. If the above is correct, then we can look for a fairly good trading market for the next few weeks, which will afford splendid chances to nimble traders to turn an honest dollar. The market is evidently a gamble, for no one can tell with any degree of certainty how much, if any, ore will be developed. Official letters received the past week do not report any change in the work or material of Utah. In Sierra Nevada they are crossdrifting to the east on the Layton tunnel level, and to the west on the 900-foot Union shaft level. Fast progress is being made in the Riley tunnel. In Union they are making fair progress in east crossdrift No. 2 on the 900-foot level. They are in over 70 feet, with porphyry in the face. In Mexican the east crossdrift on the 1000-foot level is in nearly 600 feet. At last advices they were in softer porphyry, showing clay separations. The Ophir west crossdrift on the 1000-foot level is in about 700 feet. It shows vein matter and clay separations. The west crossdrift on the old Central tunnel level is in about 340 feet, with nothing in particular reported. In Con. Virginia active exploiting work is continued on the 1550-foot, 1650-foot and 1750-foot levels. Well-informed miners are quite hopeful of good results following the work now under way. They are still drifting north in Andes on the 175-foot level. They ought to be in position soon for exploiting work. Best & Belcher and Gould & Curry are still engaged in repairing the Bonner shaft. Low-grade ore from Gould & Curry is being reduced at the Kinkead mill. From Savage there is nothing new to hand. No work is being done by Hale & Norcross. Good progress is being made in repairs in the main incline in Chollar at and above the 1100-foot level. When finished, other exploiting work is expected to be started. The south drift run jointly by Potosi and Bullion was at last advices in low-grade quartz. A west drift is being run in Potosi to connect with the north stope above No. 1 crossdrift. Killtime work is still the order on the 500-foot level of Alpha. From Con. Imperial and Confidence nothing new comes to hand. Advices from Yellow Jacket report one shift only at work, but more men will probably be put on in January or February. Nothing is being done by the Kentuck people, so far as we can learn. The work in both Crown Point and Belcher is said to be closely watched, but this has been reported for the past few years, and all that came of it has been assessments. From Seg. Belcher and Overman nothing new is reported in official letters. The work in Justice ought to be nearing the point where they expected to strike the ore found above.

It looks now as if general attention will soon begin to center in the mines on the Brunswick lode. A joint west crossdrift has been started jointly by Con. Virginia, Best & Belcher and Gould & Curry on the 600-foot level to test the report of the two experts. They are also running south on this level. The west crossdrift in Gould & Curry is in about 50 feet. In Chollar work is confined to the 300-foot, 500-foot and 600-foot levels. Nothing new is reported. In Potosi on the 500-foot level they are crossdrifting west as they are in the 600-foot level. They are raising from the latter level. Active exploiting work is being done in Occidental on the 550-foot, 650-foot and 750-foot levels.

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING DECEDBER 14, 1897.

595,450.—CHAIR—I B. Archer, No San Juan, Cal.
595,517.—LUGGAGE CARRIER—H. J. M. Baker, Port Townsend, Wash.
595,372.—GAME—R. S. and F. B. Crooks, S. F.
595 672.—ARTIFICIAL FUEL—J. T. Davis, S. F.
595,673.—ARTIFICIAL FUEL—J. T Davis, S. F.
595,384.—SACK HOLDER—F. H. Gilbert, Ridgefield, Wash.
595,567 —SADDLE HORN—J. W. Haggard, Portland, Or.
595,316.—FOLDING CHAIR—I. G Leek, S. F.
595,334.—BICYCLE ALARM—S. J. Pachtz, S. F.
595.501.—BICYCLE GEAR—J. E. Stoops, Dayton, Wash.
595,356.—CAR FENDER—O. A. Sutherland, Keeler, Cal.
28,033.—DESIGN FOR CABINET—E. H. Ellis, Pasadena, Cal.

Colorado's Gold Fields, Illustrated.

Just out, with correct map and nearly 100 mining views natural as life. This valuable book will be sent free, prepaid, with our big 56-col. family paper 3 months on trial for 25c; club of 5 and 5 books $1. Latest mining news. Mention THE PRESS and address *Illustrated Weekly Sentinel*, Denver, Colo. Cripple Creek is fully described.

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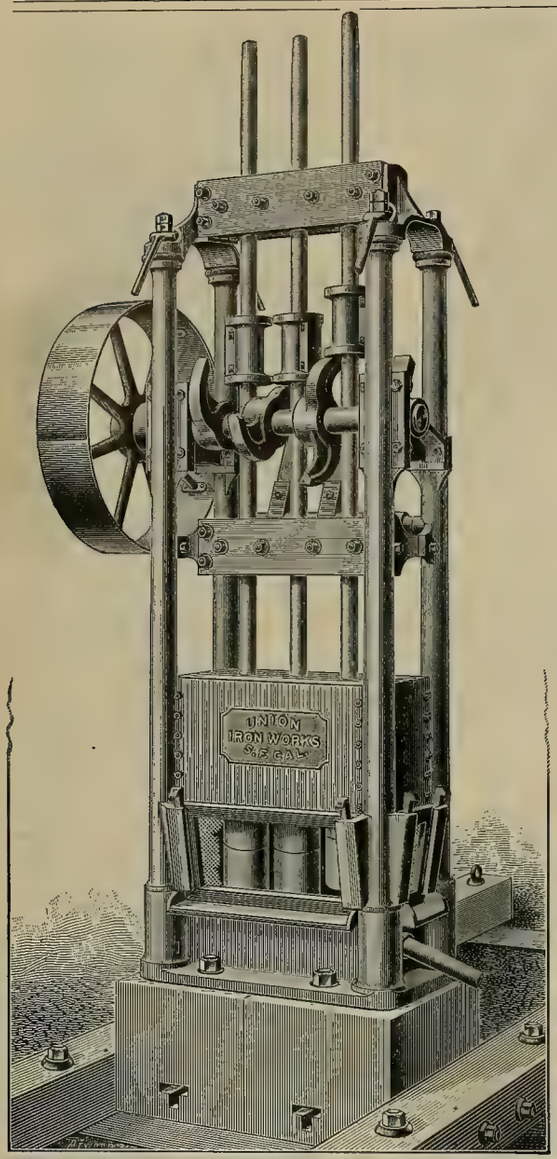

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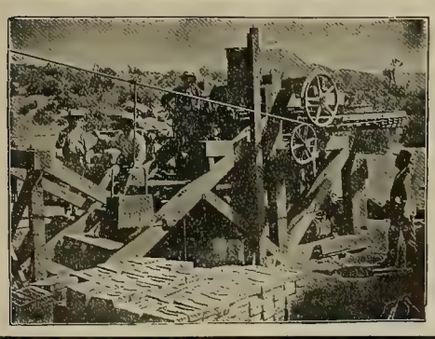

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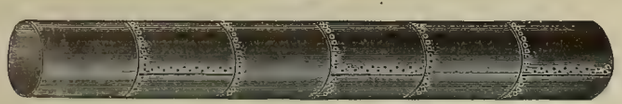

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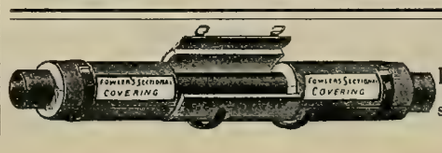

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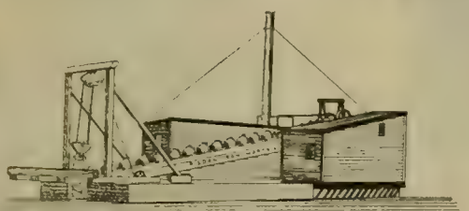

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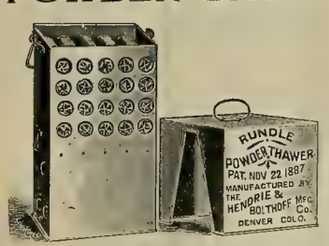

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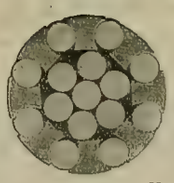

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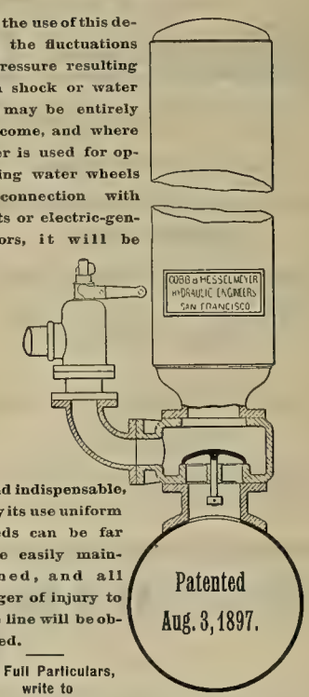

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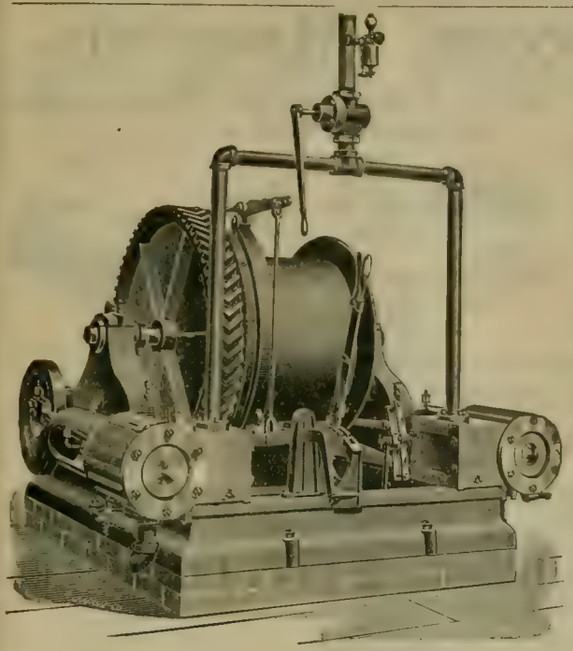

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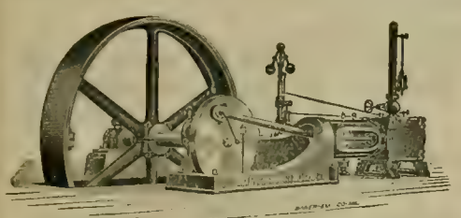

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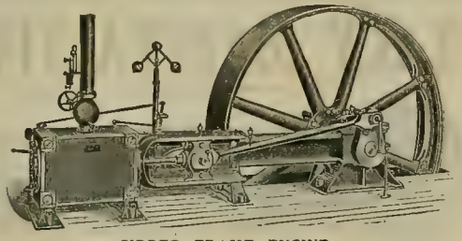

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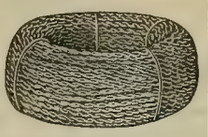

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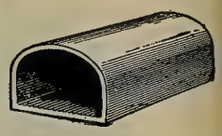

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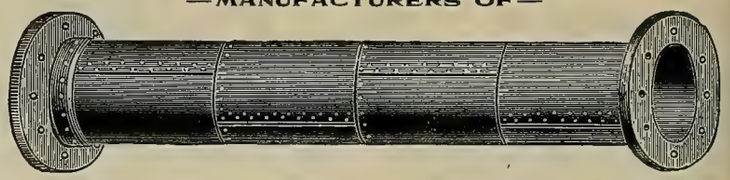

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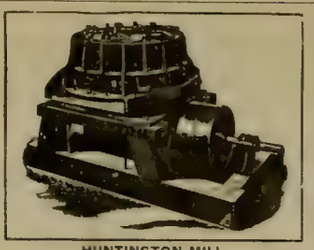

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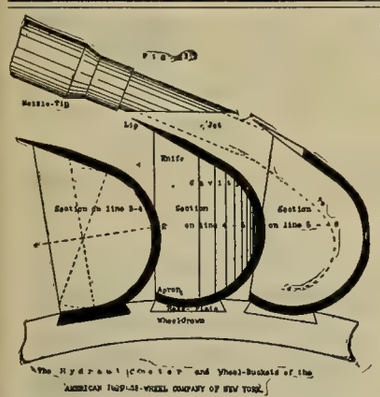

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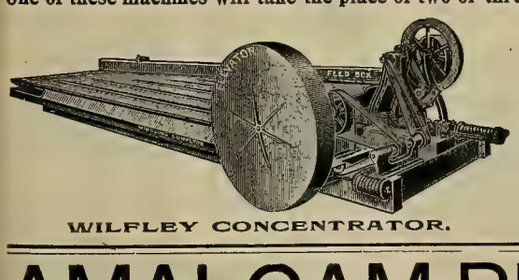

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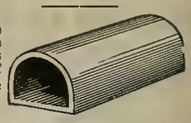

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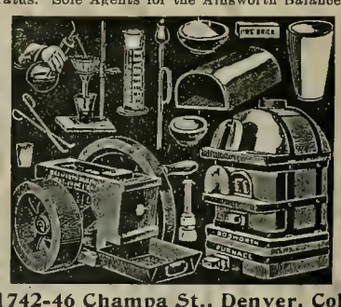

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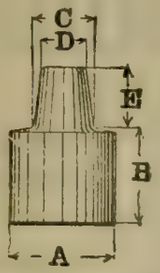

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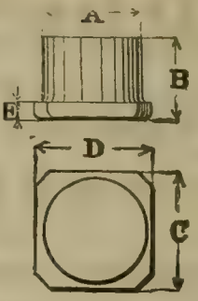

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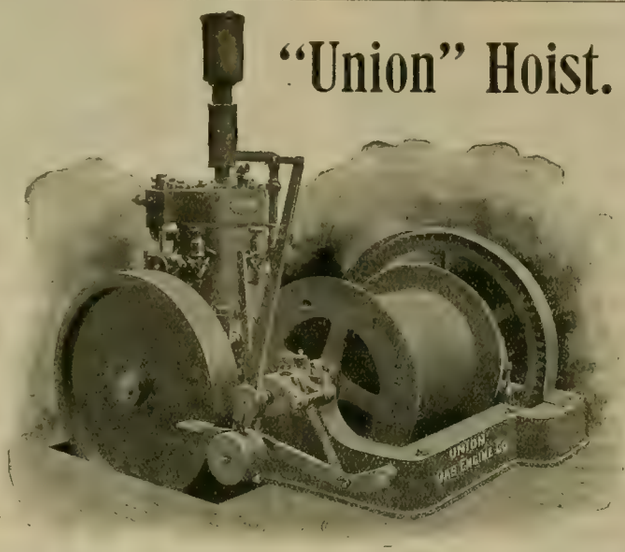

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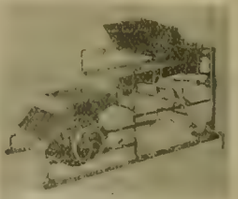

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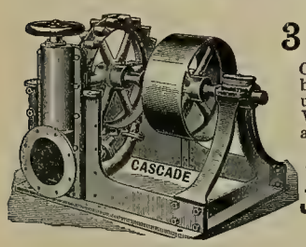

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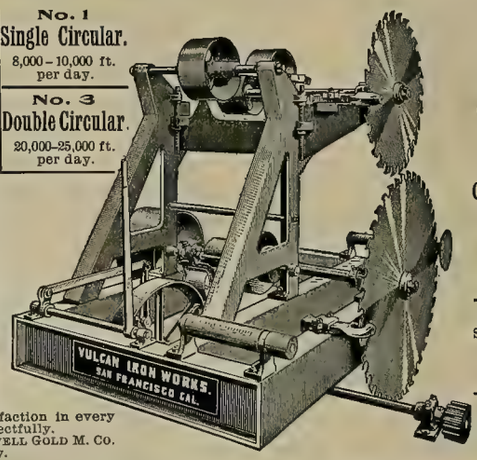

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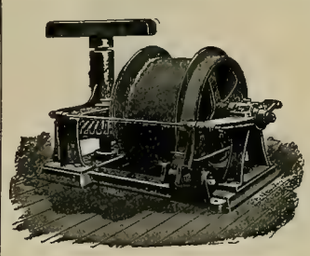

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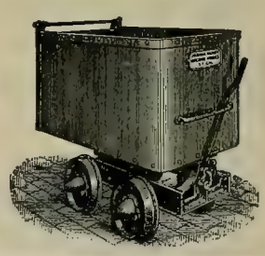

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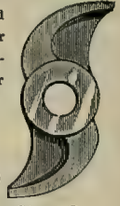

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Any stock upon which this assessment shall remain unpaid on the 6th day of January 1898 will be delinquent and advertised for sale at public auction; and, unless payment is made before will be sold on SATURDAY, the 29th day of January 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

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Office—125 Beale street, city and county of San Francisco, California.

ALTA SILVER MINING COMPANY - Location of principal place of business, San Francisco, California; location of works Go d Hill, Gold Hill Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3d day of December, 1897, an assessment (No 58) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of January, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on FRIDAY, the 28th day of January, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. F. JACOBUS, Secretary.

Office—Room 33, Nevada block, No 309 Montgomery street, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 7th day of December, 1897, an assessment (No. 29) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 69 Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 11th day of January, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 1st day of February, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary

Office—Room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

DELINQUENT SALE NOTICE.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 8) levied on the 28th day of September, 1897, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
A. F. Frey, Trustee	178	4,200	
Balance due.			43 10
A. F. Frey, Trustee	211	100	2 50
R. Z. Johnson	385	1,525	38 13
Emma Rosenbaum	325	1,000	25 00
Emma Rosenbaum	326	300	7 50
Emma Rosenbaum	327	200	5 00
Fr H. Rosenbaum	343	417	10 43

And in accordance with law, and an order from the Board of Directors, made on the 28th day of September, 1897, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, room 44, Phelan building, San Francisco, California, on MONDAY, the 27th day of December, 1897, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

A. F. FREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

Alaska : : Mines.
Developed and Undeveloped Free-Milling Properties.
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JUNEAU..... .....ALASKA.

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Has prospects for sale in Trail Creek and the whole of the Columbia basin. Will buy legitimate stock and mines for investors. Will examine mines. Has lots for sale in Trail and Deer Park

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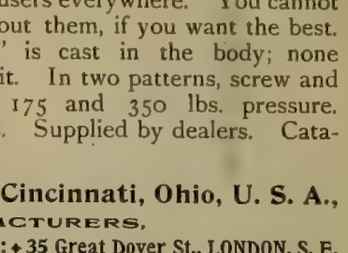

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OFFICE OF GEORGE M. COOLEY,
SAN BERNARDINO, CAL., July 11, 1896.

WEBER GAS & GASOLINE ENGINE CO.,
KANSAS CITY, MO.

GENTLEMEN—I wish to make the following statement regarding the use of distillate in the "Weber" Engine. I connected up my No. 4 "Weber" for distillate, as per your instructions, and find it to be more than satisfactory. In making th test I pumped 108 000 gallons of water at a cost of three-quarters of a cent per 1000 gallons, raising the water sixty-eight feet. This, I think, is a good showing, and one that will make many friends for the "Weber." Yours very truly, GEORGE M. COOLEY.

WEBER GAS AND GASOLINE ENGINE CO.,
430 S. W. Boulevard,.....KANSAS CITY, MO.

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IN THE PAPER READ BY THE MEN WHO BUY WHAT YOU HAVE TO SELL.

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Alta S M Co, Nev	58	10c	Dec 3.	Jan 7.	J E Jacobus, 309 Montgomery
Belcher S M Co, Nev	57	20c	Nov 20.	Dec 24.	Jan 14. C L Perkins, Mills Building
Best & Belcher M Co, Nev	63	25c	Nov 2.	Dec 7.	Dec 28. M Jaffe, 309 Montgomery
Bullion M Co, Nev	51	5c	Dec 17.	Jan 21.	Feb 12. R R Grayson, 331 Pine
Challenge Con M Co, Nev	24	10c	Dec 16.	Jan 19.	Feb 9. C L McCoy, Mills Building
Con Cal & Va M Co, Nev	10	25c	Nov 3.	Dec 8.	Dec 29. A W Havens, 309 Montgomery
Crown Point G & S M Co, Nev	72	20c	Nov 10.	Dec 15.	Jan 5. Jas Newlands, Mills Building
Exchequer M Co, Nev	40	5c	Nov 1.	Dec 6.	Dec 30. C E Elliott, 309 Montgomery
Gould & Curry S M Co, Nev	82	20c	Nov 2.	Dec 7.	Dec 29. A K Durbrow, 309 Montgomery
Hale & Norcross S M Co, Nev	11	10c	Mar 20.	Dec 28.	Jan 18. R R Grayson, 331 Pine
Marguerite G M & M Co, Cal	8	10c	Nov 4.	Dec 13.	Jan 15. F Mettmann, 337 Twelfth
N Gould & Curry G & S Co, Nev	19	10c	Nov 13.	Dec 17.	Jan 3. E W Sichel, 337 Pine
Occidental Con M Co, Nev	29	10c	Dec 7.	Jan 11.	Feb 1. A K Durbrow, 309 Montgomery
Overman S M Co, Nev	78	5c	Nov 17.	Dec 22.	Jan 12. G D Edwards, 414 California
Red Cap M Co, Cal	2	$5	Nov 29.	Jan 6.	Jan 29. H H Martin, 125 Beale
Thorpe M Co, Cal	8	2½c	Sept 28.	Dec 4.	Dec 27. A F Frey, Phelan Building
Union Con S M Co, Nev	55	15c	Dec 6.	Jan 11.	Jan 31. A P Swain, 309 Montgomery
Utah Con S M Co, Nev	26	5c	Dec 2.	Jan 6.	Jan 24. A W Havens, 309 Montgomery

Market Reports.

The Markets.

SAN FRANCISCO, Dec. 23, 1897.

General trade is no different from the holiday weeks of former years. The demand for goods is confined to actual wants, for merchants prefer not to buy much until after the turn of the year. We notice that, considerable goods on which there will be higher freights have been taken by jobbers in expectation that better prices will rule. The prevailing opinion is that large numbers of persons and companies for Alaska will outfit in this city, where cheaper and better supplies can be had owing to our trade being largely with mining districts. With iron workers the opinion prevails that we will get the lion's share of business owing to our foundry men and machine men being better fitted to turn out desired tools and machinery.

The local money market continues to work on easy lines, with funds accumulating, considerable of which is held for disbursement next month. It is quite generally accepted that disbursements in January will be larger than ever before in the corresponding month. Much of this increase will come from dividends by incorporated companies. The disbursements by State, national and municipal authorities in this city will be in excess of former years. The East continues to report easy money markets. It is authoritatively reported that large sums of American funds have been placed in Europe owing to a better rate of interest. This goes far to show the growth of this country in creating wealth.

New York Silver Prices.

NEW YORK, Dec. 23. — Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	25 15-16	56⅛
Saturday	25 15-16	56
Monday	26 1-16	56⅛
Tuesday	26¼	57
Wednesday	26 5-16	57
Thursday	26½	57⅜

	Copper.	Lead.	Iron.	Tin.
Fri.	10 87½@11 00	3 72½	10 00@12 25	13 70
Sat.	10 87½@11 00	3 70	10 00@12 25	13 70
Mon.	10 90 @11 00	3 70	10 00@12 25	13 67½
Tue.	10 90 @11 00	3 72½	10 00@12 25	13 67½
Wed.	10 90 @11 00	3 72½	10 00@12 25	13 65
Thur.	10 90 @11 00	3 70	10 00@12 25	13 65

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	6
Commercial Loans, prime	5
Call Loans gilt edged	4@4½
Call Loans mixed securities	5@6
Mortgages prime, taxes paid by lender	6@8
New York Sight Draft	12½c Prem
New York Telegraphic Transfer	15c Prem
London Bankers' 60 days	$4.83¾
London Merchants	$4.82½
London Sight Bankers	$4.86¼
Refined Silver, per oz. 1000 fine	57⅜
Mexican Dollars nominal	47@—

SILVER.—The market, after settling down to 56 cents per ounce fine, commenced to strengthen. The ups and downs are hard to forecast. They either show the market is being manipulated at London for still higher prices or else the available supply is well concentrated, and any buying demand shows itself in stiffer figures. Good crop prospects in Argentine and also in India may possibly exert a favorable influence on the market, particularly in the latter country, for it points to a better demand. It is rather singular that India and Russia are the only countries that have increased their imports; the others show a falling off. One cause of the increase by the former is that there has been a decided falling off in Council bills. With liberal supplies of the latter, exchange wants are largely met without sending silver there.

MEXICAN DOLLARS.—The market holds to fairly steady prices. The last steamer for China took out over 550,000.

COPPER.—The market has ruled quiet, but steady. The East reports a fairly firm market for the closing weeks of the year.

Our market is quoted as follows:

Ingot casting, jobbing	13 @—
Ingot " wholesale	12½@—
Sheet copper	— @16½
Bolt	¼ and 5-16, 20c; ⅜ and larger, 16½

TIN.—The market is quiet for both pig and plate on spot, but for forward delivery considerable business has passed. The general tendency seems to be to easy figures.

The market is quoted in jobbing lots as follows:

Pig, per lb., jobbing	—@ 15
Plate, I C coke, heavy, per box	$4 10@4 25
" " light, "	4 00@—

SHOT.—The market is steady.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 40
Drop, B and larger sizes, " "	1 65
Buck, Balls and Chilled, do, " "	1 65

POWDER.—There is nothing new to report in our market.

The market is quoted as follows for Hercules: No. 1, from 11¾c to 17¼c, according to strength and quantity; No. 2, from 9 to 11c, according to strength and quantity.

QUICKSILVER.—The past week shipments aggregated 125 flasks to Central America and 200 flasks to Mexico. These are the largest single week shipments for over a year. The market is firm.

Our market is quoted at $39 for domestic consumption and $35@36 for export to the west coast of Mexico.

LEAD.—The market is quiet but steady. The East reports considerable inquiry for round parcels for delivery next year, but buyers' views are below sellers'.

Our market is quoted in jobbing lots as follows per 100 pounds:

Pig	4 75 @	5 00
Sheet	6 30 @	6 80
Pipe	5 60 @	6 10

IRON.—Unless all advices are misleading, the consumption of pig next year on this coast and at the East will be the largest on record. Contract sales for delivery well into 1898 have been made by furnace men at the East.

AMERICAN.

	To Arrive.	Spot.
Sloss	$20 00	$22 00
Thomas	21 00	22 00
Salisbury	29 00	31 50

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

NAILS.—The market is firm at an advance.

We quote the following basis: 20d to 60d, inclusive—wire $2.60, cut $2.50.

COAL.—Suits in the Federal courts against the coal combine have not as yet had any visible effect. The consumption is quite heavy, owing to extreme cold weather.

Receipts of Coal for the week ending Tuesday were as follows in tons. Puget Sound, 11,140; Nanaimo, 3389; Comox, 3810; Newcastle, N. S. W., 5882; Departure Bay, 11,504. Total, 36,225.

COKE.—The consumption promises to be larger next year than it has been this year.

The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	— —	@	— —
" spot, in bulk	11 00	@	— —
" in sacks	12 00	@	— —
Cumberland	10 00	@	— —

PLATINUM.—The market is steady.

Our market is quoted in a jobbing way at $15 per ounce and for scrap $10 an ounce.

BORAX.—Our market is strong. Notwithstanding heavy shipments to the East, New York advices state that supplies are light and market stiff.

The market is quoted as follows:

Refined, in carload lots, in barrels	6
Refined, in carload lots in sacks	5¾
Powdered, in car lots	6¼
Concentrated, "	5½

ZINC.—The market is firm.

Our market is quoted at 10 to 15 cents, according to thickness.

ALUMINUM.—The market is steady.

We quote in jobbing lots at 45 to 50 cents per pound for ingots.

ANTIMONY.—The market is steady.

Our market is quoted at 8¼c in a jobbing way. New York mail advices quote 8c for Cookson's, 7½c for Hallett's and 7c for Japanese.

Chemicals.

The year is going out on a very quiet market, with a light trade reported. It is stated that cheap purchases are well exhausted and new business will be the order early in 1898. When this obtains it is quite likely that stiffer prices will rule. There are no changes reported in anything. Eastern advices report quiet markets, with no change in prices that have been current for some time.

SULPHURIC ACID.—The demand is quiet.

We quote in a jobbing way at 1½c per lb for 66%.

ACETIC ACID.—The market is steady at 6 to 12c per pound from store for carboys, according to make.

NITRIC ACID.—Our market is reported firm from store at 6⅞@7c per pound in carboys.

BONEASH.—There is a slow demand.

Our market is quoted in a jobbing way as follows: Extra, 4c a pound; No. 1, 3½c; No. 2, 2½c.

BLUE VITRIOL.—Our market is steady, with better inquiry.

We quote in a jobbing way at 4c per pound.

SPELTER.—The market is steady.

We quote our market in a jobbing way at 5 cents a pound.

BISMUTH.—The market is firmer.

Our market is quoted in a jobbing way at $1.40 a pound.

SODA ASH, 58% (LeBlanc process).—The market is steady at $1.55 per 100 lbs. in a jobbing way.

CAUSTIC SODA, 60%.—The market is steadier at 3c per pound in a jobbing way.

HYPOSULPHATE OF SODA.—The market is quiet at 2½c a pound from stores.

NITRATE OF SODA. — The market is quiet, with a steadier tone.

Our market is quoted from store at 4c for 95%.

PHOSPHORUS.—The market is steady.

We quote in a jobbing way at 70 to 75 cents per pound.

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